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Technocratic dreams and troublesome beneficiaries

The Sardar Sarovar (Narmada) Project in Gujarat

Guro Aandahl
Centre for Development and the Environment

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Department of Sociology and Human Geography
Faculty of Social Sciences
University of Oslo

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Indian (Gujarati or Hindi) words used in the dissertation:

Adivasi - tribal
Baknari – siphon
Bidi – Indian cigarettes
Chay/*chai* - tea
Chiku – a fruit
Crore – ten million
Desi – Indian, homegrown
Faliu/falia – neighbourhood
Gram sabha – village assembly
Gunta – unit of land equivalent to 1/40 acre
Kaccha – temporary, not solid; about houses: made of mud
Kharif – monsoon season
Lakh – hundred thousand
Mandali - association
Panchayat – village council
Piyat mandali – irrigation association
Pukka – solid, paved, permanent
Rabi – winter season
Sarpanch – leader of village council
Swadeshi – self-reliance
Swaraj – self rule
Talati – village accountant
Taluka – administrative tier below district, subdistrict
Vigha – unit of land equivalent to 0.59 acre
Wallah – a person associated with something
Yatra – procession, pilgrimage

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1. Introduction

In late August 2002, the Ahmedabad edition of *The Indian Express* described the joy of the city dwellers and farmers over the first release of Narmada water into the Sardar Sarovar Project (SSP) canal network:

> "Ahmedabad's residents still haven't stopped celebrating. Every evening, thousands of them drive to the nearest bridge to watch the waters, just as thousands thronged the six bridges across the river last week to watch its watermark rise. And when the BJP – which may well milk the issue for the elections – organised a public celebration on Wednesday, huge crowds turned up to watch the boats, the lamps flowing on the water and the fireworks." (The Indian Express, Ahmedabad, August 30, 2002)

> "The water flowing in the canals has brought the smiles back on farmers' faces in Central Gujarat and parts of Saurashtra. At Kapadwanj, farmers with fields near the main canal woke up to find the water flowing. 'We took out motors from the borewells and ponds and immediately installed them near the canal. I think if the water is there for another month or so we can think of a third crop,' Punjabhai, a farmer said." (The Indian Express, Ahmedabad, August 31, 2002)

After decades of conflict and construction, the promised Narmada water was finally arriving in the drought-prone Indian state of Gujarat. The Irrigation Bypass Tunnel from the Sardar Sarovar reservoir was opened on August 18th, and a couple of days later, the water in the Narmada Main Canal reached the city of Baroda, where it was released into the city's water reservoir, and after less than a week it reached Ahmedabad, the main city of Gujarat. Here, Narmada water was released into the dry Sabarmati River, and Amdavadis flocked to the river, whose flow since the construction of the Dharoi Dam in 1970 had been reduced to a smelly, polluted monsoon-season drain. Newspapers also announced that water would be flown in the SSP Saurashtra Branch Canal and released into rivers, ponds, and other reservoirs alleviating the drought that had plagued the State for the last three years[1].

I started the planning of my PhD research in 2003 based on these joyful news reports, deciding to explore the use and impacts of the Narmada water in the dry North-Gujarat command area. What I had not seen then was a small piece in the Mumbai edition of the *Times of India* of July 15th 2002, reporting that the lack of distribution network would create

[1] "Narmada water is finally flowing through Narmada Bypass Tunnel", announced the Gujarati newspaper *Sandesh* on August 18th 2002, and on August 23rd, *The Indian Express* stated that "Water level in canal rises as Narmada water reaches Baroda. On August 30th, the newspaper reported that "Narmada makes Sabarmati come alive", and on August 31st: "Water in parched Saurashtra at last".

problems for the SSP: "the government still does not know how to take the water to the fields", the paper reported, as the overemphasis on constructing the dam meant the distribution network lagged behind[2]. When I arrived in Gujarat in March 2004, I realised that the original research question might be premature. In North Gujarat in 2004, there was no Narmada water in the canals. I therefore shifted my research sites southwards, to Phase 1 of the project where, according to the SSNNL, the distribution network would be complete before the monsoon. During the course of fieldwork, I reluctantly had to admit that the canals were unlikely to be completed in time for my PhD research. In addition, I struggled to get the information I needed about command area villages and water distribution policies. The officials of the implementing agency, the Sardar Sarovar Narmada Nigam Ltd (SSNNL), were highly sceptical of foreigners expressing interest in the project, assuming that I was an undercover anti-dam activist. And the few officials who were willing to meet me invariably spent the first fifteen minutes of our talk complaining about the ignorance of the resistance movement, the urgent necessity of the project for Gujarat, and the superiority of the Sardar Sarovar Project. Still frustratingly stuck in my old research purpose, I would nod politely and wait them out while taking a mental note of what I was being told as "the same old story". Two meetings made me realise that this was in fact an important part of the story, and one which needed to be told.

The first was my first interview with Professor Yoginder K. Alagh, the leader of the Narmada Planning Group and in many ways the chief planner of the SSP after 1980. I met him in the hope that he could provide a backdoor into the fortress of the SSNNL in Gandhinagar so that I could get the maps and lists I needed. But he described the planning process and the expert planners' enthusiasm and devotion to the project in a way that made me realise some striking similarities with my own background as an environmental activist: these planners seemed to me to be *idealists.* The other meeting that changed the course of my research was with Professor Vidyut Joshi, a sociologist who had been close to the Narmada Planning Group. It was less pleasant; and he gave me the blunt message that I could come back and talk to him *after* I had read all that had been written by the planners and proponents of the project. I never returned to Joshi, but I did look up the literature of the SSP planners, and as a result I changed

[2] "Narmada project may pose several problems", Times of India, Mumbai, July 15th 2002.

my research questions. As I talked to Alagh and read the planning texts, I gradually realised the important role ideas had played in the shaping and defence of the Sardar Sarovar Project, a role until now largely undocumented in the vast literature on the Narmada. The planners and bureaucrats were not simply pursuing a hidden agenda, secretly intending to line their own pockets in the name of 'development', nor were they blindly obeying the decisions of their political leaders. I also came to see the missing distributory canal network not only as a major hindrance for answering my original research questions, but a major hindrance for the realisation of the ideas of the planners, a situation with causes that could be sought also at the village level.

Purpose and research questions

This is a dissertation about changing ideas of 'development'. More precisely, it is a dissertation that uses the case of the controversial Sardar Sarovar Project in Gujarat, India, to explore how ideas matter to development and how reality interferes in the materialisation of ideas. The two overarching research questions that have guided the research are:

1) How did the planners of the Sardar Sarovar Project conceptualise 'development', and how did their ideas influence the project?
   and
2) How and to what extent is the behaviour of the beneficiary farmers and villagers influencing the implementation of the various components of the project?

An extensive body of research exists on the Narmada issue, but these questions remain unasked and unanswered. This dissertation therefore seeks to fill a gap in the existing scholarship on the Narmada issue, which with few exceptions has focused on the issues of resistance and displacement in the Narmada Valley in Madhya Pradesh. The core of the dissertation covers the planning period from 1980 till today, from the establishment of the Narmada Planning Group after the Award of the Narmada Water Disputes Tribunal which ended an inter-state conflict that had lasted for decades. However, I also cover more briefly the history of the project since its inception after Independence. A historical approach is required to properly understand how the project changes over time. I further explore how ideas are put to practice by following the SSP canals and water to the villages. The complex

natural and social environments of rural Gujarat will affect both the way the project is implemented and the future impacts of the water on socio-economic well-being. And ideas about the Indian village community are affecting the strategies and policies of the Sardar Sarovar Project.

The Sardar Sarovar Project in brief

The Sardar Sarovar Project (SSP) is part of a larger plan to build several dams on the river Narmada and its tributaries. The river runs westwards from the hills of Madhya Pradesh in Central India to the Arabian sea at the Gulf of Khambhat in Gujarat, passing briefly through the northern tip of Maharashtra on the way. The Sardar Sarovar Dam is the terminal dam on the river, one of the thirty large dams proposed, and is a project of the Government of Gujarat. It is a multipurpose project, aimed at providing irrigation, power, and water for drinking and industrial use, and it has been the target of one of the strongest social movements of India. Submerging around 38,000 hectares of land and 244 villages in the river valley, the reservoir is intended to provide irrigation water for 1.8 million hectares of land and 3,360 villages in Gujarat and Rajasthan. The numbers of displaced families and persons vary, the current government figures are 48,269 families[3] to be resettled, while the resistance movement claims that more than 320,000 persons will be displaced and that the numbers of negatively affected people reach a million when including those displaced by the canal system and allied projects[4].

The Narmada conflict centred on the first dam to be built, the Sardar Sarovar Project, and it attained international proportions. The opposition movement, the Narmada Bachao Andolan, and its leader, Medha Patkar, are now world famous. I was active in the Norwegian environmental movement for nearly ten years, and in the early 1990s, we mobilised against the "Narmada dam", as did numerous environmental organisations across the Western world[5]. The opposition succeeded on many fronts; it led to the cancellation of the World Bank loan

[3] Number of persons is not provided, only of families, as it is to families that compensation is given (www.nca.gov.in). If we assume an average family size of five persons, this would mean an official estimate of around 250,000 persons displaced.
[4] www.narmada.org
[5] I was not particularly involved in the dam issue myself, but the damming of rivers was one of the many issues we mobilised against, in Norway as well as by supporting struggles for rivers abroad.

funding the SSP, it changed World Bank lending policies for large infrastructure projects, and it halted the completion of the SSP for several years, among other things through a five year stand-still of construction during a public interest litigation case in the Supreme Court of India. But the Government of India and the Government of Gujarat have not yielded to the pressure, and the project is slowly being realised.

Human geography, dams, and development

Disciplines provide frames and perspectives for understanding social problems. A human geographical perspective emphasises context and the interconnectedness of social and natural processes operating at different spatial scales. The dissertation will show for example how the local and the global scale are interconnected, and how nature and society interact. As a human geographer, I am driven by the wish to explain a particular problem, rather than refine and test a set of theories. My primary aim is to explain and make sense of a case that is interesting in and of itself – the Sardar Sarovar Project, arguably one of the most controversial development projects of the twentieth century. For this purpose, I draw on a range of theories, guided by the needs for explanation emerging from the empirical findings of the research. Through a contextualised analysis of the SSP and empirically grounded theoretical discussions, I hope also to contribute to a deeper understanding of the broader issue of development challenges and development conflicts.

Dams and/or canal irrigation have been the research object for human geographers with other aims than mine. Some analyse dams as material and spatial expressions of modernity (Kaika 2006; Swyngedouw 2007), others with a more political geography approach focus on the social movements against dams (Routledge 2003). My approach is guided by a concern for 'development' and the aim of the study is to contextualise the Sardar Sarovar Project within the history of thinking about, and doing, 'development'. This can in turn contribute to a reflexivity within both development geography and the broader field of development studies.

I occasionally use the term 'discourse' when describing how 'development' has been conceptualised, practised and contested over time, but this thesis is not a "discourse analysis" in its specific sense as an analytical tool and methodological approach based on a poststructural philosophy of language and texts. By 'discourse' I mean a way of talking about

a phenomenon and an understanding grounded in a set of ideas or beliefs sometimes unquestioned or taken as common sense[6]. Discourses include "assumptions, values, judgements, and contentions that provide the basic terms for analyses and debates, influencing both agreements and disagreements" (Leichenko and O'Brien 2008:14). While I recognise that ideas are connected to one's position in society, and that hegemonic ideas are likely to be related, in some way or another, to the interests of ruling and dominant classes in society, the question of ideas of development cannot simply be reduced to the vested self-interests of the ruling class. Indeed, in increasingly complex economies and societies, it is difficult in itself to identify *the* ruling class. The main aim of the dissertation is not to explain where hegemonic ideas come from and how and why they change, but to show that they exist, that they guide the vision of development practicioners, and that their changes have impacts on the choice of development strategies and policies, including projects like the SSP.

Outline of the dissertation

The dissertation is in three parts, and ends with a concluding chapter drawing the lines from the different parts together. Part One, *Water, dams and development: From TVA to WCD*, frames the study and provides necessary background information on the Sardar Sarovar Project and the conflict it caused.

Chapter 2 provides a historical perspective on hydraulic engineering and its role in development. This chapter sets the stage for the subsequent analysis by presenting and discussing how dams and other human interventions in the flow of rivers have been understood, and how this has changed over the course of the twentieth century with a communitarian and environmental turn taking place in the 1980s, whereby the technological optimism of the age of modernisation was seriously challenged. Chapter 3 presents the hydrological landscape of Gujarat, a predominantly semi-arid and arid region of India. Droughts have been recurring phenomena in Gujarat, in colonial and pre-colonial times frequently leading to famines. The chapter briefly presents the different irrigation

[6] An alternative term when discussing changing views of development could have been "paradigm". However, this term carries with it connotations to Kuhn's theory of scientific revolutions in the natural sciences, and paradigm shifts through which the old order of 'normal science' breaks down and a new scientfic truth emerges, and this does not describe the evolution of social science and development studies very well (Nederveen Pieterse 2001).

technologies that have been used in the region since early pre-colonial times, and the colonial and post-colonial irrigation policies.

Chapter 4 outlines the history of the Sardar Sarovar Project from the inception of the idea of damming the Narmada to the years after the cancellation of the World Bank loan. It describes the major events in the project leading up to the Award of the Narmada Water Disputes Tribunal in 1979, the rising opposition to the project in the 1980s and 1990s, and the financial impacts of the cancellation of the World Bank loan. Chapter 5 situates the Sardar Sarovar Project and the Narmada conflict in the international debate about big dams, and presents in more detail than Chapter 2 the arguments of the anti-dam movement. The chapter furthermore presents the approaches and conclusions of the existing academic scholarship on the Narmada, which has focused almost exclusively on the opposition to the dam and the issue of displacement. Chapter 6 concludes Part One with an outline of the methodology applied in this study.

Part Two, *The Sardar Sarovar Project and changing ideas of development,* is an analysis of the ideas and perspectives of the planners of the Sardar Sarovar Project, as they are revealed in and between the lines of the texts they wrote, and in interviews with me. Chapter 7 presents the hegemonic development ideas of large parts of the twentieth century: development as state-led industrialisation and modernisation, and the challenges to this development approach from the 1970s onwards. Chapter 8 is an analysis of the plans and planning approach of the Sardar Sarovar Project, and how it was influenced by the growing strength of the opposition movement and the changing conceptions of 'development'. It ends with a discussion of the role of ideas versus vested interests in policy making.

In Part Three, *Implementation and the politics beyond planning*, I follow the Sardar Sarovar canals and the Narmada water to the villages. I explore the politics beyond planning through a case study of two villages in Central Gujarat, one in a backward region of the command area, and another outside the command area but nevertheless benefiting through illegal siphoning of canal water and the recharge of groundwater. In Chapter 9, I present the two case villages through a brief discussion of the question of the question "does irrigation trickle down?" Chapter 10 explores the reception of the SSP in the command area, and Chapter 11 discusses the reasons for the problems experienced in implementing the project. Chapter 12 adds more

complexity to the implementation issue by exploring water as a political and unwieldy resource in a village that is collectively ‘stealing’ Narmada water from the Main Canal.

The Conclusion summarises and concludes the dissertation.

Part One.
Dams and development: From TVA to the World Commission on Dams

2. Dams and development in a historical perspective

Large dams have become important symbolic structures in the development debate, as they have come to embody meanings and values that extend beyond the mere physical storage of water. This chapter will outline the major issues involved in the dam and irrigation debate, through a historical perspective that moves backwards from the TVA to pre-colonial Indian water engineering.

America, TVA and the Prototypical Development Project

"This is a book about tomorrow."

These are the opening words of David A. Lilienthal's 1944 book "TVA: Democracy on the March", a passionate description of the ideology and achievements of the Tennessee Valley Authority, mostly known through its acronym, the "TVA". Written during the Second World War, the book expresses firm hope and belief that democracy can be adapted to the "machine age". "I believe in the great potentialities for wellbeing of the machine and technology and science;" writes Lilienthal, "and though they do hold a real threat of enslavement and frustration for the human spirit, I believe those dangers can be averted" (1944:xii).

Lilienthal, or "Mr TVA", was the co-director and first chairman of the TVA, and is considered the chief ideologist of the project (Ekbladh 2002). The TVA was a cornerstone of President Franklin D. Roosevelt's New Deal Program to stimulate the economy after the Great Depression. It was initiated in 1933 as a comprehensive river-planning scheme under a single authority, the Tennessee Valley Authority. The single authority, the regional development corporation, was a novel feature in American planning. It was given the responsibility by the Congress to develop all resources in a region, or in the words of Lilienthal: "idle resources were to be set to work – rivers, land, minerals, forests" (1944:170). The Tennessee River, a tributary to the Mississippi, ran through the Tennessee Valley which spanned the states of Kentucky, Tennessee, Mississippi, Alabama, Georgia, North Carolina, and Virginia in the south-east part of the USA. This was a poor agricultural region based on relatively small farms (on average 75 acres) and low-productivity cultivation of corn and

cotton (Lilienthal 1944). The Tennessee River was not navigable, and prone to destructive floods. The TVA involved the construction of sixteen new dams and the improvement of five old ones, with the aim of controlling the floods of the river and produce electricity for households, farms, and factories. The dams turned the wild river into a navigable waterway for transportation of manufactured goods and farm produce, and into artificial lakes with opportunities for fishing and recreation. Lilienthal (1944:12) describes the progress achieved: the river had become a "highway that is carrying huge amounts of freight," up and down the channel moved "huge modern towboats, powered by great Diesel engines," "quiet cotton towns of yesterday" had become busy river ports, and "thousands of new pleasure craft of every kind – costly yachts, sailboats, homemade skiffs" sailed on the new lakes.

The dams on the river displaced more than 8000 farm families[7] who were offered the choice between cash compensation or a new farm. Almost no one chose cash compensation (Lilienthal 1944). Even cemetaries were dug up and the graves moved to places selected by the local communities and churches. Attention to this detail, writes Lilienthal, "has had much to do with the confidence in the TVA's technical leadership and in its technicians that one finds today so firmly fixed in the minds of many people in this valley" (1944:63). A new town, Norris, was built for displaced people and for workers of the TVA. Norris was a planned, modern community. It was completely electrified, and the government provided adult education, a collective dairy, experimental farms, cooperative workshops, an innovative school for children, a community cooperative store, and a meeting hall (Macy and Bonnemaison 2003). The domination of collective enterprises and services made Norris and the TVA an innovation in the United States, and was also the source of fierce criticism from those who saw this as a socialist experiment and a danger to the free enterprising spirit of capitalism[8].

The combination of high-tech scientific planning with grass-roots democracy was one of the main ideas in the TVA philosophy. A decentralised management structure, cooperative management and decision-making in electricity production, demonstration farms showing

[7] Another estimate is that 50,000 persons were displaced by the construction projects of the TVA (Ekbladh 2002).

[8] In Europe, British ideas about a Danube Valley Authority modelled on the TVA was met with strong opposition from Friedrich Hayek, "an eloquent foe of planning" (Ekbladh 2002:347).

farmers the latest in modern farming methods, and grass-roots based Farm Improvement Associations for knowledge sharing were among the features intended to achieve true grass-roots participation in and control of technological development (Lilienthal 1944)[9].

The aim of the development of the Tennessee Valley, as envisioned by Lilienthal, was not only material prosperity, industrialisation, and navigable waterways. This was a modernisation project aimed at a deeper transformation of the outlook of men. It would release them from fatalism and hopelessness. The modernisation process would unleash man's technical and entrepreneurial skills and abilities. The hands-on experience with the possibilities opened up by science would make people demand "the fruits of technology and resources" (Lilienthal 1944:3). This demand is "the real revolution of our time," writes Lilienthal:

> "No longer do men look upon poverty as inevitable, nor think that drudgery, disease, filth, famine, floods, and physical exhaustion are visitations of the devil or punishment by a deity." (1944:3)

A crucial part of this ideology is the possibility for, and indeed necessity of, the human transformation of and control over nature:

> "[This] is a story of how waters once wasted and destructive have been controlled and now work, night and day, creating electric energy to lighten the burden of human drudgery." (Lilienthal 1944:1)

The Tennessee River before the TVA was an "idle giant and a destructive one" wrote Lilienthal; with the TVA it was "put to work for the people" (1944:3).

Tennessee was not the only American river to be put to work for the people. The Tennessee Valley has a humid temperate climate, and hydraulic engineering of the Tennessee River therefore focused on electric power, navigation, and flood control, and not irrigation. The

[9]In reality, there was little difference between the TVA and conventional agricultural extension services, and participation was limited by both income and race, excluding the poorer and African-American farmers. The Fordist price policy of the power cooperatives has been deemed a success; it increased electricity consumption by making it affordable to more people. On the other hand, the plan for people's participation in power-policy making was harder to realise (Ekbladh 2002). Some studies of the social impacts of the TVA emphasise how the TVA failed to create a broad and inclusive economic growth process. A profound critique of the TVA from 1984, William Chandler's *The Myth of TVA* showed that economic development and people's well-being was not better in the TVA-region than in adjoining non-TVA areas. Although aimed at improving the livelihoods of poor small farmers in one of the poorest regions of the USA, critical scholars maintain that the benefits mainly went to richer farmers and commercial interests. There was little the TVA could do to offset a national trend towards larger farms and mechanized agriculture (Chandler 1984).

Western states of the USA, on the other hand, are arid and semi-arid, and the waters of Western rivers were needed to make deserts bloom and to amplify the resources necessary for larger human populations. The Hoover dam, which with its 221 meter height of elegantly curved concrete holds back the torrents of the Colorado River at Boulder Canyon, was completed in 1935 after an impressively short construction period; it took less than six years from the initial excavations to the first Watt of power produced (Reisner 1993). The cities, orchards and farms of states such as California, Arizona and Utah are based on water from the Colorado and other dammed and diverted rivers (Worster 1985; Reisner 1993). In addition to the many large TVA dams, it was the dams of the arid American West which heralded the beginning of the "big-dam era" in the USA in the 1930s (Khagram 2004).

Metaphors of modern irrigation

The founding ideas of hydraulic engineering can be traced back to the European Enlightenment of the 18th century. This is the period to which the scientific revolutions of the 19th century owe much of their existence, a period characterized by optimism and belief in the victory of human rationality and scientific progress over superstition and tradition (Worster 1985; Scott 1998; Nanda 2003). This period laid the foundations for what we call 'modernity', for economic capitalism and for later political philosophies like communism and liberalism. A central part of the Enlightenment, which became important for modernism, was a reorientation of the relationship between humans and nature, towards efforts to control more of the risks and unpredictabilities of nature, and to find the means to convert nature into resources for human use (Worster 1985; Scott 1998). This *instrumental* valuation of nature is also visible in the language used to describe nature. Lilienthal's words are clear expressions of this instrumentalism.

The instrumentalism was also reflected in the language and metaphors of engineering in general. The term 'command area' of an irrigation system has connotations to the control over land brought about by control of water and the 'command' of man-made irrigation systems (Gilmartin 1998; 2003). Gilmartin (2003) quotes an article on the Cooper's Hill College of Engineering from 1883 which describes how the college gave its students not only technical education, but 'moral training' and 'discipline' to prepare them for 'victorious success'. The victorious success would be in "'subduing' nature, and turning its products into 'resources'

that could be used for purposes of production" (Gilmartin 2003:3). The standard measure of irrigation efficiency[10] was the term 'the duty of water', a term adopted from the measurement of the efficiency of steam engines (Gilmartin 2003). One may read into the term connotations of a moral mission ascribed to natural resources, a *duty* to ensure crop productivity for human consumption. The name of the federal US agency for irrigation and dam construction, the "Bureau of Reclamation", also carries with it connotations of human control over nature. By bringing water to arid areas, humans are '*re*claiming' parts of nature which rightfully belong to human production and consumption, but by some oddity of nature have been taken away from us.

As we shall see later, this instrumental valuation met a growing critique towards the end of the 20th century. Environmental historian Donald Worster is one of the critics. With modernity, writes Worster (1985), nature is for the first time stripped of all instrinsic value; it is disenchanted, demystified, and left defenseless against human utilitarian exploitation. This is the dark side of the Enlightenment, he argues, "science and its imperial project to reduce nature to facts and master it" (1985:57). Worster represents another view of nature, in which nature has soul and needs, in which it has not a moral *duty* to increase human consumption, but makes moral *claims* on humans:

> "Liberated reason can reveal what a river or a valley needs for its own realization, what values it may have beyond serving as a means to profit or amusement, what moral claims it makes on humans." (Worster 1985)

This will make possible a more democratic and humanly fulfilling social order, he argues, implying that the liberation of nature from the control of humans will also liberate people from being controlled by other people.

The gap in worldview and view of nature comes out clearly by contrasting Worster's words with David Lilienthal's. The description of a river with needs and moral claims stands in stark contrast to David Lilienthal's description of rivers forty years earlier. To Lilienthal, the wild, untamed river was the prison; it constrained both the physical and mental life of men. An instrumental view of nature and a certain amount of technological optimism or even hubris is necessary to liberate humans from the constraints of nature.

[10] How many acres of land can be irrigated by a unit of water.

A model for foreign assistance

The TVA story is the story of a hegemonic model of development which was vigorously exported to newly independent states all over the Third World after the Second World War. In the words of James Scott, the TVA was "the granddaddy of all regional development projects", and central for the American agricultural modernism which was the ruling development ideology in the three decades between 1945 and 1975 (Scott 1998). Lilienthal had promoted the universal application of the TVA in his book, describing idle and destructive rivers in countries as diverse as Czechoslovakia, Sweden, Brazil, and India and the "thousand valleys of the earth where each year people live under the shadow of fear" (1944:13). His vision was shared by President Harold Truman who explained the meaning of his bold new program for development with reference to the TVA in 1949: "I see immense undeveloped rivers and valleys all over the world that would make TVAs. (…) All it needs (…) is somebody who knows the technical approach to their development" (quoted in Ekbladh 2002:349).

The ideas of the TVA caught the attention of the world. Lilienthal's book was translated into other languages and widely read (Ekbladh 2002). TVA staff later joined the new development and international organisations established after the war: The World Bank, various UN agencies, and the USAID (Scott 1998). In "Democracy on the march", Lilienthal claims that the TVA "speaks in a tongue that is universal, a language of *things close to the lives of people*":

> "No English interpreter is needed when a Chinese or a Peruvian sees this series of working dams, or electricity flowing into a simple farmhouse, or acres that phosphate has brought back to life. For it is not really Norris Dam on a Tennessee stream or a farm in Georgia that he sees, but a river, a valley, a farm in China or Peru. The changes that are taking place here are much the same as those which men all over the world are seeking." (Lilienthal 1944:204-205)

Lilienthal himself travelled the world as a consultant on comprehensive river planning in the decades after the War. The newly established World Bank funded many of these dams in the newly independent states, and the TVA ideas were influential also in the Bank. The Cold War context made the grass-roots model of the TVA particularly important for convincing the newly independent Third World states that development, scientific planning and social engineering was possible without communism and Soviet-style planning (Ekbladh 2002).

Over 2000 visitors came annually to the TVA by the 1950s (Ekbladh 2002). The leaders of independent India, too, were among those who sought technical advice from the USA for dam building and comprehensive river planning. A guided tour of the TVA and a meeting with Lilienthal was part of the program on Prime Minister Jawaharlal Nehru's first visit to the USA in October 1949. Lilienthal was invited on a return visit to India, which took place in 1951 (Rangachari 2006). The Damodar Valley Corporation (DVC) in Eastern India, established in 1948, was modelled directly on the TVA, and ideas of comprehensive planning of river basins resonated well with the ruling development ideas in Independent India, centred as they were around a strategy of central, technocratic planning for development, as will be discussed in more detail in Chapter 7 and Chapter 8).

From TVA to Sardar Sarovar

TVA-style basin-wide planning of the Damodar River Valley was adopted by India before the adoption of a federal Constitution in January 1950. The Constitution established that water is a State subject, but that regulation and development of inter-state rivers and river valleys are Union (i.e. Central) subjects (Iyer 2003). After the DVC, India abandoned the model of river-basin authorities vested with management powers, because "most States were apprehensive of their own powers being eroded" (Iyer 2003:69). It is therefore not in the centralised *basin-wide* planning and management model we find the main significance of the TVA for Indian river policies up to the Sardar Sarovar Project, although it was attempted in the DVC. Rather the significance lies in the *ideas* so vividly expressed by Lilienthal and the ease with which these ideas about natural-resource development travelled the world. It also lies in the way the TVA illustrates the centrality of *technological exploitation of water resources* in twentieth-century development strategies (as seen in the statement by Harold Truman), and the pivotal role of the *state* and *state planning* in these development strategies. And it lies in the symbolic value of the 'TVA' for normative positions in the development debate: the project is by some seen as a prime example of the hubris and failure of technological approaches to development (for example Chandler 1984; McCully 2001), while others in it find inspiration and a source of optimism about solutions to the new social and environmental challenges facing us in the 21st century. Examples of the last position are the architects Christine Macy and Sarah Bonnemaison:

> ”As architects, we believe in taking ideas developed in the past and making them work for us today. If the experiment of the TVA is inspiring, it is because it had a vision of creating entire towns based on cooperative living and using electricity generated by the force of flowing water. Today, the equivalent would be for the government to subsidize the building of new communities that would run on solar and wind power and have communal greenhouses as treatment plants for sewage and community gardens.”(Macy and Bonnemaison 2003:8-9)

Another direct parallell between the TVA and the SSP is the idea of combining expert planning with cooperative management.

The importance of British India

The literature on big dams and river projects tends to present this as a 20th century phenomenon fuelled by US model dams, US expertise and business interests, and World Bank promotion of big dams in the Third World[11]. However, 75 years earlier the educational journey for hydraulic engineers and water developers had gone in the other direction; they travelled from the USA to the British colonies, in particular to India.

When the USA set out to expand the settlement of its Western frontier through the control of water in the second half of the 19th century, U.S. irrigation engineering was characterised by piecemeal development carried out by competing private interests, and seriously lacking in technique and comprehensive planning (Worster 1985). In 1875, engineer George Davidson was therefore sent on a federal mission to areas of the world were the technology was more developed: China, India, Egypt and Italy. “What he saw, especially in India,” writes environmental historian Donald Worster, “fairly took his breath away: audacious engineering, monumental designs, works grander than the pyramids, a grace and sophistication of technique that made the American efforts seem shabby and amateurish” (1985:148). Fifteen years later, in 1890, Herbert Wilson from John Wesley Powell’s irrigation survey went to India “to see how things really ought to be done” (Worster 1985:148). Indian irrigation efficiency was far better than American, irrigating around three times as much land per unit of water as in the USA. Wilson wrote a two-hundred-page report on the British-Indian model, claiming that “India stands pre-eminent for her gigantic engineering undertakings” (Worster 1985).

[11] An example is Khagram (2004).

The lessons from British India and Egypt taught American engineers and scientists that a central planning agency was necessary for optimal utilization of river water resources, and they demanded a central, federal agency which could plan and carry out large irrigation projects in the West. In 1902, after the passing of a National Reclamation Act, a federal Reclamation Service within the Geological Survey of America was set up for the Western states of the USA. The Reclamation Service became independent in 1907 and was renamed the Bureau of Reclamation in 1923 (Worster 1985). Its mission is still "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public"[12].

"North-West India was one of the great experimental centres for irrigation engineering in the late 19th century," writes historian David Gilmartin (2003) who demonstrates how the profession of engineering in Britain has important colonial roots. The East India Company had invested in several irrigation projects under the leadership of engineers trained at a military college. With the construction of the Ganges canal in the 1840s, there was a growing demand for irrigation engineers, and this was a direct cause for the establishment of a College of Civil Engineering at Roorkee in Saharanpur district in the United Provinces, educating both Indian and British irrigation engineers. Another civil college was founded in 1871 at Cooper's Hill in England and funded by the Government of India (Gilmartin 2003).

The British concentrated their canal projects on the Indus River in Punjab, the Ganges and Yamuna Rivers in the western United Provinces and the Kaveri in the Madras Presidency. The great Ganges Canal was first envisaged in 1836, but plans were shelved and then resumed in 1839 after the severe famine of 1837-8 (Stone 1984). Construction of the Ganges Canal started in 1843, and it was fully operational in 1857. It was the largest canal in the world, spanning 563 kilometres from Haridwar to Kanpur, and with a total network of more than a thousand kilometres of main and branch canals. Later, the British constructed canals in Punjab and Sindh, and most of these canals were built between 1880 and 1900 (Stone 1984).

By the late 1930s, the largest irrigated area by government canal works was in Punjab (12.3 million acres), followed by Madras (7.2 million acres), UP (5.3 million acres) and Sindh (4.7

[12] http://www.usbr.gov/main/about/mission.html Accessed 31.1.2008.

million acres). In addition, a total of 2 million acres were irrigated by government canals in Bihar, the North-West Frontier Provinces, Orissa, and Bombay (Stone 1984).

The colonial impact on Indian agriculture

Views on the importance of dam and canal irrigation in today's India are related to views on the impacts of canal irrigation in Colonial India. A brief review of the positions in this debate is therefore useful as a background for a study of the Sardar Sarovar Project. The views on colonialism differ both in the interpretations of the *intentions* and the *effects* of British colonial policies. I will get back to these questions after a brief presentation of pre-colonial irrigation techniques in the sub-continent and the associated risks.

Indian pre-colonial water technologies: managing rain, rivers and ground water

Water management has always been important in arid and semi-arid parts of the Indian sub-continent. The specific climate, topography, hydrology, and soil conditions in different parts of the subcontinent gave rise to different forms of water management techniques from ancient times.

In South and Central India, tank irrigation was widespread. Tank irrigation involves an interlinked system of crescent-shaped dams or bunds built across the natural drainage paths of the monsoon rain water. These systems cover large areas and were developed through trial and error throughout the centuries of different South Indian kingdoms and rulers (Mosse 2003). The British officers of the East India Company who came to South India in the 18th century noted that the tank irrigation system was intricate and elaborate. In the words of British administrator Thomas Munro, there was "scarcely any place where a tank can be made to advantage that has not already been applied to this purpose by the inhabitants" (quoted in Mosse 2003:31). The tanks collect rainwater, and were managed by one or several villages. Water stored in the tanks was used for irrigation and also percolated into the ground water and recharged wells, although well irrigation seems to have been of minor importance (Mosse 2003). Decisions on the distribution of the tank water were taken at the village level. However, because the position, height, and maintenance of each tank had implications for tanks and villages both above and below it in the drainage flow, a political superstructure was needed (Mosse 2001).

In North India, pre-colonial agriculture was largely rain-fed or used groundwater resources from open wells. However, both the Mughal and the Sikh rulers of the Indus and Ganges basins had developed large canal systems which diverted water from the rivers in times of peak flows, so-called inundation canals (Stone 1984; Gilmartin 1998). Agriculture was not the sole or even main purpose for all these canals, but the watering of the Mughal palace gardens and hunting grounds (Whitcombe 1972; Stone 1984). Some parts of Sindh, in today's Pakistan, does not get any monsoon rain, and therefore depended entirely on the annual floods of the Indus River for water. Here, the Muslim Amir rulers orchestrated the construction and maintenance of natural and man-made inundation canals which followed the contours of the land (Perera 2003). The rulers had the power to summon forced labour for the task of silt removal from the inundation canals. Crops received water either by lifting through "Persian wheels" operated by labourers or cattle, by gravity when the canal was full, or by being cultivated on river bed land when the floods receded (Perera 2003). In Western India, Saurashtra and Gujarat, well irrigation was the most common form of irrigation, as will be described in more detail in Chapter 3.

Despite the relatively widespread use of diverted river water in North India, rainfall and well water were the most important sources of irrigation for both pre-colonial and colonial North India. Colonel Baird Smith, who prepared a report for the British Famine Commission in 1862, estimated that in 1860-1, out of the total cultivated area of twenty-four million acres in the North-West Provinces, three to four million acres were irrigated by wells and only one million acres were irrigated by canals (Whitcombe 1972). As we have seen, in pre-colonial South India, irrigation by tanks was more important than by wells, but the tank systems also served to recharge ground water and thereby support additional well irrigation (Mosse 2003).

Monsoon agriculture and risk

Agriculture in a monsoon climate is risky and unpredictable. The traditional methods of irrigation described above improved human control over parts of the hydrological cycle while at the same time increasing the risk of certain damages. The interlinked hydrological system of tanks in South India increased the risk of flood damage in case of heavy rains. When continued heavy rainfall breached the embankments of a tank in the upper parts of the system, the floods cascaded down the tanks with a domino effect and caused serious damage to life

and property (Mosse 2003). In years of failed monsoons, the rain-based tank system could not provide protection from droughts. "The endemic condition of unpredictability and scarcity in the tank-irrigated regions [of Tamil Nadu[13]] resulted in intensive famine and emigration to neighbouring districts throughout the eighteenth and nineteenth centuries," writes Mosse (2003:35). The inundation-canal-based agriculture in Sindh was likewise risky and unpredictable. Crops cultivated on river beds on receding floods ran the risk of being washed away if the river re-flooded; and crops depending on gravity flow from a full canal could whither when the water level suddenly dropped (Perera 2003). Rainfall and well-based agriculture of the North-Western Provinces was vulnerable to failed and erratic rainfall, and farmers tried to spread the risk of total crop failure by diversifying the crops planted in each field; they planted crops with different needs of water amount and water timing in the same field to ensure that at least one crop stood the chance of surviving (Whitcombe 1972). If the rains failed completely, only irrigation could save the crops.

Colonial canal construction: Famine prevention or exploitation?

There were several reasons for British expansion of canal irrigation in India, and to disentangle and attribute weight to the different intentions behind political decisions is complicated. Usually, there is a mixture of different interests, intentions, and political considerations that brings forth a certain set of policies. On the one hand, the British clearly had selfish interests in India. The main aim of colonialism and imperialism was the accumulation of wealth and power. India was a major source of raw materials for the industrialisation of Britain. The destruction of the Indian weaving industry is only one example of the damaging effects of British rule on the local economy. The reason for the construction of irrigation canals is also frequently attributed to exploitative intentions. Irrigated land was a source of revenue for Britain both through taxes, which were higher on irrigated land, and through export earnings from cash crops like indigo, cotton, and sugarcane which needs assured and plentiful water supply. The first British canals were therefore so-called "productive" irrigation canals, intended to generate revenue large enough to cover the interest on their cost of investment. With this policy, the construction of dams and canals in

[13] The regions in Mosse's study are Ramnad and Sivaganga.

many regions were deemed uneconomical, f.ex. in the famine-prone Bombay Deccan (Attwood 2005).

However, there were also humanitarian considerations behind canal construction. The occurrence of a severe famine in North India in 1837-8 was the main reason for the reopening of the then shelved plans for the Ganges Canal (Stone 1984). Engineer James Thomason, founder of the Thomason College of Civil Engineering at Roorkee, claimed in 1851 that "The government has embarked with all the energies it can command in the noble work of improving the condition of the people and developing the resources of the country" (quoted in Gilmartin 2003:1). Later, the drought of 1876-79 caused a terrible famine with an estimated death toll of 6-10 million people in the Madras Presidency, the Bombay Deccan, and the North-West Provinces (Davis 2001). A Famine Commission was established after this, and its report of 1880 advocated the construction of protective irrigation works to prevent the devastating effects of drought in the future (Davis 2001). A liberal irrigation lobby in England, led by among others Sir Arthur Cotton and Florence Nightingale, played an important role for the establishment of this famine commission[14]. This group advocated a more humane colonial policy and a priority of irrigation investment over railway investment, as well as spending on public health and removal of the salt tax (Davis 2001). Other recommendations of the Famine Commissions were the construction of railways to facilitate the transport of food grains from surplus to deficit areas, and a set of Famine Codes which were adminstrative guidelines for early warning systems and relief provisions in the case of crop failure and impending food shortage[15] (Banik 2007). The main logic of British famine prevention policies was to ensure purchasing power in drought affected areas by providing public work projects, and facilitating private trade in grains by providing transport infrastructure (Drèze 1995). However, the relief provisions given by the government were quite stingy, and the level of wages paid for relief work was extremely low (Drèze 1995). Drèze quotes a circular of the Government of India from 1883 which stated that "while the

[14] Davis quotes historian Brennan who quotes a letter from the Secretary of state for India, Lord Salisbury, to Viceroy Lytton in 1877: "Strachey will also explain to you what I have talked a good deal to him about – the necessity of some commission on Famine measures in the future, in order to save ourselves from the Irrigation quacks. They will undoubtedly make a strong fight: for I observe that under the Presidency of Cotton, they have been beginning some sort of League … for the Parliamentary campaign" (quoted in Davis 2001:57).
[15] The Famine Codes were established in 1883 (Banik 2007).

duty of the Government is to save life, it is not bound to maintain the labouring community at its normal level of comfort" (1995:154).

In short, the comprehensive and centralised irrigation planning which so impressed the Americans towards the end of the 19th century had been developed as a result of several factors. Political, economic, technological, and humanitarian factors combined to give an impetus to hydraulic engineering works in India. Several famines and the Mutiny of 1857 made the British government see irrigation as a means of preventing social unrest (Whitcombe 1972; Stone 1984); the cultivation of cash crops for export presupposed assured water supply; scientific developments in mathematics opened new possibilities in hydraulic engineering; and the new engineering possibilities empowered the state to control larger units of rural society through control of the environment (Gilmartin 1998).

Some historians pass a devastating verdict on British famine-prevention policies. Davis (2001), f.ex., dismisses them as based on a Malthusian ideology, describing "deliberately cruel" selection criteria for relief access and comparing the lowest ration, the so-called "Temple ration" of 1 pound of grain per day, to Nazi experimental research in the Buchenwald concentration camps. Drèze (1995), on the other hand, gives the British some credit in actually wanting to prevent famines, although financial considerations and a non-welfarist ideology contributed to dangerously low rations. While Drèze notes that the "Temple rations" fortunately were abolished right away, Davis does not mention this, giving the impression that this extremely low ration was the rule for a long time. However, it is clear that financial considerations and the aim of keeping British expenditure in India at the lowest possible level also influenced the sanctioning of protective irrigation canal construction. Expansion of irrigation into famine-prone areas was only carried out if it proved economically remunerative, taking into account the cost of famine (Stone 1984).

Impacts of colonial canal irrigation

On the issue of impacts of colonial canal irrigation, the two main competing views can be found in Elizabeth Whitcombe's "Agrarian Conditions in Northern India" from 1972 and Ian Stone's "Canal Irrigation in British India" from 1984. Whitcombe concludes overall that the negative effects of the canal irrigation introduced by the British in the region between the

rivers Ganges and Yamuna in the United Provinces were substantial, and largely outweighed the positive increase in production. Her verdict on the impacts of British colonial policies on the agricultural conditions in North India is harsh: the result was a "depressed peasantry" labouring in "a distorted ecological and economic environment " (Whitcombe 1972:xi and 276). Canal water benefited mostly cash and export crops like cotton, tobacco, sugar cane, and indigo, argues Whitcombe. The coarse food grains, which were the staple diet of the majority of the population, did not require irrigation neither in the *kharif* nor *rabi* season. This distorted the production away from food grains and towards cash and export crops with the consequence that food prices increased and the poor suffered. The relative simplicity of canal irrigation by gravity compared to the more laborious lifting of well irrigation encouraged over-cropping and over-application of water which led to reduced productivity of the soil, and loss of crop land to salinisation and water logging. In addition, the canals and accompanying increase in water table disrupted the stability of the soil in its vicinity and caused existing earthen wells to cave in. This forced farmers to pay for the more expensive canal water and thus trapped them in a cycle of dependency on the government system, argues Whitcombe. The change from well to canal irrigation, therefore, was not always voluntary (Whitcombe 1972:80). Widespread application of canal irrigation was also an important source of revenue for the British, who therefore encouraged it despite its known negative environmental side-effects. The new railway lines exacerbated the negative environmental effects of canal irrigation, as they cut across natural drainage lines and impeded surface runoff. A British report on the environmental conditions in Indian agriculture by 1891 estimated the amount of salinity damaged land to between four and five thousand square miles[16], or from 2.5 to 3.2 million acres (Whitcombe 1972).

Stone (1984) questions the negative conclusions of Whitcombe, and argues that except for a documented increase in malaria, the picture for Indian peasants and agricultural environment was not so gloomy. He questions the severity of the problem of salinisation and waterlogging, and has a different interpretation of the farmers' response to the new irrigation technology. The effects of the canals on wells varied from area to area. "Indeed, just as some villages could lose entirely their source of irrigation as a result of the canal, so it was possible for

[16] 1 square mile = 640 acres

villages out of the canal's reach to have an improved water supply in their *pukka* wells, as was the case in parts of eastern Bulanshahr", writes Stone, and concludes that the effect of canals on wells "is mixed rather than one of sweeping destruction" (1984:85). Even though the negative side-effects of canal irrigation were well-known in contemporary society, it was advocated by successive Famine Commissions, Irrigation Commissions and Indian Nationalists. Stone interprets this as a sign that the benefits of canal irrigation exceeded the damages. Contrary to Whitcombe's analysis, Stone argues that well irrigation was "markedly restricted as well as restricting" for farmers (1984:70). He emphasises historical evidence that farmers chose to abandon their most efficient wells in favour of the canal, even when the canal water was only available through lifting:

> "The canal was an innovation which met their requirements, and it did so because it slotted into the productive aspects of the peasant system in a way which made it generally more advantageous than even the most favourable well irrigation." (Stone 1984:70).

He compares the dynamic economy of the Western districts (which had canal irrigation) of the region with the stagnation in the Eastern districts (which did not have canal irrigation), and concludes that the canals were the fundamental ingredients in the Western growth process. The canals "enhanced the peasant's ability to utilise more fully his available resources (by saving labour and bullocks, extending the range of cropping options, and reducing some of the risks his production was constrained by)" (Stone 1984:340).

The canal strengthened and enlarged a class of medium-to-large peasants, and this lay the foundation for a widely spread distribution of income, and prevented the "possibilities for scale economies conducive to polarization" (Stone 1984:346). Stone therefore sees in the canal irrigation of the Western Uttar Pradesh a lesson in appropriate technology for present-day developing countries.

Commersialisation of agriculture was further encouraged by the expansion of railways. As with British canal irrigation, the effect of British railway construction is a subject of controversy. We have seen the contrasting opinions of Whitcombe (1972) and Stone (1984). Some writers claim that the railways, contrary to the claims of the Famine Commission, actually carried food *out of* areas with starving populations, instead of *into* them (an example is Davis 2001). Other studies conclude that the expansion of railways considerably reduced

poverty and famine vulnerability by facilitating routine transport of grain into regions were harvests failed (Drèze 1995; Attwood 2005)[17]. Attwood (2005) argues that transport infrastructure and protective irrigation structures, in combination with enforcement of drought-relief policies, caused a considerable reduction in famine mortality in the Western parts of the Deccan Platteau. The Western Deccan had been virtually insulated from other grain-producing areas of India before the railways, which made the population extremely vulnerable to undernutrition and hunger in the case of droughts. Traditional methods of irrigation by diversion weirs (*bandharas)* on seasonal rivers in this region only captured a fraction of the rainwater, and dried up completely during droughts (Attwood 2005). There are historical records of terrible droughts and famines in this region from the 17th century onwards. Statistics over prize fluctuations for staple food grains (jowar and bajri), in the town of Sholapur for example, over the 19th century show a marked decline in price variations after 1860 when the town was connected to the railway. This is a sign that the railway led to the influx of grains into the region in times of scarcity (Attwood 2005).

Key themes in critical irrigation studies

There are two key arguments in critical scholarship on hydraulic engineering. One is that large-scale irrigation systems increase the power of a central state over local communities. The other is that local and community-based systems are more environmentally sensitive and well-adapted to the local ecology, while large, centrally managed systems are the opposite.

Warnings of expanded state power

Karl Wittfogel was maybe the first to attempt a synthesis and comparative study of how the control of water influenced the distribution of power within a given society. His book *"Oriental Despotism. A comparative study of total power",* published in 1957, is a comparative analysis of Oriental societies relying on large-scale irrigation structures, in particular Egypt, India and China. His aim is to restore Marx's concept of an "Oriental mode of production" or an "Asiatic society", and, through this analysis, issue a warning against the impending threats of absolutist power embodied by Stalin's Soviet Union in the early and

[17] Dreze refers specifically to Michelle McAlpin who has published several detailed empirical historical analyses of this issue.

mid-twentieth century. By reviving the concept of an "Asiatic society" (which Wittfogel relabelled "hydraulic society"), he argued against Stalinist Marxism which advocated a unilinear historical materialism unavoidably moving towards a class-less, communist society (Wittfogel 1957). Marx had found the "Asiatic society" concept in the writings of the classical economists, who were impressed by the large water works maintained for irrigation and communication in Asia and the Near East. In these societies, the economists claimed, the government was the biggest landowner, and held political authority of despotic strength because of the need to orchestrate the construction and maintenance of large-scale irrigation structures. This organisation of society was neither found in the classical antiquity nor in medieval Europe, and this puzzled the economists (Wittfogel 1957). Wittfogel found that it was too simple to say that the government owned all land in hydraulic societies, but agreed that peasant property owners were kept disorganised and politically impotent. In hydraulic society, he argues, the ruling class is the bureaucracy, "there exists a *bureaucratic* landlordism, a *bureaucratic* capitalism, and a *bureaucratic* gentry" (Wittfogel 1957:4). Oriental despotic rule "atomized those nonbureaucratic groups and strata which, in feudal Europe and Japan, spearheaded the rise of a commercial and industrial society" (Wittfogel 1957:8). This is the reason why Marx expected British rule in India to accomplish "the only *social* revolution ever heard of in Asia"[18] (Marx 1853, quoted in Wittfogel 1957). Unfortunately, says Wittfogel, Marx overestimated the transformative capacity of capitalism and underestimated the strength of the water-ruling bureaucracy in a water-deficient landscape:

> "At the end of Western colonialism and despite the introduction of parliamentary governments of various kinds, the political leaders of the Orient are still greatly attracted by a bureaucratic-managerial policy which keeps the state supremely strong and the nonbureaucratic and private sector of society supremely weak." (1957:9).

Wittfogel focuses on power relations and the issue of *self-reliance*. He argues that many primitive peoples chose *not* to change to hydraulic (i.e. irrigated) agriculture because they held the nonmaterial values of independence and political self-reliance higher than material

[18] Marx in New York Daily Tribune, June 22, 1853.

security. They endure "lean years and even long periods of famine" instead of paying the price of political, economic, and cultural submission to an external power[19] (Wittfogel 1957).

Worster (1985) takes Wittfogel's analysis further. He argues that it is not only ancient imperial or modern communist state bureaucracies which disempower local communities of farmers, but also capitalist, modern agriculture. Capitalist agriculture is based on the exploitation of both people and nature, and the rulers are those who control the hydraulic means of production. The prime example of this, says Worster, is Californian agriculture, were large cultivators produce much more food than any American may need, and federal technicians reorganise natural watersheds for this purpose, destroying the natural environment through the instrumentalization of rivers. The freedom of the cultivators has been compromised in this agriculture:

> "Accepting the authority of engineers, scientists, economists, and bureaucrats along with the power of capital, the common people became a herd. (…) Instead of maturing into autonomous, rational individials capable of deciding ultimate issues, as one side of the Enlightenment promised they would all do in the modern age, they instead become lifelong wards of the the corporation and the state." (Worster 1985:57-8)

Worster is inspired by Schumacher's *"Small is Beautiful"* (1973) and deep-ecological ideas about the value of nature. He argues that big organisations, like those governing large-scale irrigation structures, are profoundly anti-democratic. Instead, watershed-defined local communities, responsible for the development of their own land and waters, commonly owned and managed for the public good, can provide the basis for true democracy.

There are alternatives to agribusiness and bureaucracy, he argues. For the American West, they include:

> "relearning old, discarded techniques of floodplain and dry farming, finding or creating new cultivars that require little water, shifting to a more pastoral economy based on sheep, goats, and cattle, and diversifying into a variety of craft and small industrial livelihoods. Those western farmers who wanted to raise cotton or corn on an extended basis would have to migrate back East, where the rain is naturally available and the farmer does not have to rely on technological gigantism." (Worster 1985:333).

[19] The full quote is: "The many primitive peoples who endured lean years and even long periods of famine without making the crucial changeover to agriculture demonstrate the immense attractionof nonmaterial values, when increased material security can be attained only at the price of political, economic, and cultural submission" (Wittfogel 1957:17).

Only communities relying on their own capital, labour, and knowledge, "can free themselves from the distant, impersonal structures of power that have made democracy little more than a ritual ratifying choices already made by others" (Worster 1985:333). Local communities are more egalitarian, "power is diffused, elites are inchoate" (1985:32).

James Scott argues that the centralizing effects of large canal-irrigation projects are "perfectly obvious", because "authorities decide when to release the water, how to distribute it, and what fees to charge" (Scott 1998:286). "For colonized farmers [colonized by the state], the effect of such centralization and expertise was a radical de-skilling of the cultivators themselves," and diminished autonomy for their communities, he argues:

> "The unspoken logic behind most of the state projects of agricultural modernization was one of consolidating the power of central institutions and diminishing the autonomy of cultivators and their communities vis-à-vis those institutions. Every new material practice altered in some way the existing distribution of power, wealth, and status; and the agricultural specialists' claims to be neutral technicians with no institutional stake in the outcome can hardly be accepted at face value." (Scott 1998:286)

The influential anti-dam writer Patrick McCully argues along similar lines:

> "As schemes relying on large dams require, by their expense, scale and technological sophistication, that they be centrally managed by government bureaucracies, so the arrival of canal water frequently means the increasing intrusion of the state in the lives of the farming communities, and the consequent erosion of the ability of individuals and communities to make decisions for themselves." (McCully 2001:172)

McCully refers to the example of Indonesia which had a long tradition of cooperative local water management. When these institutions were eroded by the interference of central-state bureaucracies, the communal, cultural, and social services provided by them were also lost. With reference to Wittfogel and Worster, McCully argues that the domination of rivers is a means for some people to control other people, of ruling elites to control local people. This disempowerment and deskilling argument is popularised by Arundhati Roy, one of the most prominent anti-dam activists in the later years, after she joined the Narmada Bachao Andolan in 1999 with her scorching essay "The greater common good":

> "Big Dams are obsolete. They're uncool. They're undemocratic. They're a Government's way of accumulating authority (deciding who will get how much water and who will grow what where). They're a guaranteed way of taking a farmer's wisdom away from him." (Roy 2002:57)

These state-sceptical views are also found in the environmental movement in India, and they are clear in the publications of the influential Delhi-based NGO Centre for Science and Environment (CSE) which has been influential in advocating water conservation through traditional water harvesting methods over the last 20 years. "*Swaraj*" or "Self-Rule" is a key concept in the arguments for water harvesting. This is a Gandhian vision of village communities, and the report "Making Water Everybody's Business" (Agarwal, Narain et al. 2001) is dedicated "To those who are trying to make Mahatma Gandhi's dream of *gram swaraj*[20] come true". The idea is that traditional, local technology will empower villagers and minimize dependence on outside experts and government officials. This is highlighted by one of the authors of a chapter in the report:

> "Attitudes towards the use of water resources must change and cheap, community-based and sustainable methods adopted. People need not depend on governments and bureaucrats for the management of essential resources and must find the will and the way to control their own resources." (Kulkarni 2001:131).

"We can definitely handle the work without government help", says one of the villagers in Alwar on CSE's web-site[21]. In Alwar, the repair of traditional water-harvesting structures has reportedly led to the revival of the Arvari River. Programmes such as the one in Alwar are seen as important for strengthening local governance and giving a push towards self-help[22]. Down to Earth Magazine, published by CSE, featured a cover story on traditional water managers' role in solutions of water disputes around India (Down to Earth 2003). They make sure tanks are maintained, water allocated equitably and conflicts resolved. However, this tradition is on the verge of extinction around India, argues CSE. "The intervention of government in irrigation is the sole reason for the decline of *neerkattis* [South Indian traditional water managers]," says A. Vaidyanathan, former director of Madras Institute of Development Studies, to Down to Earth. The reason is here attributed to the neglect of traditional water management by the government of Independent India. After Independence, India's hydraulic regime was transformed, and large dams, canals, and irrigation departments replaced the traditional water managers, the story goes. The traditional practices are unique in that "they give power to the powerless", says one of the activists to the magazine: "Based on

[20] '*Gram swaraj'* means 'village self-rule'.
[21] http://www.rainwaterharvesting.org/Rural/Bhaonta-Kolyala.htm
[22] http://www.rainwaterharvesting.org/index_files/Paani_Yatra6.htm

equity principles, they give priority to the disadvantaged communities. These community systems are genuinely 'sarvajanik' [community-driven]".

Making water everybody's business is conspicuously empty of discussions of intra-village problems of social and economic inequality. The author of the Gujarat chapter, for example, is surprised to find that a project village initially was divided along caste lines[23] (Prasad 2001). If such problems do exist, the common task of reviving lost traditions solves the differences and joins everybody into "one big family", according to the success stories in CSE's reports.

We thus find in Wittfogel, Worster, and the CSE publications warnings against expanded state power and praise for the local community, self-sufficiency, and self-reliance. However, they differ somewhat in their interpretation of pre-British Indian society. In CSE's work, as described earlier, water management in pre-colonial Indian peasant societies is presented as community-based and environmentally sustainable. In Worster's work, too, as we saw in his presentation of the impacts of modern canal irrigation, India before the British was a peasant agricultural society based on the "simple, cheap strategy" of watering crops only when they risked dying. With the British canals, peasants "subsequently came to depend on the government works completely", he writes with reference to Whitcombe's analysis (Worster 1985:152). To Wittfogel, on the other hand, India before British rule was a hydraulic state, an empire ruled by water buraucrats controlling the large irrigation structures. To help explain this discrepancy between Wittfogel on the one hand and Worster and CSE on the other, we can borrow Mosse's term of a "landscape simplified for polemical purposes". Empirically, one can find evidence for both arguments; parts of pre-colonial India had traits of a hydraulic state, parts were harmonious communities in balance with nature. History is used rhetorically for a purpose. Wittfogel's work has the explicit aim of providing intellectual ammunition to a fight against totalitarian states, in particular communism. Worster's and CSE's work are environmental critiques of capitalism. It serves Wittfogel's purpose to present pre-British India as a despotic hydraulic state[24], as well as it serves the environmental message of

[23] "Ironically, his own village was divided into various factions based on political ideologies, profession, class, *and even caste*" (Prasad 2001:371, emphasis added).

[24] Wittfogel wrote in a period when environmental issues were not as important as they became later in the 20th century. But he started his academic work as a part of the Frankfurt School, where scholars such as Max Horkheimer, Theodor Adorno, and Leo Löwenthal developed a Marxist philosophy founded on humanist values

Worster and CSE to present it as an agrarian and communitarian harmony among people and between people and nature.

Dams and "high-modernism"

Large dams and canal-irrigation projects are the iconical monuments of what James Scott has famously called "high modernism" (Scott 1998). Dams and canal irrigation are not discussed as a special case in Scott's book *Seeing like a state*, but they are mentioned throughout the book as manifestations of this particular ideology[25], and a case study of the TVA was left out only to shorten the book. The subtitle of *Seeing like a state* is "How certain schemes to improve the human condition have failed", and Scott's answer is that the failures[26] are due to an ideology of "high modernism":

> "a strong, one might even say muscle-bound version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and above all, the rational design of social order commensurate with the scientific understanding of natural laws." (Scott 1998:4).

The high-modernist interventions began with the "nearly limitless ambition to transform nature to suit man's purposes", and this ambition has "perhaps been the keystone of high modernism", argues Scott (1998:94-5). Dams and canals are among the prime examples of this effort, as we have seen in the previous pages of this chapter. David Lilienthal is also listed by Scott as one of a "pantheon or Hall of Fame of high-modernist figures", people who "envisioned a sweeping, rational engineering of all aspects of social life in order to improve the human condition" (1998:88).

High modernism was the hegemonic ideas of progress of around two centuries, from their first manifestations in the scientific forestry projects of the late eighteenth-century Prussia to the

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and questioned the effects of instrumentalist and utilitarian views of nature. He left the Frankfurt School because he "wanted a science of society, not a philosophy of values" (Worster 1985:54).

[25] A few examples, with emphasis added: "They tended to prefer certain forms of planning and social organisation (such as *huge dams*, centralized communication and transportation hubs, large factories and farms, and grid cities)" (p4-5); "In a nonstatist society, such tasks have required new public authorities or "super-agencies" having quasi-governmental powers for sending men to the moon or for constructing *dams, irrigation works*, highways, and public transportation systems" (p 95); and the before-mentioned: "The centralizing effects of Soviet collectivization and ujamaa villages were perfectly obvious. So are those of *large irrigation projects*, where authorities decide when to release the water, how to distribute it, and what water fees to charge" (p 286).

[26] Unfortunately, Scott does not discuss the notion of "failure" and the contested nature of judging a project or a development approach as a failure or a success.

post-colonial villagization projects of Nyerere's Tanzania. Scott's examples of failed high-modernist projects range from scientific forestry via vast engineering projects like the Suez Canal to the Green Revolution and collectivization in the Soviet Union. His examples of states which were willing to put unrestrained power behind their schemes are as diverse as the United States in the decades around the Second World War, Nyerere's Tanzania, the Soviet Union, Iran of the Shah, South Africa under apartheid, early nineteenth-century feudal Prussia and Nazi Germany. The diversity of these examples and states alone suggests that what he describes may be seen as a deeper and more formative zeitgeist rather than a specific, conscious political ideology. What, in more detail, are the defining traits of high modernism, according to Scott?

"This is a book about tomorrow," announced Lilienthal in the opening of his book. A core feature of a high-modernist ideology is the temporal emphasis on *the future*. The promise is freedom from scarcity, wants and poverty in the future, provided some sacrifices are made in the present. These sacrifices are imposed by experts and technocrats, - the ruling intelligentsia of high-modernist states. Particularistic political interests should not interfere with scientific planning, and high-modernism is profoundly apolitical. It is the ideology of the "bureaucratic intelligentsia, technicians, planners, and engineers" (Scott 1998:96). The historic and moral mission of this intelligentsia, to drag a backward population into the twentieth century, provided them with "high morale, solidarity, and the willingness to make (and impose) sacrifices" (1998:96). The idea of progress was "vouch-safed by scientists, engineers, and planners" (1998:342).

These planners, representing the state, have a particular vision (hence the title of the book), or more precisely: the vision of the state has particular *needs*, the need to make society *legible*. Therefore, the human condition can and should be improved through radical simplification of complex, organically evolved societies and environments. This simplification and reordering of society is a way of creating better objects for political control. High modernism is characterized by an aesthetic vision of what order and efficiency looks like, and a belief that if the arrangement (city, agricultural fields, village settlement etc) *looked* right, it would also function well. In order to rule (whether "rule" is understood as dominating or serving the citizens), the state needs to *see* its citizens. Simplification is necessary for this, to reduce the number of confusing and confounding factors to a minimum, and to identify a few, ordered

variables and their interrelationships. High-modernist vision, by relying on the scientific method, is temporally "short-sighted", argues Scott, and it has "blind spots" and a "weak peripheral vision". The planners cannot know with certainty what will happen in the future, when the uncertainties of their models have multiplied; they don't see what does not fit the scientific experimental method and what cannot be rectified by their instruments; and they don't see the interaction effects and confounding variables in the periphery of their field of knowledge. For example, in the case of scientific, modern agriculture based on high-yielding crop varieties, chemical fertiliser and pesticides, the multiple-order effects on the wider ecology were not incorporated in the models.

The benefit of these systematically simplifying aspects of the scientific method is the exceptional clarity one can achieve *within* one's field of vision: the high degree of certainty with which one can know that one dose of X will cause a certain change in Y, given *ceteris paribus* conditions. The problem is that reality is not like the laboratory or test field, and the behaviour of real people is not easily modelled. "Taken together, the parts of the landscape occluded by actual scientific practice – the blind spots, the periphery, and the long view – also constitute the real world" (Scott 1998:294). The high-modernist plans are based on knowledge about abstract, theoretical, context-free interrelationships obeying the laws of physics in abstract, theoretical places. Typically, the high-modernist schemes failed because "local knowledge, practice, and context are considered irrelevant or at best an annoyance to be circumvented" (Scott 1998:201).

There is an institutional logic to the high-modernist vision, argues Scott. It is an "optic of power" (1998:253). It is attractive to the state because its social arrangements are conducive to rule: the creation of legible populations and landscapes is necessary for service delivery (in accordance with a developmentalist ideology) as well as appropriation of taxes and centralisation of control. The result is diminished autonomy for civil society and local communities, and expanded power of the bureaucracy. We see here a similarity between Wittfogel's thesis and Scott's: both worry about the expansion of bureaucratic power, and both see canal irrigation as instruments of such bureaucratic power. However, Scott is more in line with CSE and Worster when he dates the bureaucratic expansion to the modern period, whereas Wittfogel, as mentioned earlier, finds oriental despotic hydraulic regimes further back in history, in the classic empires of Egypt, India, and China. Contrary to Wittfogel's

thesis, Scott argues in a footnote that centralised management is not necessary for fair allocation of water in large-scale irrigation works: "The fact is that quite large irrigation systems have been successfully organized for hundreds of years without centralized political authorities exercising coercive powers" (1998:420*fn*69). His reference for this is a study of the traditional irrigation systems of Bali that were nearly destroyed by the introduction of ADB funded expert rules and simplifications, the same traditional, community-managed irrigation systems used by McCully as examples of the inseparable link between a community's culture and its traditional irrigation systems.

The argument of *Seeing like a state* can also be read as an example of a normative preference for community-based, traditional, and decentralized management of local resources, despite Scott's assurances that he is not "uncritically admiring of the local, the traditional, and the customary" (1998:7). At the very least, the rural communities that are the objects of central state, high-modernist agricultural schemes in the book seem remarkably homogeneous in at least one sense: they are a 'peasantry' consisting of family farms applying, to the extent possible, family labour: "[e]ach farm family has its unique endowment of land, skills, tools, and labour, which greatly constrain how it farms," and "the same family farm will go through several stages in the course of a family cycle of development" (Scott 1998:299). These family farms will have preferences varying with their family composition, land, and history, preferences that are not taken into account by the technocratic planners in the central state. But the description of a peasantry consisting of family farms using family labour, gives the impression of a much more united local community than for example is prevalent in rural South Asia. Scott argues that if the state planners had listened more to the experiences and knowledge of the actually existing farmers, the plans might not have ended in such disaster.

Communities and ecological sensitivity

Frequently accompanying the view that central states and bureaucracies destroy traditional and sustainable water management methods is the argument that local communities with local and traditional knowledge are more sensitive to the environment and well-adapted to the micro-ecology of their locality. "[A] social condition of diffused power is more likely to be ecologically sensitive and preserving," says Worster (1985:332). The small community "cannot afford massive intervention in the environment," he argues, and "moreover, it lacks

the technical hubris common to concentrated power" (Worster 1985:332). The solution to today's problems of water scarcity is to be found by looking to the consciousness and values of primitive peoples like the Papago Indians or the Chinese Taoists who lived in self-contained, low-technology communities with only modest material aspirations. Decentralisation and community control over natural resources is taken as a prerequisite for ecologically sensitive practices.

The assumption behind this view is that local communities, if left to themselves without government (or other external) interference, would prefer to maintain an environmentally sustainable, non-consumerist, non-industrialist lifestyle. Amita Baviskar points out that these environmentalist discourses "hold the poor to impossibly high ecological standards", and somehow ignore that "most social groups, on achieving upward mobility, immediately embark upon resource-intensive production and consumption patterns" (2005:173). The assumption has potentially counter-productive consequences; for example, local autonomy over natural resources in North-East India has led to deforestation at unparalleled rates in the last decades (Baviskar 2003). Mosse makes a similar point regarding traditional tank irrigation, that "most of the ecological dilemmas facing tank irrigation precede the colonial period and persist long afterwards" (2003:94).

This suggests that there are other reasons behind environmental destruction than the erosion of sustainable traditions because of the intrusion of an external power, be it an ancient empire, a colonial power, the modern bureaucracy, or corporate globalization. One factor to be considered is technological change. Traditional or indigenous methods of irrigation may have been ecologically sensitive primarily because the available technology set limits to the possible scale of irrigation, not because traditional communities revered their natural environment. Scientific developments in the 19th century created immense new possibilities for the reconstruction of the natural world. Some technologies, like canal irrigation and diversion of river systems, demanded a central, coordinating state. Others, like the machine-driven tubewell run by diesel or electricity, are operated by individual farmers and, in the absence of coordinated and enforced ground-water policies, are depleting the groundwater aquifers of India at alarming rates. This was not possible with traditional well irrigation using

bullocks or labourers. A pair of bullocks, drawing water from a well in 60 to 80 litres leather buckets, could irrigate only 0.25 acres per day[27], making the maximum irrigation capacity of a well around 1.5 acres. With manual levers, wells could irrigate even less land (Whitcombe 1972). Estimations from Gujarat in 1918 suggest that an average bullock-powered *kos* could lift 1080 gallons in an hour, and therefore irrigate one acre of land in 54 hours. In contrast, a machine-driven pump could on average draw 4803 gallons per hour and irrigate an acre in 12 hours. Thus, a much larger area could be irrigated but the unfortunate side-effect was that water level in the well fell rapidly (Hardiman 1998). The tanks of South India normally provided irrigation water for an area similar to the size of their own submergence area, which on average was 48 acres in Tamil Nadu (Mosse 2001). Large dams like the Sardar Sarovar submerge large areas of land, but can on the other hand irrigate several times its own submergence area.

Did the British destroy traditional Indian irrigation systems?

Robert Wade concluded in "Village Republics" from 1988 that the most striking finding in his study of cooperative water management in South India was "that such organization exist at all in village India" (Wade 1988:211). His evidence suggested that "there may be much more autonomous group action in the Indian countryside *than is usually thought*" (1988:213, emphasis added). Fifteen years later, Mosse (2003) writes about collective organisation of water management in a tank-irrigated landscape in South India and says that village-wide organizations are "not widely characteristic of rural Tamil Nadu, *despite the widespread belief in their existence* or the ideology of their recent decline." (Mosse 2001:233, emphasis added). Both Mosse and Wade describe roughly the same situation: that such autonomous cooperative institutions exist in some, but not most, villages. But the dominant view of Indian villages in academic and policy-making circles have changed. Part of the reason for this change had been new analyses of management of common property resources emerging in the late 1980s and early 1990s[28].

[27] Bullocks could irrigate 8 *biswas* per day. 1 *biswas*=1/20 *vigha.* 1 *vigha*=5/8 acre. Source: Whitcombe.1972. Agrarian Conditions.

[28] For example, the work of Elinor Ostrom and her book "Governing the Commons" (Ostrom 1990) had far-reaching impacts on research on and policies for resource management. The significance and influence of her

In India, the changing views on the traditional institutions of its villages is accompanied by a narrative explaining the decline of such institutions with the interference of the modern institutions of the colonial state. Many have pointed out that this "standard environmental narrative" or discourse plays a prominent part of the environmental debate in India (Sinha, Gururani et al. 1997; Toft Madsen 1999; Mosse 2003). In this representation, pre-colonial village societies are thought to be adapted to the micro-ecology of monsoon systems and managed in an ecologically unharmful way. The collapse of these systems is, furthermore, attributed to the British who introduced state control over water resources and prioritized modern engineering knowledge, thereby eroding traditional ecological knowledge (Mosse 2003). Despite its distinctive and heterogeneous voices, this environmental discourse shares a set of foundational values, in particular by valuing tradition over modernity (Sinha, Gururani et al. 1997), and it plays an important role in the campaign for water harvesting and dominates public discourse on Indian environmental history in general (Mosse 2003). The narrative rose to prominence in the early 1990s, as research brought forward evidence against the narrative of the "tragedy of the commons" which had dominated in the 1970s and early 1980s.

"Even while this narrative loses academic credibility," writes Mosse, "it is still found to pervade the everyday thinking and policy making of many environmental activists, NGOs, development practitioners, journalists, and other shapers of public opinion" (2003:10). It suffuses the publications of CSE, and is part of the argument of Madhav Gadgil and Ramachandra Guha's ecological history of India, "This fissured land" (Gadgil and Guha 1997) and Vandana Shiva's more polemic "Water Wars" (Shiva 2002). CSE's reports on water, including their rendering of the standard environmental narrative, is widely influential, and frequently referred to by water policy analysts reporting on promising new initiatives that may provide alternatives to large-scale dam building (for example Wood 2007)[29]. Whitcombe (1972) presents essentially the same story in her depiction of the collapse of traditional well irrigation because of the British canals. Her research is widely cited by environmentally concerned writers, among others Donald Worster who uses it to support his theory of the

work was honoured with the Nobel Memorial Prize in Economic Sciences in 2009 ("The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel").

[29] Wood, for example, mentions that one of the reasons for the decline of traditional, local water harvesting systems is that "the community cooperation and free labour of villagers necessary for the annual cleaning and maintenance of tanks are increasingly difficult to come by" (Wood 2007:198).

importance of hydraulic engineering for imperialism and the subsequent disempowerment of local communities (more on this later). Here is Worster's rendering of this narrative:

> "In the case of India the foreign experts sought to transform a peasant agriculture into a modern, commercial one by means of the water innovations. What they achieved was something less than that – and more. The traditional pattern in most Indian villages was to water crops by individual wells, but only when they were in danger of dying. It was a simple, cheap strategy. The new British canals, as the historian Elizabeth Whitcombe shows, destroyed that strategy and tried to put in its place a perennial, systematic irrigation. Peasants subsequently came to depend on the government works completely. They became prisoners of the high-cost agriculture those works represented and, tragically, let both their wells and their old life cave in. The modern water system was far more expensive than the old – too expensive as it turned out for raising anything but export crops: cotton, sugarcane, wheat, and opium. India, it is true, made more money with the new system, becoming in many commodities a major world exporter, but that success did not improve the lot of the poorer classes. The peasants themselves and their livestock actually had less to eat than before." (Worster 1985:152)

Ramaswamy Iyer, former Secretary of Water Resources in the Government of India (1984-86) and consultant to the World Commission on Dams, sums up the history of Indian irrigation technologies in the same way:

> "While the rulers built some relatively large structures (for instance, the Grand Anicut built by the Chola kings in Tamil Nadu over a thousand years ago, or the canals built by the Mughals in north India), the systems were largely local and community-managed. All this changed with the advent of British rule and of 'modernity'. Control over water resources passed from the hands of the community into those of the state. While the ownership of natural resources was claimed by the state, their management passed into the hands of engineers and bureaucrats. The induction of Western engineering ushered in the era of large dams and there was a concomitant decline of traditional forms of small-scale, local, community-managed systems." (Iyer 2003:123)

However, historical research has shown that colonisation and commersialisation can not alone bear the responsibility for the decline of traditional water-harvesting technologies. For Gujarat, Hardiman (1998) has shown how agricultural commersialisation predated the British and *contributed to* the development of 'traditional' water-management methods like the construction of wells and tanks. While there were systems of village control over irrigation, the "so-called 'village community' was often, in reality, synonymous with [a] corporate elite", he writes (Hardiman 1998:1540). In the more stratified villages, a small elite organised irrigation, owned the wells, and reaped the benefits, and in the less stratified villages, peasants shared the produce more equitably, but they were indebted and the land was controlled by

feudal landlords who appropriated most of the crops. "It was a system which provided a subsistence for the poor, but did not alleviate their poverty," according to Hardiman (1998:1538). Furthermore, the traditional irrigation systems of Gujarat were in decay already when the British aquired the rule in most of Gujarat in 1817, due to the many wars that ravaged the region in the 18th century (Hardiman 1998). (Chapter 3 will present the pre-modern irrigation systems in Gujarat in more detail.)

Similar observations have been made for South India. Based on a detailed historical study of the practices of tank irrigation in South India, Mosse (2003) concludes that the decline in traditional water-management structures has less to do with the erosion of village traditions and community than with what he sees as changing systems of statecraft. Firstly, pre-colonial water management hardly deserves the label 'egalitarian' or 'community-based'. The traditional South Indian water broker, the *nirkatti*, usually came from the upper, landholding caste, and water was distributed between groups of landowners, all of which consisted of upper caste farmers (Mosse 2003)[30]. Through this system, the upper castes were able to exercise privileged rights to scarce water and exclude others, most notably Dalits (Mosse 2003). Secondly, Mosse maintains that tank systems have been "in a state of decline and neglect for as long as they have been systematically described and certainly from the earliest British surveys" (Mosse 2003:37). He argues that in the South Indian kingdoms of the 18th century, tank irrigation systems were a political asset and the establishment of new irrigation tanks was used to maintain authority and rule.

The officers of the East India Company, who arrived in South India in the 18th century, described an irrigation system in decay. They blamed the poorly maintained and non-functioning tanks on the recent undermining of ancient tradition by an exploitative state, and saw this as a "sign of the administrative and moral disorder of the native regimes they had come to replace" (Mosse 2003:12). As in the contemporary environmental debate, writes Mosse, this was "a landscape simplified for polemical purposes". By the end of the 19th century, colonial officers surveyed the same dilapidated systems and identified the root cause to be the collapse of village tradition due to excessive government benevolence.

[30] Contrary to the claim of Vandana Shiva (2002), that the nirkatti came from the harijan landless caste in order to achieve neutrality.

> "Indeed, the ideal social order and irrigation practices which are taken as tradition by today's activists or yesterday's colonial officers were already representations legitimizing power within premodern society." (Mosse 2003:13)

The invocation of a traditional, harmonious village order, although a powerful rhetorical and normative tool, is most probably based on a construction. The identification of the moment of the collapse of traditional systems involves a seemingly endless journey back in time. For South India, it can be located at various points of time in history, from the present government's neglect of indigenous knowledge, via colonial commersialisation in the late 19th century, and back through the centuries to the collapse of the 10th century Chola empire and its system of village government (Mosse 2003).

New traditionalism and notions of 'community'

As we have seen, notions of local *community* are at the core of what has been called the "new traditionalist discourses" (Mosse 2003) of environment and development in India. 'Community' is a word with almost exclusively positive connotations (Watts 2004). Watts quotes Williams (1973) on the historical metamorphoses of the word 'community' in the English vocabulary:

> Community can be the warmly persuasive word to describe an existing set of relationships, or the warmly persuasive word to describe an alternative set of relationships. What is most important, perhaps, is that unlike all other terms of social organization … it never seems to be used unfavorably, and never to be given any positive opposing or distinguishing terms (Williams 1973:76, quoted in Watts 2004:196).

However, as Watts (2004) reminds us, communities need not be emancipatory or "good" and the identities and meanings that constitute different communities may be multiple and contradictory and operate at several spatial scales simultanously. Platteau and Abraham (2002) have similar objections to the enthusiasm for community-based, participatory, and decentralised approaches to development. They argue that development practitioners tend to overlook "endogenous community imperfections", such as elite dominance and lack of a collective identity and mutual solidarity. In fact, they argue, such imperfections are likely to increase when economic opportunities expand, resources grow scarce, and education and aspiration levels rise.

A related term on the participatory development agenda is 'civil society', which, like community, is also often associated with virtues such as freedom, pluralism, and participation, resting on a binary opposition afflicting "the state with coercion and society with freedom" (Watts 2004:197). The wide-spread new-traditionalist faith in India, not only in the field of water or environment but in general, is fuelled by, among other things, a widespread disenchantment with the Indian state, which is seen as inefficient and corrupt. 'Civil society' in the Indian debate is almost exclusively located in traditions and customs that are either before or outside the state. In Indian 'civil society' literature, community ties based on custom are privileged over modern constitutional arrangements which are associated with colonialism and thus suspect (Gupta 1999). Gupta quotes at length one of these communitarian voices, the Indian political scientist Rajni Kothari:

> Civil society's ordering of politics and governance is, in my view, the take-off point for humane governance. Such a re-entry is what contemporary social movements strive for. Human rights movements, ecology movements, women's movements, the peace movement are all about restoring the first principles of the 'good' and the 'good life' in the conduct of human affairs. Such sources of regeneration… lie more in the South than in the North, more in women than in men, more in the marginalized than in the powerful, more in ethnic identities and submerged civilizations than in dominant cultures" (Kothari 1988:3 quoted in Gupta 1999:239).

In Gupta's view, the community-focus does not include democratic values and choice. Communities provide security through exploitative patron-client relations, he argues, and comments:

> "To argue that tradition housed values of tolerance, fraternity and broad-minded good will is bound to take the uninitiated by complete surprise . (…) In a country generally acknowledged to be the most hierarchical, rigid and oppressive among known human civilizations the claim is now being made that Indian tradition exerted, on balance, a healthy respect for peoples' initiatives and aspirations." (Gupta 1999:239-40)

Platteau and Abraham (2002) share the same opinion, although writing with reference to Africa:

> "In so far as the notion of democracy presupposes the possibility of dissent and the peaceful handling of divergent opinions and behaviours, one can safely say that it is alien to traditional rural societies." (2002:112).

Gupta finds the Indian version of 'civil society' ironic. It breaks with the origin of the concept of civil society in the works of European philosophers such as Locke, Rousseau and Hegel. 'Civil society' in their view represented a break away from "a hierarchical and medieval past

and a movement into a more public spirited era" in which free individuals are citizens of a constitutional republic (1999:235). To bypass or abolish the state is to let it off the hook, Gupta warns, instead we need to pressure the state to perform. In his view, only a constitutional democratic state can ensure citizenship and a vital civil society, and not intermediate institutions outside the state, or traditional forums "before" it (Gupta 1999).

If we take for granted a simplified narrative which is only loosely rooted in historical and present realitites, we risk overlooking matters of importance. Mosse (2003) argues that the new traditionalist narratives may be strategically useful in policy debates, as models with much to offer future solutions for resource management and distribution. However, they:

> "are unlikely to serve the practical interests of cultivators – especially poorer, lower caste, or female farmers – where they have the (unintended) effect of undermining the importance of public investment or legitimizing new management and financial demands on farmers, or where they ignore the wider political economy of water or the local politics of access." (Mosse 2003:13)

It is important to realise that there are local political and ideological conflicts over natural resource management, and to consider the role of the state, not only in aggravating social and environmental problems, but in solving them.

Development Utopias: high modernist or simple traditionalist?

Utopianism is one of the defining traits of high modernism, and of modernism's aspirations to tame nature, argues Scott (1998:89-90). The ideology is "uncritical, unskeptical, and thus unscientifically optimistic about the possibilities for the comprehensive planning of human settlement and production" (1998:4). In many ways, this dissertation is about a "high modernist" project: The Sardar Sarovar Dam and its canals.

However, before embarking on a detailed analysis which will contribute to a critique of the limits of high-modernist development planning, a brief consideration of "Utopia" is in place. As we saw in the preceding section, the alternative development ideologies, which criticize state-led, environmentally unsustainable development projects, tend to paint a romantic picture of tradition, local communities, and ancient technologies. Is there not a case also for arguing that the "new traditionalist ideologies" have utopian or unrealistic aspirations?

Worster, for example, describes a zero-growth society as the ideal society. In this society, the desert should be valued

> "as a place of inspiration and training for a different kind of life. Relieved from some of its burdens of growing crops, earning foreign exchange, and supporting immense cities, it might encourage a new sequence of history, an incipient America of simplicity, discipline, and spiritual exploration, an America in which people are wont to sit long hours doing nothing, earning nothing, going nowhere, on the bank of some river running through spare, lean land. They would come then to the river to see a reflection of their own liberated minds, running free and easy. They would want little, enjoy much. Now and then they would dip their hands into the current and drink a little. They would irrigate their spirits more than their ego. In the midst of what had once been regarded as the bleakest scarcity they would find abundance." (Worster 1985:335)

Many will regard this vision as just as utopian or unrealistic as the most hard-core high-modernist planning projects. The alternatives sketched by Worster for the American West (a pastoral economy based on sheep, goats, and cattle, combined with crafts and small industries) are not as profitable, he writes, and the transition will therefore require "considerable local self-discipline" (1985:333). I find it puzzling that he, for a societal change of Maoist dimensions involving revolutionary changes in settlement patterns and economic activities, does not envisage a role for some central state or agency, but leaves it up to "local self-discipline".

Despite the obvious benefits, and even necessity, of a less resource-intensive pattern of consumption, it is questionable whether the values of this introspective, spiritual, simple, and disciplined life are shared by the masses and can be achieved through democratic means today. Worster asks the same question: "Is it a fable, this alternative, a idyll from an inaccessible yesterday, or is it a real possibility, one being pushed along to fulfillment by the currents of history?" (1985:335) .

A more profound question is whether "yesterday" really was like this, whether premodern communities could survive if all their members sat "long hours, doing nothing, earning nothing, going nowhere, on the bank of some river"? Maybe the time-saving conveniences of modern life, for most people, are a prerequisite for having the spare time, after subsistence needs are served, to devote time to the liberation of minds. Many ways of life of the past, of course, had many benefits which a consumerist, materialist, modern culture has lost. But they were also haunted by tragic famines and generally high mortality, and most people led a

physically much more exhausting existence. Scott emphasises at one point in his book that we are all beneficiaries of high modernist projects (1998:97). Although critical, political analyses have shown that large-scale modernisation projects of social and technical engineering are frequently driven by the self-interests of some ruling elites and frequently have had inegalitarian outcomes, we should not neglect that there were also genuine concerns for improvement of the human condition, and in many respects successful outcomes.

Summary

Lilienthal's tribute to the TVA in particular and dams in general is an example of the enthusiasm for modern technology that dominated the early 20th century. Machines and technology and science promised freedom from scarcity, wants, and drudgery to an extent unimagined and unimaginable in earlier times. Lilienthal's words resonated well with, and were indeed born out of, 20th century modernism, with its emphasis on human control and use of nature. As will be further elaborated in Chapter 7, putting idle rivers to work for people became one of the core strategies for 'development' in the post Second World War international arena. Lilienthal and his colleagues from the TVA were among the important missionaries spreading this gospel in much of the Third World through the new international development institutions. The involvement of American hydraulic engineers in dam construction around the world has contributed to a common view that the technology and the ideas embedded in it is an American invention, and therefore also serves American economic and geopolitical interests. The historical roots of American hydraulic engineering, however, are more complex, and just below the surface we find the engineers of the British colonial empire and British India, where 19th century hydraulic engineering was at its most sophisticated and efficient.

This chapter has shown that a presentation of the environmental history of India or South Asia is hardly a neutral exercise in chronological description of facts. Rather, the past offers a wide-ranging set of experiences and events open to competing interpretations. Our normative views on the present and our wishes for the future will influence our readings of the past.

Therefore, history is not about the past[31], but about the present and the future, and this is especially true for the history of phenomena that are high on the contemporary political agendas. This comes out clearly when we compare the different presentations of the colonial history of India, in which the highly negative conclusions of Elisabeth Whitcombe forms the basis for the "standard environmental narrative" of colonial destruction of viable, community-managed traditional irrigation systems that were adapted to and did not destroy the local ecology. The standard environmental narrative is used by a political movement advocating an alternative approach to water management, an approach focusing on local, small-scale, community-based water technologies rather than centralised, large-scale, state-initiated engineering works that involve massive interventions in nature. It is also the standard frame of understanding in much of the dam-critical literature of the late 20th century, when, as we shall see in Chapter 5, dams became the key targets of a growing social movement mobilizing for alternative development policies around the world. Between Lilienthal's "Democracy on the March" in 1944 and the establishment of the World Commission on Dams in 1998 (which I will present in Chapter 5), new norms and values regarding 'development'gradually rose to political influence.

Parts of this global shift were the changing views on science and technology, on the future and the past, and on the state and the community. Dams were the iconical monuments of the age of modernisation, embodying modernist virtues such as human control over nature and the productive employment of natural resources. As such, they also became the prime targets of the critics of modernisation, and especially of a new traditionalist discourse that turned the old modernisation discourse inside-out and valued what the modernists regarded as hinders to progress: tradition, the past, and the vagaries of nature. In modernism, the past is an obstacle, filled with superstition and archaic repressive structures. The temporal emphasis of the new traditionalism is the past, filled with ancient wisdom, community solidarity, and ecological adaptation. State-led development was increasingly critizised through the 1980s, both from the left and the right, and alternatives were sought in bottom-up, participatory, and community-based models of development. Dams have been critizised as centralizing

[31] I am grateful to Professor Anna Lindberg for this succinct formulation in the "India Today"-seminar organised by SUM and IKOS, University of Oslo in September 2009. This was what I had been thinking for a while when reading the competing presentations of the environmental history of India, without arriving at this catchy phrase myself.

instruments of state power for many years, based on the underlying argument that the control of nature implies control of other people. However, as will be argued in this dissertation, there is reason to abandon the strict state-community dichotomy.

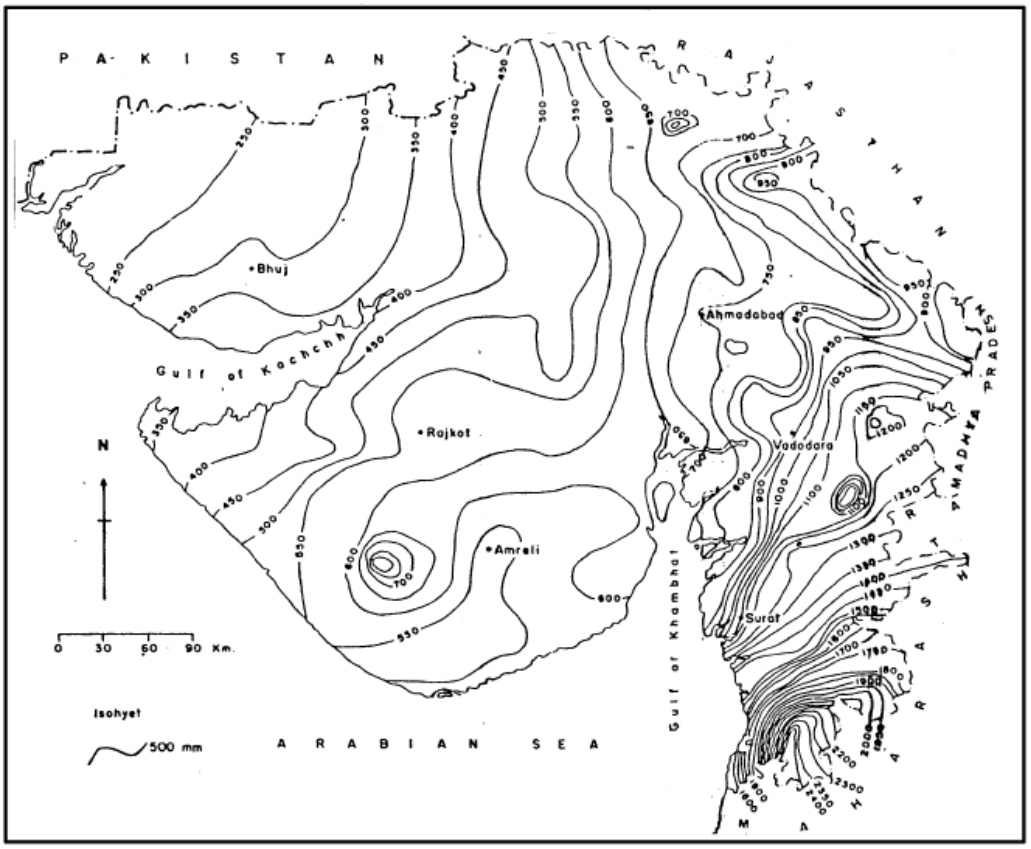
3. Water in Gujarat

Water is a scarce resource in Gujarat. Climatically, most of the State is semi-arid or arid, although the southern part is humid. Rainfall is low and varies a lot from year to year, and droughts are frequent. Agriculture has therefore always been a risky business. This chapter will briefly present the distribution of water resources in Gujarat, and the efforts to control the hydraulic environment through different irrigation technologies through history.

Rain, rivers, and groundwater

Gujarat is a coastal state in Western India, sharing borders with Pakistan and Rajasthan in the north and Madhya Pradesh and Maharashtra in the east and south. The climate in Gujarat has a north-south gradient with ample rainfall in the south and gradually less rainfall towards the north of the state (Map 1).

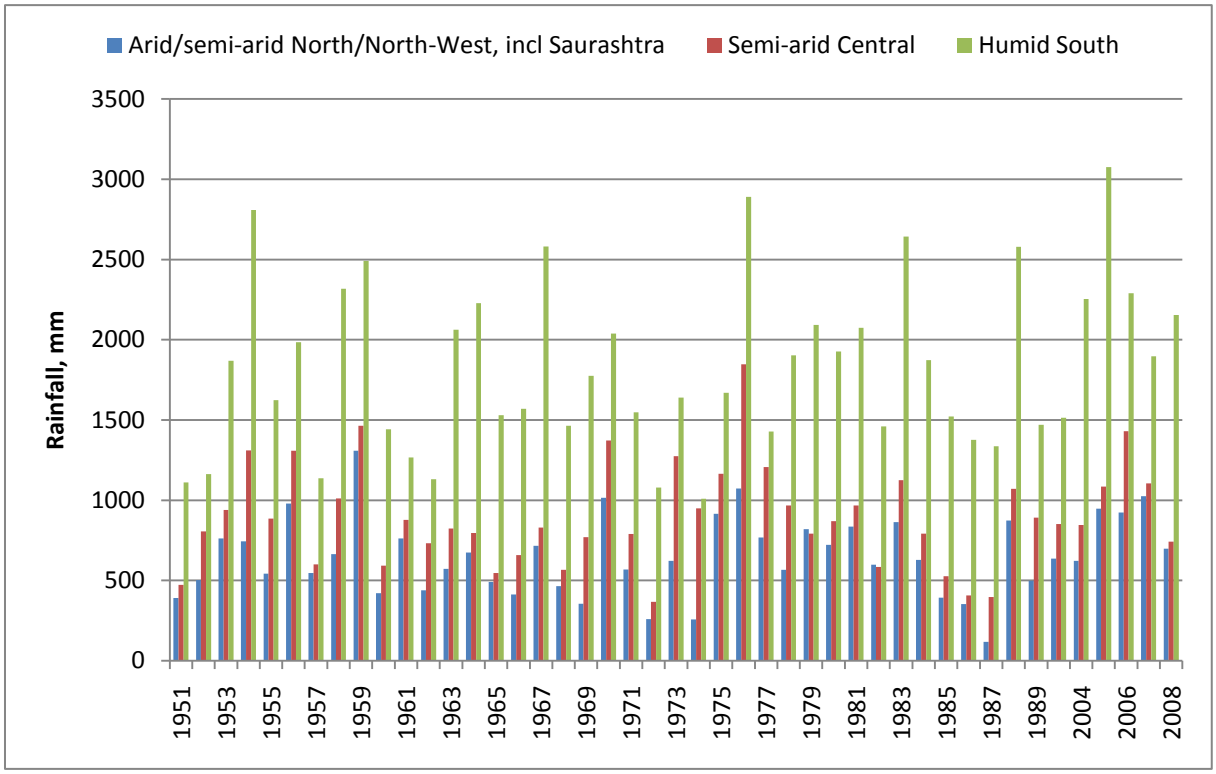
Map 1. Isohytes (rainfall) of Gujarat.



(Source: P.P. Patel 1997)

More than 70% of the state's area has an arid or semi-arid climate (Patel 1997). The driest conditions are found in Kutch, the northern peninsula of Gujarat with its salt desert *Ranns* and grassland *Banni*. Here, the average annual rainfall ranges from 250 to 450 mm and falls in only 15 days during the Northwestern monsoon. At the other climatic extreme, the Southern Rocky Highland covers the districts of the Dangs, inland Surat and Valsad, and the south-eastern parts of the districts Bharuch and Baroda with a typical sub-humid to humid climate. This region receives an average annual rainfall of 1300 to 2200 mm, with high dependability and more than 65 rainy days per year.

Figure 1. Rainfall in Gujarat, 1951-2008 in millimeters[32].



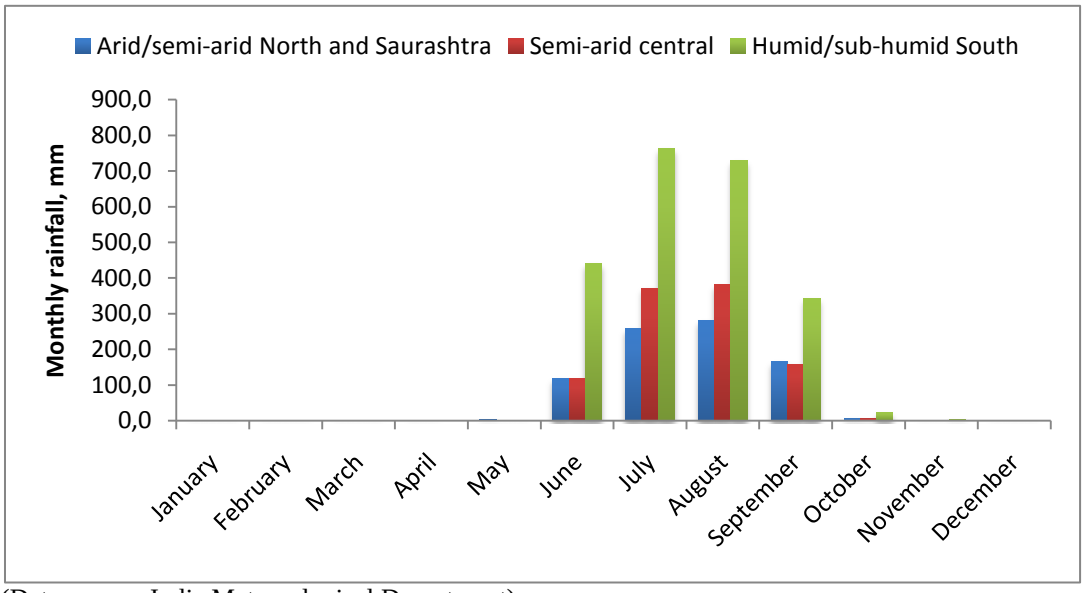
(Source, Bhatia 1992 and Indian Meteorological Department)

The high variability of rainfall in large parts of Gujarat, combined with arid and semi-arid conditions, has made agricultural productivity highly variable, and drought and scarcity frequent. As the rainfall only falls during the North-west monsoon, the summer is dry in all of

[32] Note the gap for 1990-2004. The figure is meant to show the consistently variable nature of rainfall in Gujarat, therefore the lack of data for these 15 years is not important. Data sources: for the years 1951-1990 from Bhatia (1992), for 2004-2008) from Indian Meteorological Department made available in downloadable Excel spreadsheet from http://indiawaterportal.org/. For the sake of readability of figure, I have regionalised the district-wise rainfall data. The method is described in Appendix 3.

Gujarat. Even the south, with high annual rainfall, experiences chronic water shortage in the summer because the rain is concentrated in the monsoon months (Patel 1997).

Figure 2. Monthly rainfall, average 2004-2008, regions of Gujarat[33]

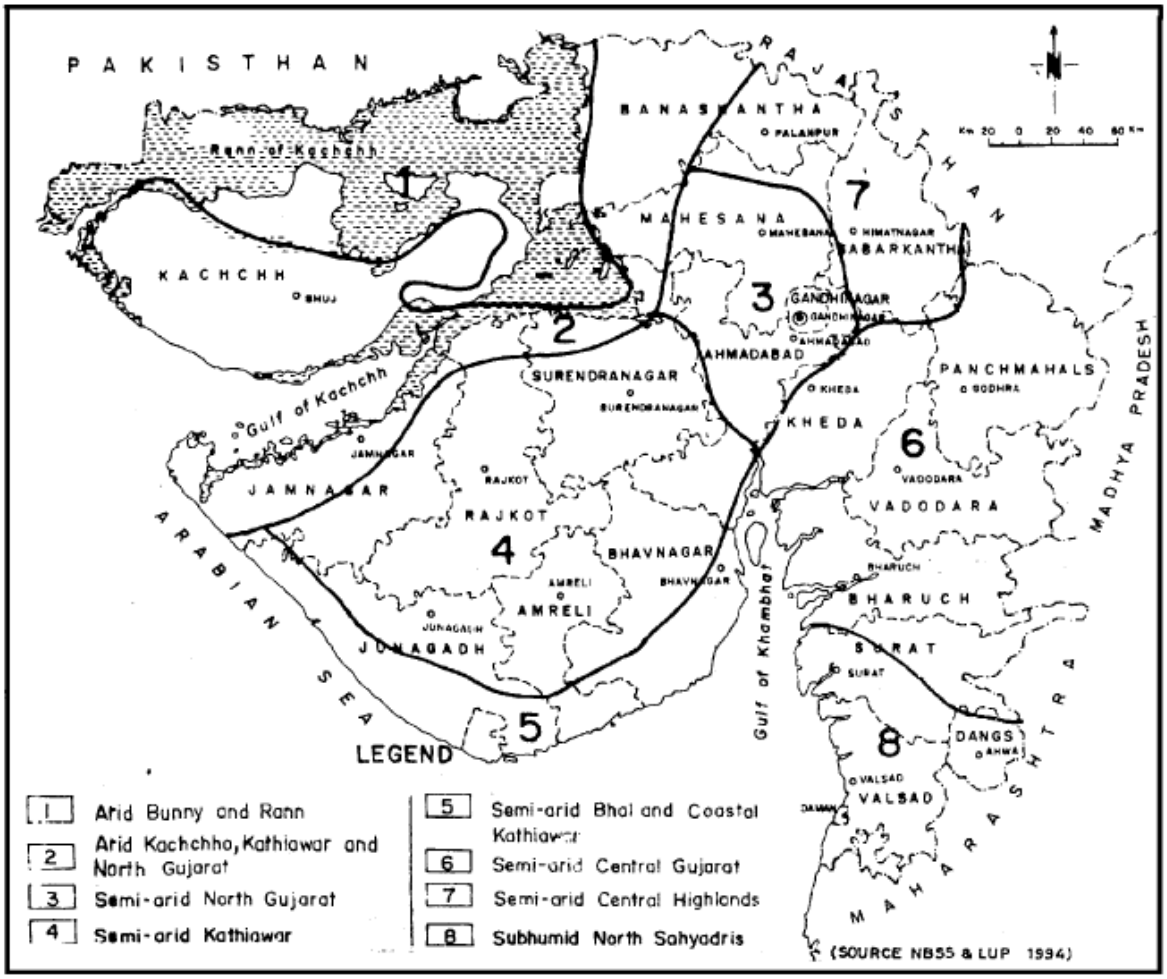


(Data source: India Meteorological Department)

The state only has three perennial rivers, the Tapi, the Narmada and the Mahi in South and Central Gujarat, and one major non-perennial river, the Sabarmati in North Gujarat. Taking into account inter-annual rainfall variability, evapotranspiration, and length of growing period, the National Bureau of Soil Survey and Land Use Planning has divided Gujarat into eight agro-ecological regions (Map 2). Of these, only the southernmost part of the state is classified as subhumid. This region forms the northern tip of the Western Ghats (Sahyadris) mountain range.

[33] Regionalisation is explained in Appendix 3. For each region, the displayed monthly rainfall is an arithmetic average of the district rainfall data from the Indian Meteorological Department 2004-2008, as available from http://indiawaterportal.org .

Map 2. Agricultural sub-regions of Gujarat



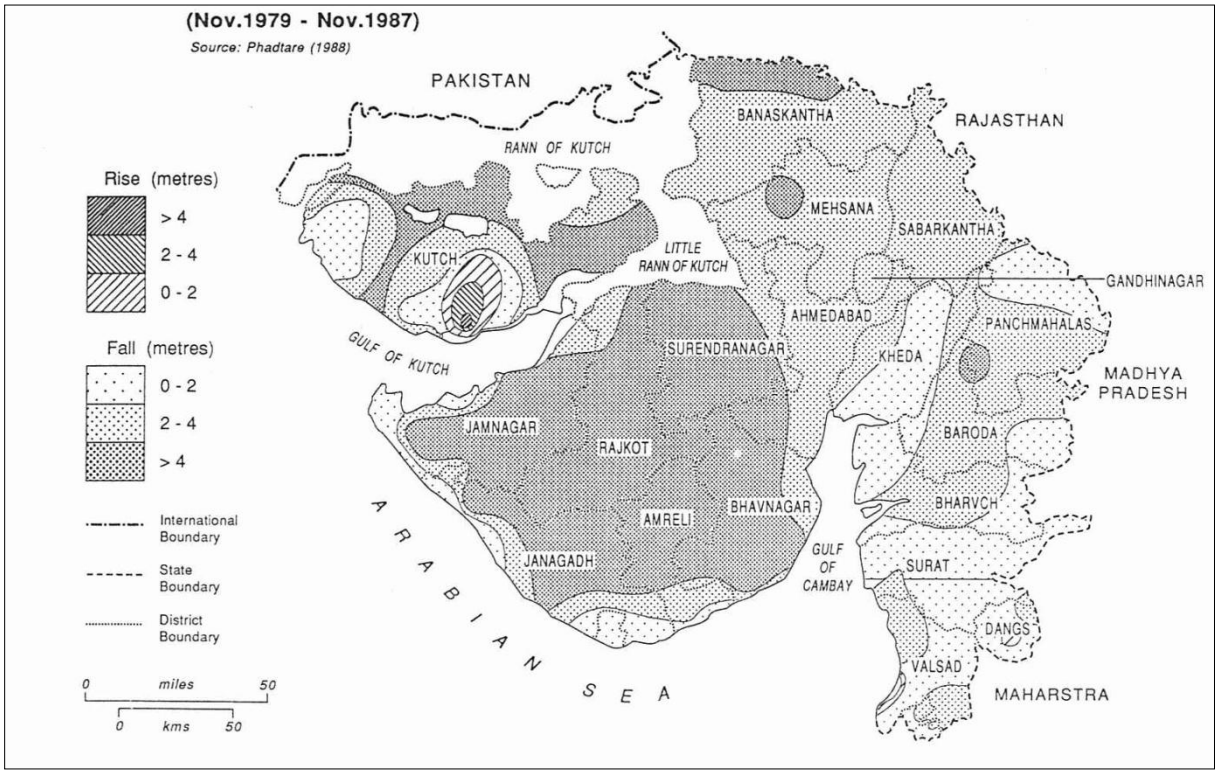
Source: P.P. Patel (1997)

According to the Central Groundwater Board of India, 31 *taluka*s have overexploited their groundwater resources in Gujarat, and the groundwater tables are in "critical" conditions in 12 *taluka*s and "semi-critical" conditions in another 61 *taluka*s, i.e. 104 out of the state's 184 *taluka*s have groundwater tables under stress[34].

Map 3 shows the changes in groundwater tables from November 1979 to November 1987, during the decade that private tubewell technology really took off in Gujarati agriculture.

[34] http://cgwb.gov.in/gw_profiles/St_Gujarat.htm Accessed 9.Oct.2009

Map 3. Groundwater table changes 1979 - 1987



(Source: Bhatia 1992)

We see that the groundwater tables diminished by more than 4 metres in almost all of Saurashtra, and with between 2 and 4 metres in North Gujarat and large parts of Bharuch, Baroda, and Panchmahals districts. The reason is that groundwater is being extracted continuously even when there is no recharge in drought years. With extraction of water from increasing depths, the contamination by salts and minerals increase. Especially severe is the problem of fluorides and salt in drinking water, and salt in irrigation water. Salinity increase is a particularly severe problem in coastal areas where depletion of groundwater causes seawater to ingress into the inland groundwater further aggravating the natural salinity conditions along the coast (Bhatia 1992).

Droughts and distress

There are three seasons in the agricultural year: *kharif* is the monsoon season from the Gujarati months of *Ashad* to *Aso*, or between July and November. *Rabi* is the winter season from *Karthik* to *Mha*, or November to March, and the summer is from *Fagan* to *Jeth*, or

March to July[35]. *Kharif* is the principal season for agriculture, and the crops possible to grow depend on the amount of rainfall and the water retention capacity of the soils.

Severe famines as a result of drought-induced crop failure are recorded from the early history of Gujarat. Bhatia (1992) provides a list of scarcity, drought, and famine conditions in the history of Gujarat. Large-scale starvation and mortality is reported frequently in historical sources from the Mughal (A.D. 1526-1707) and Maratha (A.D. 1707 -1800) periods; Bhatia lists more than thirty well-known famines. In the British period, scarcity years were frequent, but they less often led to large-scale mortality or famines[36], although this happened in the years 1801-04 and 1899-1902 (Bhatia 1992). There have been no instances of famine in Gujarat[37] after Independence, but several water-scarcity years due to failed rains. In post-Independence Gujarat, large parts of the state experienced failed rains and scarcity conditions in 1957-8 and frequently in the decade from 1960 to 1970. From 1971 to 1973, in 1974, and 1979 there was a drought to varying degree in most parts of Gujarat. Severe droughts hit the state again from 1985 to 1988 and from 2000 to 2002.

The historical records of famines in India point to the fact that famines and starvation deaths are rarely caused directly and only by crop failure. The many famines of the Maratha period in Gujarat in the 18th century were probably caused mainly by the many wars that ravaged the region in these years, disrupting production systems and destroying wells and water harvesting structures. The same had happened during the collapse of earlier dynasties, like with the collapse of the Patan kingdom in the 13th century (Hardiman 1998). In the 19th century, under British rule and also in the princely states of the region, the state initiated relief works during the worst droughts and also at places supervised the sale of foodgrains in an attempt to ensure equitable distribution of a limited resource (Bhatia 1992). Starvation in

[35] The Gujarati months follow the lunar calendar, and are the practical guidelines for the seasons for most of the Gujarati farmers I talked to. For example, the Rabi or winter season ends with the festival Holi at the Fagan full moon, and after Holi, the hot season is expected. The Gujarati calendar are as follows: *Fagan* corresponds to March/April, *Chaitra* to Aptil/May, *Vaisakh* to May/June, *Jeth* to June/July, *Ashadh* to July/August, *Shravan* to August/September, *Bhadarvo* to September/October, *Asho* to October/November, *Karthik* to November/December, *Magsar* to December/January, *Posh* to January/February, and *Mha* to February/March.

[36] There is no clear definition of a "famine" as opposed to several instances of starvation deaths. It is clearly a matter of scale of hunger-induced mortality. Bhatia relies on historical records of what was registered as large-scale, critical mortality conditions, and therefore clearly "famines".

[37] Or in India at large, although starvation deaths still occur in the poorest regions of the country, and severe undernutrition and malnutrition among the poor in all parts of India reduce health and increase mortality.

India did not occur because there was not enough food, but because people did not have the means to buy food, as happens for example when an agricultural economy is upset by a drought or a war. This argument has been most famously developed by Amartya Sen (Sen 1981), but was also a well-known fact for the Famine Commissions of late 19th century India[38].

Government relief efforts in scarcity and drought years have been a considerable drain on state finances after Independence. During the drought years of the 1960s, the government spent 50.28 crores (502.8 million) rupees on relief measures (Government of Gujarat 1972) and during the drought of 1985 to 1988 the government spent 2480 million rupees on the drilling of deep tube-wells as a relief operation to provide drinking water for villages without water in addition to the cost of short-term provision of drinking water through tankers and trains and the cost of relief work to poor people rendered unemployed by the failed agriculture (Bhatia 1992). The cost of relief in droughts has lead the Government to emphasise what they see as the critical importance of developing the irrigation potential in the state. For example, the Government concludes after presenting the relief expenses of the decade of 1960-69: "The importance and urgency of accelerating development of irrigation potential in the State hardly needs emphasis" (Government of Gujarat 1972:108).

Irrigation

Agriculture in the Gujarat region has mostly been irrigated through wells[39]. As described in detail by Hardiman (1998), groundwater in large parts of the region could be found at shallow depths before the invention and expansion of efficient motorized pumps in the 20th century. The soil conditions favoured rainfed agriculture, as the ground acted as a large sponge soaking up the monsoon rain. Historical sources tell us that farmers in large parts of Gujarat

[38] Bhatia quotes the Famine Commission of 1880 that wrote: "…as a general rule, there is an abundance of food procurable, even in the worst districts in the worst of times; but when men who, at the best, merely live from hand to mouth, are deprived of their means of earning wages, they starve, not from the impossibility of getting food, but for want of the necessary money to buy it" (Bhatia 1992:4).

[39] The Gujarat region before British rule and modern state formation consisted of many more or less losely defined princely states and kingdoms. The British gained control over much of the region in the beginning of the 19th century, first when the British East-India Company wrested power over much of the region from the Maratha rulers in the Second Anglo-Maratha War from 1803-1805, and the rest of the region came under direct British rule (or in the case of the princely states, indirect British rule) in 1818 when the Marathas were defeated in the rest of India by the British (www.britannica.com , www.wikipedia.org).

dug wells and reservoirs (*talavs*) to water their crops. Water was drawn from the wells by bullock-pulled large leather bags (*kos)* or by human-driven large lifting wheels similar to the ones known from ancient times under the sanskrit name *araghatta.* The irrigation methods varied with the regional geo-hydrological conditions. In the alluvial plains of Central and North-Central Gujarat, temporary earthen wells could easily be dug each year. In rocky areas, largely in the north and east and much of Saurashtra, well irrigation was a long-term project, it often took as long as ten years to dig through the rock to find water. Irrigation from rivers by inundation canals was also practiced, but never in permanent structures, as the river beds shifted from year to year. Near rivers, farmers dug percolation pits in the river beds to permit rainwater to recharge the ground and well water. Where the river beds were steep, water could be drawn with *kos* and *araghatta*- type installations like from wells. It is known that the Solanki dynasty diverted the river Rupen at Modhera near Ahmedabad and led the water in a 70 km canal to a reservoir in the north (Hardiman 1998). The inhabitants of Gujarat in pre-colonial times were thus practicing several forms of hydraulic engineering utilizing the technology available at the time.

Pre-colonial well construction in Gujarat was performed by a specialised caste of well and reservoir builders, the Ods. Their services were expensive, and had to be financed by loans from merchant-usurers, so-called *sahukars*. Peasants had to borrow by mortgaging the future crop of their land. Hardiman writes that the usurers earned a great profit from this arrangement and therefore encouraged well-digging. He therefore concludes that the involvement of finance-capital in well-building has a long history in Gujarat. Historical evidence of the importance of money-lenders for well-construction is found from the 14th century, and their involvement was reinforced in the 16th, 17th, and 18th centuries when large parts of Gujarat became embedded in the expanding all-India and international trade in cash crops. During this period, Central Gujarat became the core agricultural zone of the region. Agriculture in Gujarat was thus commercialised to a considerable degree before the colonial period, and this commercialisation was important for investment in irrigation systems. Furthermore, as far back as the Solanki dynasty in Patan in North Gujarat (945 to 1215), the state had a strong interest in irrigation because they could levy higher taxes on irrigated lands (Hardiman 1998).

Political economy of irrigation

The pattern of landownership was an important determinant for the political economy of irrigated agriculture in Gujarat in earlier times, just as it is today. These patterns varied regionally. Land in most parts of Saurashtra, for example, was controlled by feudal landlords (*garasiyas)* who were normally deeply indebted to usurers of the *bania* or *luhana* communities. The real control of the land therefore frequently lay with the usurers. The cultivators in this region were the Kanbis (now known as Patels) who were not normally considered owners of the land. There was generally little socio-economic differentiation within the Kanbi community. A similar lack of differentiation was found in the Bhil villages along the Northern and Eastern borders of Gujarat where land was controlled by Rajput Thakors.

> "In both of these cases, there was a general level of poverty, with no very profound class differences amongst the land holding peasants of the village. This appears to have promoted a culture of sharing of resources." (Hardiman 1998:1537)

The villages in Central Gujarat, in contrast, were highly stratified. Land was controlled by groups of shareholding peasants, known as "bhagdars", all coming from the same lineage of a particular caste or community (usually Kanbi or Sunni Bohra), each peasant owning a share of the village land. Below them in the village hierarchy were subordinate non-shareholding peasants who enjoyed occupant rights providing they paid taxes, and tenants who could be ejected at will. The benefits of irrigation in the most hiearchical villages were reaped by the elite. In less hierarchical villages, landlords appropriated the bulk of the produce, and left the peasants at subsistence level (Hardiman 1998).

British rule and groundwater policies

By the time of the arrival of British rule in Gujarat around 1818, the traditional systems were out of work, and the British were under the impression that agriculture in Gujarat was almost entirely rainfed. Most of the reservoirs (*talavs*) and inundation canals had been destroyed, and many wells had gone dry. The reason for the decay of these irrigation systems was the many wars which ravaged the region in the late 18th century, between local chiefs, competing dynasties, and the British. The maintenance of *talavs* was not kept up, leading to a drop in well water levels, and new investments in irrigation works seized.

The British asserted themselves as owners of the natural resources of India, and taxed the farmers heavily. They claimed the right to "rents" on the use of resources like water without obligation to develop them further. The influential Patidars of Kheda objected to the taxes in the 1860s, demanding the rights to the groundwater in wells on their land, and heated newspaper debates followed over two decades. The British government conceded to the demands in 1881, and agreed it was unfair to tax peasants for improving their land. They gave individual rights to landholding peasants to exploit the water resources beneath their land without any extra taxation:

> "By implication, this meant that rights in groundwater belonged to the owner of the land and not to the state, as the British had tried to assert initially." (Hardiman 1998:1539)

This, highlights Hardiman, is in stark contrast to British state appropriation of other natural resources like forests and common land, and it was a concession to the advantage of landowners with means to extract groundwater.

By the turn of the century, a water market had appeared in Kheda district in Central Gujarat and well construction increased. Kheda was one of the most productive agricultural areas of the region and dominated by entrepreneurial Patel farmers. The droughts of the first years of the 20th century caused a drop in groundwater levels, and induced the introduction of tubewells by the British. The government encouraged the adoption of tubewell technology, and rented out well-boring equipment. The British initiated new irrigation construction in Gujarat, focussing on well construction. The main encouragement lay in tax relief for well construction. Water-extraction rates increased manifold with the tubewells, leading to rapidly diminishing groundwater levels already then: wells dried up after a few years of operation. Despite the tax reliefs for well construction, it was a heavy investment and the landowners had to borrow from money lenders (bania sahukars) at high interest rates. The landowners were therefore deeply in debt and had to sell water from their wells to neighbouring fields in order to recover their investment and repay their debt. This development was mostly seen in the Charotar region of Central Gujarat. Here, almost all the new tubewells were in the richer Patidar villages, controlled by the village shareholders (the Patel *bhagdars*), and the pumps belonged to wealthy farmers. The sale of groundwater was developed in a large scale in Charotar before Independence, and after Independence, this model spread to other regions in Gujarat (Hardiman 1998).

Escalating groundwater extraction

The Government of India encouraged groundwater exploitation and irrigated agriculture, starting with the Grow More Food campaign in 1953 (Bhatia 1992). With the Green Revolution of the 1960s and the electrification of villages in Gujarat, there was a dramatic increase in electric tubewells in the State, while the number of dug wells has stagnated. Dug wells (or open wells) are, as suggested by the names, dug down to the water table, in hard rock areas sometimes with horizontal holes drilled into the rock to increase the seepage of water into the well. Pumps in borewells may be powered by diesel or electricity, and electric pumps may be submersible or groundlevel. Tubewells or borewells are pipes that are drilled into lower water tables often several hundred feet deep and operated by submersible electric pumps.

Whereas only 823 villages in Gujarat were electrified in 1960-61, by 1985-86, more than 17,000 (of a total of 18,114 villages) were electrified, and tubewell irrigation increased accordingly: in 1960-61, there were around 5400 pumpsets and electrified tubewells, against around 317,400 in 1985-86 (Bhatia 1992). The electric tubewells allows for extraction of groundwater from deeper aquifers, and mining and depletion of groundwater has become a severe problem. The Government of Gujarat drafted the first bill to regulate tubewell installations in the early 1970s, as it realised already then that high-density tubewell areas were depleting the groundwater (Government of Gujarat 1972). Nevertheless, in the 1970s the aim of the Government was to electrify as many wells as possible, because the "increase in efficiency and consequent increase in production of crops due to electrification needs no emphasis" (Government of Gujarat 1972:125). At this time, power supply was the main limiting factor, as more than 1/3 of the total power capacity of the state was being consumed by farmers for well irrigation (Government of Gujarat 1972).

The expansion of tubewells which continued throughout the 1980s, and the regulations for tubewell installations were never properly enforced. Tubewell irrigation was further encouraged by subsidised electricity in 1988. Before 1988, electricity for irrigation pumps was charged per unit of consumed electricity and based on meters. In 1988, a flat-rate tariff based on the power of the engine was introduced as a result of farmers' agitations for cheaper electricity (Dubash 2002) and complaints about corruption in meter reading and billing (Shah

and Verma 2008). According to Shah and Verma (2008), the flat-rate policy was of great benefit to poorer and smaller farmers, as it encouraged well and pump owners to sell water to neighbouring farmers, thereby giving poorer farmers access to irrigation. On the down-side, the expansion in groundwater irrigation increasingly depleted the groundwater reservoirs of Gujarat and led to the groundwater crisis experienced in large parts of Gujarat in the 1990s. Furthermore, the flat rate considerably under-priced the actual cost of electricity production and provision, and constituted a big subsidy to farmers. According to Energy Minister Saurabh Patel, the subsidy amounted to Rs 1,700 crores annually by 2004[40]. The farmers' lobbies were effective in preventing the Gujarat Electricity Board (GEB) from increasing the tariffs, leading to great financial losses in the GEB (Dubash 2002; Shah and Verma 2008). Between 1999 and 2004, the GEB accumulated losses of Rs 6,000 crores.

The escalating costs of providing electricity for agriculture forced the government to gradually reduce the availability of power, from being available 18-20 hours per day in the 1980s to 10-12 hours per day around the turn of the millennium. In 2002, the flat-rate tariff had stagnated at an annual rate of 350 rs per horsepower (HP) for engines smaller than 7HP and 500 Rs/HP/year for engines larger than 7HP (Shah and Verma 2008). The Government of Gujarat suggested increasing the rates to 1,260 Rs/HP/year in 2002, but this caused huge protests from the farmers' organisations[41]. As argued by Dubash in 2002 :

> "The power of cheap electricity as a vote getter has left successive state governments helpless to raise tariffs or shift away from the existing flat rate structure which has encouraged wasteful use." (Dubash 2002:251)

The final result was a compromise hike to 850 Rs/HP/year (Shah and Verma 2008). In 2003 the government re-introduced metered billing of electricity for well irrigation, but again ended up in a compromise with the farmers' organisations, and limited the new policy to new electricity connections.

[40] Frontline, February 27th 2004, "Dissent in the Parivar". http://www.frontlineonnet.com/fl2104/stories/20040227002404200.htm Accessed 5.3.2009
[41] Dionne Bunsha, "Farmers' power" in Frontline, Vol. 21, No.12

Surface water schemes and dams

Development planning in Gujarat after Independence emphasised surface water schemes and initiated dam projects on all the major rivers of the State in addition to medium and minor surface water schemes like the construction of tanks, diversion weirs, check dams, percolation tanks, and lift irrigation schemes (Government of Gujarat 1972).

The Perspective Plan for 1974-84 provides for minor irrigation schemes through check dams, percolation tanks, lift irrigation and wells. Check dams and percolation tanks are simple structures that help recharge the groundwater and therefore irrigation wells, commended in the plan for "greater adaptability even in difficult areas where bigger schemes are not possible", but with relatively small potential for expansion because most of the better sites for such schemes had already been explored and the remaining sites were more difficult and hence more expensive (Government of Gujarat 1972:117). Minor schemes have always been part of the irrigation policies of the State, but in the late 1990s, as part of a nation-wide trend, the Government of Gujarat gave renewed emphasis to minor irrigation schemes and initiated a large rainwater-harvesting scheme in partnership with NGOs and religious leaders who encouraged and mobilised people to construct checkdams. The Sardar Patel Participatory Water Conservation Programme was launched in 2000 and has been deemed a success as it contributed to the construction of over 10,000 checkdams in North Gujarat and Saurashtra (Prasad 2001).

The first large dam project in Gujarat was the Ukai-Kakrapar Project on the river Tapi in Surat. The first phase of this project was the Kakrapar Weir, completed in 1959, and the second phase was the Ukai Dam completed in 1973. The Dantiwada Dam on the River Dantiwada in Banaskantha was completed in 1965. Next came the Kadana dam on the river Mahi in Central Gujarat, initiated in 1969 and completed in 1979. In 1972, the Dharoi Dam on the Sabarmati River, and the Panam dam on the Panam, a tributory to the Mahi in Panchmahals District, were all approved by the Planning Commission. The Panam scheme was operational by 1981.

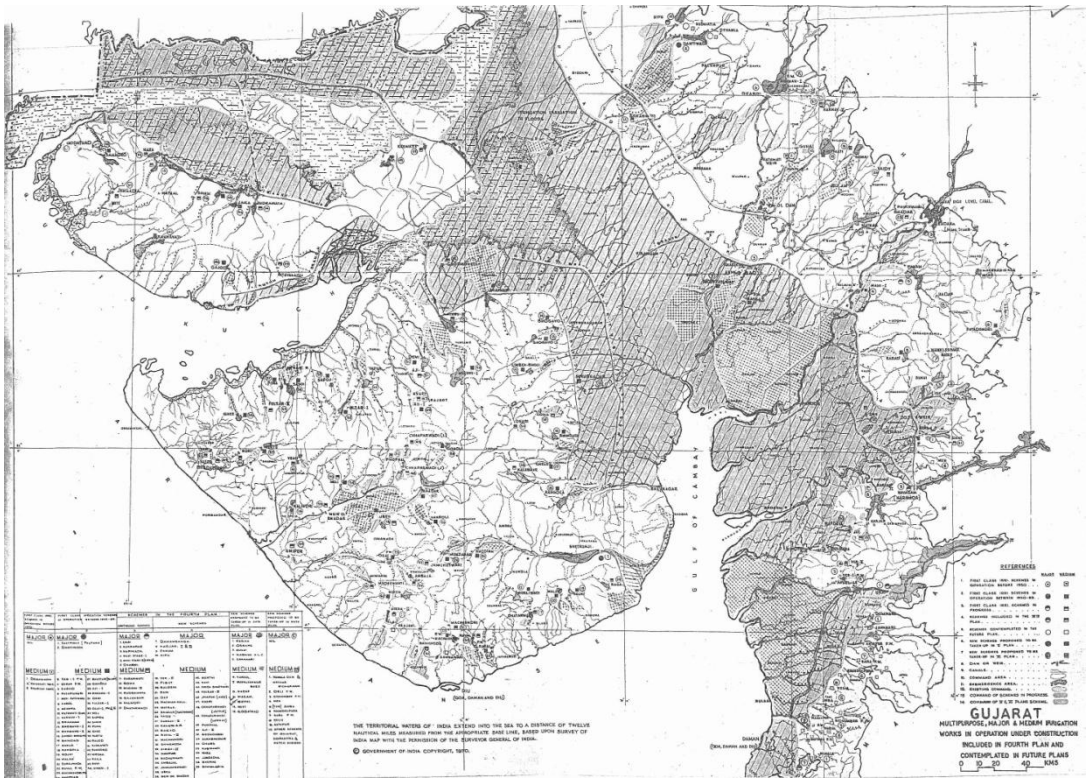
After the approval of the dams on the Panam and Sabarmati Rivers, there were no remaining rivers in Gujarat with sufficient water for damming except the Narmada. The vast alluvial plains of Gujarat offered few, if any, suitable sites for the construction of a reservoir for

economic exploitation of water resources (Government of Gujarat 1972). The largest of the existing dams was the Ukai, with a command area of 158,000 hectares and alone contributing 46% of the irrigation capacity of the dams of Gujarat before the Sardar Sarovar. However, the Ukai is located in the humid south with relatively abundant water resources. The Perspective Plan for Gujarat for 1974-1984 therefore attributes utmost importance to the speedy clearance of the Narmada Project for Gujarat:

> "In order to achieve self-sufficiency in food, extend facilities of irrigation to relatively dry areas of the State and reach the target of providing irrigation facilities to 50 per cent of the cultivated land in the State, top most priority will have to be given to the Narmada Project in the Fifth and subsequent Plans." (Government of Gujarat 1972:111)

An appendix to the plan details the "salient features" of the Narmada Project, which because of inter-state conflicts has been "unfortunately delayed (...) for nearly seven years" (Government of Gujarat 1972:174). "Its early implementation will usher in an area of prosperity for the entire western region, maybe the entire country," the plan says. The list of "salient features" of the Narmada Project is equal to the list of salient features recurring in the SSNNL publications of the last twenty years, but the numbers have changed. The planned height of the dam (full reservoir level) is 161.54 meters, as compared to the final project plan of 146 meters, and the planned irrigation command area, as per the Perspective Plan of 1972, is 29.66 *lakh* hectares, as compared to the final project command area of 18 *lakh* hectares. An economic appraisal had been done and showed that the benefit-cost ratio was 7.72 at 5% annual cost and 4.86 at 10% annual cost. As can be seen from the map of existing and planned surface irrigation schemes in Gujarat in 1970 (Map 4), the main features of the command area of the Sardar Sarovar Project were already decided almost ten years before a decision was reached on the share of water going to Gujarat.

Map 4. Surface irrigation schemes, operational and planned, Gujarat 1970.



(Source: Government of Gujarat (1972))

High hopes were pegged to the Narmada Project in 1972. The project is presented as crucial for flood control on the lower banks of the Narmada River, and for meeting the growing demand for power in the entire western India. The plan further expects the Narmada Project to reclaim large areas of the Banni and the Rann, i.e. the salt deserts and the grasslands of Kutch, areas very close to the Pakistani border. Irrigation is therefore also a defence strategy: "Sturdy peasants will be settled in these areas to provide effective defence of the national frontiers as has been done in Rajasthan for the Bikaner Canal area and also in Israel by Kibbutz" (Government of Gujarat 1972:173). Furthermore, the plan states that the Narmada will meet "in no small measure, the deficit of the entire country in food and fibre" (1972:173).

Summary

This chapter has shown that water is a limited and unevenly distributed resource in Gujarat, and an essential input in the important agricultural sector of the state. Rainfall in Gujarat is highly variable from year to year, to the extent that low rainfall years should be considered a

natural recurring phenomenon rather than an aberration or a failure. Natural conditions of climate, topography, and geology have shaped the hydrological landscape of the region. However, natural endowments are not the only determinants of water access and water scarcity. People in Gujarat have practiced hydraulic engineering for hundreds of years, utilizing the available technology of the time, but the access to these irrigation sources have been structured by socioeconomic position of different groups in society. Commersialisation of agriculture and available finance from money-lenders were important factors for the construction of well-irrigation in pre-colonial and early colonial Gujarat, as digging of wells required large investments and the ability to handle risk. The impacts of drought and the prevalence of drought-induced famines have been influenced by political factors like wars and political insecurity, and social and economic structures like caste, land ownership, and trade. Political interventions like relief policies and irrigation investments have helped reduce the severity of droughts in Gujarat, and famines have been averted since Independence. The government has emphasised the expansion of irrigation, both through subsidies to groundwater pumping and through the exploitation of every utilizable surface source. This is the background for the high hopes pinned on damming the Narmada in Gujarat.

4. The sixty-year project: A brief historical overview of the SSP

Ideas about harnessing Narmada water for irrigation are documented from the time of British rule of India. The first colonial Irrigation Commission of 1901 refers to a proposal made in 1863 for the formation of joint stock companies for the construction of a dam across the Narmada and irrigation works for tracts of land between the rivers Tapi[42] and Mahi in Gujarat (Khagram 2004; Dwivedi 2006). This proposal was, however, never realised. This chapter will give an overview of the protracted history of the Sardar Sarovar Project. The history of this project could itself have been an entry point to the history of Independent India, starting as it did in 1945 and continuously unfolding during the decades to follow. This, however, is beyond the scope of this dissertation, and I will limit the chapter to describe the main phases in the project's history, and the main factors that hindered or facilitated its realisation. This is important background for understanding the project and the conflict it created.

Inter-state water sharing disputes (1946-1979)

The first proposal for integrated development of the water resources in the Narmada River came from the central Government of India in 1946[43]. The first formal investigations for comprehensive planning of the project were initiated shortly after Independence in 1947, by the same Central Commission at the request of the Central Provinces and the Province of Berar and Bombay. These were the early years of Independent India, and the infant country was redrawing its internal boundaries. Madhya Pradesh was established as a state on November 1st 1956, and on May 1st 1960, the state of Bombay was divided into the two states Gujarat and Maharashtra, after a long period of agitation for independent statehood based on linguistic borders. Now, there were three political units to decide on the sharing of the Narmada water, and India was headed for decades of interstate disputes over the river.

[42] Also known as the Tapti River.

[43] Through its Central Waterways, Irrigation and Navigation Commission (CWINC) which was established in 1945. In 1951, it was renamed the Central Water and Power Commission (CWPC). The first Chairman of CWINC was Dr. A.N. Khosla. In 1952, the Ministry of Irrigation and Power was created, and the Central Water and Power Commission became its attached office (http://www.cwc.nic.in/RTI-Item-1.htm).

Today's Sardar Sarovar Project, originally called Broach Irrigation Project[44] was initially proposed by the State of Bombay and the Central Water and Power Commission (CWPC) in 1956. The proposal was for a 160 feet (48 metres) high dam at Navagam in Gujarat (see map), but with foundations strong enough for a further raising to 320 feet (96 metres). A slightly revised version was approved by the Planning Commission in August 1960: a 162 feet high dam and a canal providing irrigation earmarked for Broach and Baroda districts, and plans for extension of irrigation into Kutch and Saurashtra at a later stage (Khagram 2004).

The Broach project was inaugurated on April 1st 1961 by Prime Minister Nehru. The main question at this time was how to utilize India's natural resources for the national interest. Nation-building was one of the major concerns of the day, and mitigation of the centrifugal forces in the newly independent and immensely heterogeneous country was one of Nehru's main challenges (Guha 2007). Despite the respect Nehru had for Mahatma Gandhi, he disagreed profoundly with the Mahatma's anti-industrialisation visions of an India of thousands of village republics[45]. Water is constitutionally a *State* responsibility, but interstate competition over resources was regarded as a harmful "outcome of the pursuit of parochial and particularistic interests that went against the spirit of the nation and the national good" (Dwivedi 2006:65). No examination of potential negative social or environmental effects was done at this time (Khagram 2004). Shortly after, the Gujarat government started examining the potential for an even larger dam which would increase irrigation benefits tremendously. In 1963, they proposed a dam with a full reservoir level of 425 feet. This sparked off a set of inter-state conflicts, especially between the Government of Gujarat and the Government of Madhya Pradesh. The latter could not accept a Navagam Dam higher than 162 feet because that would interfere with Madhya Pradesh's own plans for irrigation from another dam further upstream (Khagram 2004).

In 1964, the Indian Ministry of Irrigation and Power appointed the Narmada Water Resources Development Committee, headed by Dr A.N. Khosla, who had been the first to propose the development of the Narmada's water resources in 1945-46 when he was the chairman of

[44] Broach was the British name for the district Bharuch in central Gujarat.

[45] Although continuously nourishing various parts of Indian public debates and organizational life, these Gandhian ideas did not achieve real prominence in policy debates until the rise of the "new traditionalist" discourse of the 1980s. More on Nehru's approach to development and planning in Chapter 7. For a concise presentation of Gandhi's environmental visions for India, see Guha (2000).

India's Central Waterways, Irrigation and Navigation Commission (CWINC). The Khosla committee submitted a master development plan for the Narmada River to the Indian government in September 1965, based on some guiding principles: National interests were to have priority over State interests; irrigation was to have priority over power; irrigation should be provided for the maximum area possible, in particular to arid areas in Gujarat and Rajasthan; and the quantity of water going waste to the sea should be minimized. The Khosla Committee initiated the first discussion of the need for a resettlement program (Khagram 2004). The Narmada development projects, including the SSP, have continued to heed the principles established by the Khosla committee.

However, the Khosla Committee did not end the interstate disputes which now reached a deadlock. The Governments of Maharashtra and Madhya Pradesh wanted to reduce the height of the Navagam dam, and the Government of Gujarat refused to yield to their demands. In July 1968, the Government of Gujarat appealed for a Tribunal to adjudicate between the parties based on the 1956 Inter-State Water Disputes Act (Khagram 2004). The Tribunal worked for ten years and reached its basic conclusion, the so-called Award, in August 1978. After a round of hearings[46], the final Award was handed down on December 12th, 1979. It proposed a scheme of more than 3000 dams, including a 455 feet high dam named Sardar Sarovar Dam at the Navagam site, and another, even larger, dam further upstream, the Narmada Sagar Dam of 860 feet. The Award further outlined the provisions for compensation to and rehabilitation of the oustees from submerged land. The Award established a Narmada Control Authority with the responsibility for ensuring the parties' compliance with the decisions of the Tribunal (NWDT 1979).

The first public protests against the Sardar Sarovar Dam had occurred in Madhya Pradesh in 1978. Prime agricultural land would be submerged in the region of Nimad if the Sardar Sarovar Dam reached 455 feet, and the protests came from Nimad inhabitants, mainly farmers with medium to large landholdings (Khagram 2004).

During 1978, even before the publishing of the Tribunal's final Award, the Government of Gujarat had started negotiations with possible donors for the expensive project: The World

[46] During which the Government of Madhya Pradesh unsuccessfully asked for a reduction in the Sardar Sarovar dam height to reduce the number of people to be resettled.

Bank, the UNDP, and Japan. The first World Bank reconnaissance mission was carried out in Gujarat in November 1979. The Bank representatives suggested further in-depth preparatory investigations and that the Government of Gujarat should establish a high-level Narmada Planning Group (Khagram 2004). These suggestions were followed, and the work of the Narmada Planning Group is the topic of Chapter 8.

A growing resistance movement (1980-1993)

The Gujarat-based NGO Arch-Vahini, headed by Anil Patel, had been working with *adivasi*s in Gujarat since the 1970s, including in the areas around the Narmada River. They started mobilizing for *adivasi* rights in the SSP in 1980, informing *adivasi* communities of their rights and the plans for the valley, and pressurizing the government for fair resettlement packages.

Activists from the Delhi-based environmental organisation Kalpavriksh toured the Narmada Valley on a field study in July and August 1983. Based on this, they wrote the first comprehensive critique of the Narmada projects. The report was published in the Indian journal *Economic and Political Weekly* in June 1984 (Kothari and Bhartari 1984).The Kalpavriksh critique was based on a deep scepticism to the contents of mainstream "development" exemplified by the SSP. They question the desirability of the agricultural and industrial 'revolutions' that the project is expected to bring about, and argue that there is always a "disastrous backfire to any activities which are carried on *against* nature rather than *with* nature" (Kothari and Bhartari 1984:919). They argue that the green revolution has not alleviated hunger and malnutrition, and that the industrial revolution has led to air, water and noise pollution. These are the inevitable effects of a destructive development model based on industrialisation, and the reason why the environmental critique of large dams questions

> "whether the project as a whole (even if successfully implemented) and the broad policy behind it, are really 'development' in the true sense of the word or whether they may not lead to a chain of environmentally destructive consequences which would negate all the short-term gains made by the project." (Kothari and Bhartari 1984:907).

However, the critique against the project was also levied at the level of planning and implementation. Kalpavriksh claimed that there was no overall planning agency for the entire package of Narmada projects and that the agencies existing, including the Narmada Planning

Group in Gujarat, were locked in unproductive feelings of distrust against each other after the decades of inter-state dispute. They argue that without a single authority governing all the dams, canals and power stations on the Narmada River, the Narmada Valley Project will suffer a number of shortcomings:

> "The absence of any single planning body has meant the absence of any single comprehensive plan for the entire project. The 'Master Plan' thus gives details of the constituent dams and canal systems but hardly deals with other crucial aspects – such as preservation of catchment forests, education of farmers, provision of medical facilities, existing and future demand-supply positions of firewood and other forest produce, treatment of pollution, rehabilitation of oustees, etc." (Kothari and Bhartari 1984:909)

Kothari and Bhartari argued that "the only comprehensive and truly scientific method" of evaluating the various alternative designs of a project is "systems analysis" which requires "complete and accurate data on all the important variables that are to be dealt with" (Kothari and Bhartari 1984:907). Despite the Narmada authorities' claims to the contrary, the Kalpavriksh team concluded that such 'systems analysis' had not been done.

Meanwhile, the Arch-Vahini and the international NGO Oxfam lobbied the Indian Government and the World Bank for proper compensation. In 1983, the Bank's resettlement consultant, Thayer Scudder, travelled to the Narmada Valley and submitted a highly critical report about the status of the rehabilitation policy. People who would be affected by the submergence mobilised in the first big public protest against the project in March 1984. In 1984, the Narmada Control Authority outlined a resettlement plan and commissioned the Centre for Social Studies in Surat to conduct a detailed socio-economic survey of the project-affected people (Khagram 2004).

Other organisations joined in the footsteps of the Arch-Vahini in 1985 and started organising the oustees in Maharashtra and Madhya Pradesh. In Maharashtra, Medha Patkar formed the Narmada Dharangrast Samiti (Narmada Action Committee). Other grassroots organizations working for the rights of the poor in the Narmada Valley joined the struggle, for example the Khedut Mazdoor Chetna Sangath (The Peasants and Workers Consciousness Union) based in Alirajpur, Madhya Pradesh, which organised the hill *adivasis*. International and foreign organisations, including Oxfam, Survival International and the Environmental Defense Fund, supported these struggles and lobbied Indian governments and the World Bank from abroad.

The World Bank approved a loan and credit agreement of 450 million USD with the Government of India in 1985, on the condition that the State Governments followed the loan agreement and adopted and implemented proper resettlement policies. However, the NGOs were not satisfied with the ways that the Gujarat Government handled the oustees, and later this year, Arch-Vahini filed a writ petition on behalf of the tribal oustees in the Indian Supreme Court. The main issue of contention was the rights of landless encroachers, a category to which many *adivasi*s belong, to compensation for the loss of livelihoods. The Court issued a stay order on the work, and appointed an inquiry commission for further investigation (Patel 1995a; Patkar 1995).

In 1986, a major divergence appeared between the Ministry of Environment and Forests (MoEF) and the Ministry of Water Resources (MoWR). Land surveys in MP had shown that there was not enough agricultural land available for resettlements of all the people displaced by the Sardar Sarovar and Narmada Sagar dams. The MoWR wanted to resettle people on degraded land which was classified as forest, and therefore protected, but the MoEF refused (Khagram 2004). According to Anil Patel, all organisations working in the Valley lobbied the Ministries for release of denuded forest land in this period (Patel 1995a; 2001).

In response to the growing domestic and international opposition to the project, the World Bank sent its largest ever mission to the region in 1987 to check the conditions of the tribal people who were facing displacement. The mission found that the Bank's condition that each oustee should be provided with 5 acres of land as compensation was not being implemented. Even the new President of the Bank, Barber Conable, came to India in November 1987 to meet the tribals and put pressure on the Government of Gujarat.

In December 1987, the Government of Gujarat announced a resettlement and rehabilitation policy that incorporated most of the demands of the Narmada movement, including the rights of adult sons to land and of encroachers to the same land compensation as landed oustees. In the resistance movement, a rift emerged. The Maharashtra-based NGOs, led by Medha Patkar, announced in August 1988 that they would oppose the dam on grounds of its basic development model even if the State Governments could find enough land for resettlement. They established the Narmada Bachao Andolan ("Save the Narmada movement"). Anil Patel

describes this turn of event from his hitherto allies as a surprise move (Patel 1995a). This is his description of what happened:

> "Soon after the December 1987 resettlement and rehabilitation policy of Gujarat state was hailed as a revolutionary policy by all concerned, the organizations working in Maharashtra and Madhya Pradesh stopped looking for the ways to achieve similar policies in their states and started raising doubts about the policy of Gujarat, stating it was destined to be merely a piece of paper. There wasn't going to be enough land available, they concluded. Before long, city-based intellectuals in Bombay, Delhi, and so on jumped into the arena, arguing vigorously that this was a charade and the tribals were bound to be cheated and they must not trust the government." (Patel 1995a:189-90)

Medha Patkar describes the NBA view of what happened, alleging that the Arch-Vahini was naïve to trust the government resolutions:

> "After that meeting [in spring 1988], we signed a common letter saying that we were giving the government two months' time, and if they did not answer all the questions in two months, we would oppose the project. Within two months we really mobilized the people and said that this is the stand we have taken and we must stick together. We also had to explain to them what the logical end of the process would be if the government did not respond. This is how the Maharashtra and MP organizations and the Gujarat people who joined us came to oppose the dam. The Vahini took a different stand. They felt it was not necessary because in June some government resolutions were issued by the Gujarat government, and in December a few more came so they decided not to join us in unitedly opposing the dam. We felt that the few resolutions by one government did not mean much since the issues were much broader. For instance, even on rehabilitations, the issues of all the three states should be looked at together. Since that time, the Vahini and we have had different paths to follow. (…) From then onward it has been a period of mass action after mass action after mass action." (Patkar 1995:162)

Oxfam's John Clark, then campaigns director and responsible for the organisation's Narmada work, supported the position of their long-term partners in India, Arch-Vahini. In a letter to Medha Patkar, he describes the different perceptions of the situation in the valley:

> "You paint a picture of total resistance in the valley to the project and a near total refusal of oustees to move. This just does not accord with what I see with my own eyes and hear with my own ears. (…) I do not intend to suggest that poor farmers are not opposing the project. My point is that the fiercest resistance comes from the medium and large farmers (who stand to lose the most, who are well organised and powerful). (…) I do declare a bias, however. That bias is towards the tribal oustees who we feel are most vulnerable. I simply don't hear them saying that they are determined not to move, that they refuse to shift down to the plains, that they are totally opposed to the project and that they want our help to stop the dam." (John Clark, Oxfam Campaign leader, in letter to Medha Patkar, 20.02.1990. Emphasis in original.)

The Arch-Vahini coalition argued that it was too late to stop the project in the late 1980s, and that the opposition movement had yet to present reliable alternatives to the Narmada for meeting the growing needs for water and electricity in Gujarat[47]. Arch-Vahini continued to exert pressure on and work with the Gujarat Government for proper rehabilitation of all the oustees to be resettled in Gujarat. The organisation is now largely keeping a low profile in the still fierce public controversies over the Sardar Sarovar Project.

The Narmada Bachao Andolan has fought the SSP with all non-violent means available in a much-admired and internationally acclaimed movement. Its alliance with in particular the International Rivers Network and the Environmental Defense Fund proved powerful, and the battle was fought on several fronts, in the World Bank, in influential World Bank member countries, in Delhi, Maharashtra and Madhya Pradesh. One of the demands was a complete review of the project, as the NBA found the planning base and the cost-benefit analyses of the project flawed, and hoped a revelation of this could stop the project. Another strategy was total non-cooperation in the Narmada Valley, denying government officials access to the villages, and refusing to cooperate with the surveying and planning for resettlement.

Singh (2000) sums up the incompatibility between the strategies of the two movements:

> "ARCH-Vahini's success depends on achieving a collaborative relationship between the government and the oustees, which the anti-dam movement is seen to obstruct, while the NBA's success largely depends on the continued failure of resettlement measures, which ARCH-Vahini is trying to prevent. The relationship between the two groups has been quite strained, even at times highly antagonistic." (2000:9)

This has led to a tense and, at times, hostile relationship between the two groups, and a failure to make a common cause even on issues about which they agreed (Dhagamwar 2000) .

Exit World Bank

In response to the immense pressure from civil society organisations for cancellation of World Bank funding of the SSP, the World Bank initiated in 1991, for the first time in its history, an independent review of a project under funding. The Terms of Reference of the Independent Review (IR) were to assess the implementation of the SSP with regards to 1) resettlement and

[47] Expressed in the letter from John Clark, Oxfam, to Medha Patkar, 20.2.1990.

rehabilitation and 2) the amelioration of the environmental impacts of all aspects of the project (Morse and Berger 1992). The IR team was lead by the American politician Bradford Morse and the Canadian lawyer Thomas Berger, and their final report, published in June 1992, is sometimes referred to as the Morse-Berger Report or simply the Independent Review. Starting in September 1991, they surveyed the Narmada Valley and the planning offices of the Sardar Sarovar Project and visited relocation sites. Their conclusions were highly critical: "We think that the Sardar Sarovar Projects as they stand are flawed, that resettlement and rehabilitation of all those displaced by the Projects is not possible under prevailing circumstances, and that the environmental impacts of the Projects have not been properly considered or adequately addressed," they said (Morse and Berger 1992:xii). Their report recommended that the Bank withdrew from the project.

After these devastating conclusions, the Central Government of India and the Government of Gujarat started wondering whether cancelling the World Bank loan agreement might actually make their lives easier. The attitude in Gujarat was always that the project would be carried out with or without World Bank funding. Within the Bank, however, the prevailing opinion was that the involvement of the Bank was essential to achieve proper resettlement and environmental protection. In July 1992 it sent a large review mission (the Cox commission) to India to assess whether the Independent Review assessment was correct (Wade 2004). After heated discussions in the Board of the World Bank in the fall of 1992, the Bank decided to continue the funding and review the compliance with the loan conditions six months later. The Board was scheduled to decide whether to continue funding in the end of March 1993. By then, its South Asia vice-president was convinced that cancellation of the loan was the only alternative. This was communicated to the Indian government. A few days before the scheduled Board meeting, the government of India announced that it would not ask for continued disbursements from the Bank (Wade 2004).

The then leaders of the Sardar Sarovar Project present this decision as an entirely unilateral decision from India. According to Y.K. Alagh, the World Bank never accepted the Independent Review, and it never acted on it:

> "The Government of India and the Government of Gujarat threw the World Bank out of the Project before the Bank acted on the Morse Independent Review at the meeting of

> the Bank's Board of Directors. The Review was never accepted by the Bank and they withdrew from the project on India's request." (Alagh, interview, 1.12.2004)

Sanat Mehta, former Minister of Irrigation (1980-1985) and Chairman of the SSNNL (1988-1990 and 1992-1994) said the cancellation of the loan was an *Indian* initiative, and that the Indian representative to the World Bank suggested it was time to withdraw from Bank funding:

> "(…) when second time I went to the World Bank, after the Morse mission, I had gone again second time, at that time my Indian representative Mister Bajar, do you know what did he tell me? *'Mr Sanat Mehta, time has come that you should tell World Bank, that we don't want your finance.'* He said it is only Gujarat which can tell this. I said why you cannot tell it? He said *'I belong to Bihar, my Suvarnarekha project*[48] *is with the World Bank. But my state is so bad in finances, that we cannot say that. You can say it.'* So then I communicated to Narasimha Rao [then Prime Minister of India], that it is better to take it out. And we took it out. And I had never difficulty of finance." (Sanat Mehta, interview, 4.3.2006)

Mehta was also quite clear that pressurizing the World Bank to quit the SSP would not help the anti-SSP movement achieve its goals:

> "So she [Lori Udall of the Environmental Defense Fund] wanted to meet me. I said you can come and meet me. So she came to meet me at the World Bank [headquarters in Washington]. I told her, in the presence of Baxter, who was at that time in charge of the projects of India, I said, 'look here Lori Udall, you are pressurizing the World Bank to get out of this project. It is not in your interest. Take it from me that if World Bank goes out of financing, the project will move much faster than now'. It has been proved." (Sanat Mehta, interview, 4.3.2006)

After the World Bank: Financial problems and delays (1994-2009)

Despite Sanat Mehta's assurance that financing the project was never a problem without World Bank funding, letters from the years after tell a different story. The Central Government provided "Additional Central Assistance" to cover the unutilised balance of the World Bank loan, but the project ran into serious financial difficulties in the mid-1990s. The SSNNL sought additional financial resources from the private market through the issuing of bonds in the SSP, starting in November 1993. The first round of bond sales raised 300 crores Rupees, and was deemed a success (Srinivas 1994). However, it did not cover the financial

[48] The World Bank (IBRD/IDA) funded the Subernarekha Irrigation System Project, a dam and canal project on the Suvarnarekha River in Bihar with a loan of 127 million dollars from 1982 to 1989 (www.worldbank.org.in).

needs of the project. Lack of funds has significantly delayed the implementation of the project. This started even before the cancelling of the World Bank loan, so the terminated loan agreement only explains this partly. A memo written by Sanat Mehta in 1994 or 1995[49] states that "extreme shortage of funds" in August 1992 had necessitated the reduction of construction work, and no new works were taken up on the canal network in Phase II beyond the river Mahi (Mehta 1994a). The works were not resumed until Sanat Mehta again took over as chairman of the SSNNL in June 1993, and Mehta argues that this delayed the project considerably:

> "Thus, the above mentioned schedule of SSP will require enormous amount of detailed planning and execution schedules. Let us bluntly admit that while doing so we will have also to make up the delay caused by the decision of deferring all the works beyond Mahi in 1992-93." (Mehta 1994a:3).

In October 1994, a meeting in the administration of the Gujarat Government was held to discuss the draft annual plan for Sardar Sarovar Project in 1995/96 (SSNNL 1994b). According to the minutes from the meeting, it was here concluded that reaching the goals of the State's 8th five-year plan was unrealistic, given the budgetary constraints and a politically-decided ceiling on market-borrowing options. The proposed outlay in 1995/96 of Rs 1930 crores was proposed cut by Rs 600 crores, all of which was suggested taken from canal construction. The Chief Secretary urged in the meeting that the construction of the canal system and the dam be synchronized, and said that the proposed budget had allocated too much money for canal construction compared with dam and hydropower works: Seven times as much money was allocated for canal as compared to the dam and power house. The ratio should be one to three, not one to seven, he argued (SSNNL 1994b). The minutes report that the Chief Secretary explained the consequences of the delay:

> "Though Gujarat has already done major work on R&R [Resettlement and Rehabilitation], bottle-necks are expected in implementation of R&R in other States and therefore possibility of reaching the height of 110 mtrs. of Dam within a year is extremely remote." (SSNNL 1994b:1)

In the recasting of the budget, suggested by the meeting, priority is given to raising the dam to 110 metres as quickly as possible:

[49] The memo seems to be written in December 1994 as a collection of arguments for the release of sufficient funds for canal construction in the state plan/budget for 1995/1996.

> "The allocation of Rs. 175 crores to Unit-1 (Dam) is absolutely necessary to raise the Dam to 110 mtrs. as quickly as possible. The allocation of Rs. 495 crore to Unit-III (Hydro Power) (…), should not be reduced because 84% of the share of this amount is coming from the other three States and our share works out to only Rs. 92 crores. If both these provisions remain the same, then, the share of other states will also remain as it is. Hence the curtailment in provision has to be in the canal system outlays which was earlier proposed at Rs. 1260 crores."(SSNNL 1994b:4)

The financial constraints have implications for achieving the targets:

> "But now that the budgetary allocation would be at same level and higher market borrowings are ruled out, achieving 8th plan-goals are well-nigh impossible." (SSNNL 1994b:5)

Sanat Mehta, then Chairman of the SSNNL, did not approve of the suggestions to scale down the implementation rate of the project, and wrote on the document that "I do not think it would be proper not to raise the plan outlay for the year 1995-96" and warns against "a big setback to early implementation of the project"[50]. He advocated the raising of funds for the SSP by expanding the issuing of bonds, and pleaded intensively in letters to the Central Government for help in pressuring the states of Madhya Pradesh, Maharashtra and Rajasthan to pay their advance shares in time and clear their outstanding dues (Mehta 1994b; 1994c; 1994d)[51]. He starts by establishing that "[o]ne of the major issues we continuously strive to address is mobilising financial resources for early completion of the project".

> "The non-payment of shares by the participating States affects the implementation of the project and consequently delays realisation of benefits. (…) With such a huge sum in arrears, even after resorting to borrowing funds from banks and other sources, the paucity of funds has affected the cash flow of the project." (Note on outstanding shares of participating states, attachment to letter to Finance Minister, Planning Commission and Water Minister (Mehta 1994b; 1994c; 1994d)

The letter also asks permission to expand the bond market to the Non-Resident Indian community. In 1994, Mehta proposed to raise more money from the "substantial savings" of the Non-Resident Indian (NRI) community by issuing repatriable bonds in the SSP. "If the Nigam is given the facility to borrow from NRI's on a repatriable basis, a large sum of money can definitely be raised at much cheaper cost than domestic borrowing," he argued in a letter to the Central Government and the Planning Commission (Mehta 1994b; 1994c; 1994d).

[50] Handwritten notes on the copy of the meeting minutes circulated within the SSNNL.
[51] The letters were sent to Finance Minister Manmohan Singh, deputy chairman of the Planning Commission Pranab Mukherjee, and Minister for Water Resources V.C. Shukla.

However, the accelerated construction of the canal system that Mehta wanted was about to face new obstacles on other fronts. The Narmada Bachao Andolan had filed two cases in the Supreme Court of India in May 1994, the first demanding the public release of the report of an Indian review of the SSP (the so-called Five-Member Group report), and the second a public-interest litigation claiming that the SSP violated fundamental human rights. After numerous delays, the hearings on the public-interest litigation began in November 1995 (Khagram 2004). The Supreme Court ordered an indefinite stay on all construction during the court case, which lasted five years. In November 2000, the three judges of the Supreme Court gave their verdict. The majority ruling (two of three judges) was that the benefits of the SSP were greater than its costs, and that the project was not a violation of human rights. The Government of Gujarat was allowed to continue construction, and was urged to complete the project expeditiously. Before every five-meter increase in the dam they have to seek clearance from the Environmental and Rehabilitation Sub-groups of the Narmada Control Authority and document that all people and villages to be affected have been properly resettled (Iyer 2003).

The project could then continue, but is far from complete, more than sixty years after the first ideas and plans were discussed. Clearance for raising the dam to 110 metres was not given before March 17th 2004, and the dam stayed at that height until March 2006, when the clearance was given to raise the height to 122 metres. The Main Canal reached Rajasthan in March 2008. Currently, in September 2009, the dam is 122 meters high, more than four-fifths of the way towards the planned 146 meters. Most of the canals have been built, with the exception of the lowest level, the Subminor canals that will actually bring the water to farmers' fields. Higher-level channels are also facing problems and suffer disrepair. This is discussed in much more detail in subsequent chapters.

Summary

The realisation of the Sardar Sarovar Project spans the history of Independent India, and is still not completed. At first it was impeded by the self-governing ambitions of the three newly created states in India, Madhya Pradesh, Maharashtra, and Gujarat who could not agree about what would be a fair sharing of the river that tied them together. The inter-state dispute delayed the project around twenty years, and when the Narmada Water Disputes Tribunal reached its final award in 1979, the Government of Gujarat hoped that the contestations were

over. In this, they were seriously mistaken, as the first popular protests against the project appeared in 1978. The opposition to the project grew from small separate, localized protests among farmers threatened by submergence to an international coalition of anti-dam organisations and social movements in the end of the 1980s, a development that nobody could have foreseen. The opposition movement against the SSP was split and pursued different strategies from 1988, the Arch-Vahini of Gujarat pressurizing the Government of Gujarat from within, and the Narmada Bachao Andolan adopting a no-dam-at-any-cost stance together with its international allies. The international pressure against the project became so strong that the World Bank loan was cancelled, and the project met increasing financial difficulties without reducing the ambitions of the Government of Gujarat. The next chapter will situate the SSP conflict in the larger international dam debate, and describe how the views on dams changed throughout the 1980s and 1990s.

5. Narmada and the international dam debate – an overview

The Sardar Sarovar Project was not the first dam in India to cause large-scale displacement and ecosystem changes. Since Independence, India has built hundreds of medium and large dams all over the country, and the numbers of displaced persons are in millions (McCully 2001). Most of these dams were planned and built before the Sardar Sarovar Project. The scale that the Narmada conflict reached is due not so much to the particular features of this dam project compared to other dams in India, but to the timing of the planning and early construction of the SSP, which took place during the 1980s. This coincided with the growth and consolidation of an international social movement against the development policies that had been pursued up to then. New norms were evolving for environmental considerations and the rights of indigenous peoples, and these norms were institutionalised in national and international laws, regulations and institutions (Khagram 2004; Wade 2004). The anti-dam movement was one of the most important and well-organised movements championing human rights and environment causes in this period, and the SSP, with its World Bank funding, became a symbolic struggle for both the anti-dam and anti-World Bank movement.

1984 is a good place to start when making a timeline of the transnational movement against large dams and canal irrigation. This year, the widely-read radical environmental journal *The Ecologist* published several articles with case studies from around the world criticising large dams and praising traditional irrigation systems[52]. The articles were also published in what was to become the three-volume publication "The Social and Environmental Effects of Large Dams" by Edward Goldsmith (editor of The Ecologist) and Nichlas Hildyard: Volume I "Overview" (1984), Volume II "Case studies" (1986) and Volume III "A Review of the Literature" (1992) (Goldsmith and Hildyard 1984b; 1986; 1992). The publication presented a

[52] The arguments and ideas expressed in these publications were of course not new in 1984. Environmental concerns had been growing for more than a decade, and large dams had been one of the main targets of environmental critique. For example, a large conference was held in the USA on December 8-11, 1968 on "The Ecological Aspects of International Development" with a specific focus on dams. It was convened by the Conservation Foundation and the Center for the Biology of Natural Systems at Washington University, and the papers were later published as a book under the name "The Careless Technology", with introduction written by Edward Goldsmith (Farvar and Milton 1973). However, it was not until the 1980s that an anti-dam movement was consolidated at the global scale.

collection of dam conflicts from the whole world, mainly in developing countries, and the destructive effects of these on ecology, livelihoods, and cultures. Along with Patrick McCully's book "Silenced Rivers" (2001), these were for many years the main sources of arguments against large dams for the environmental movement worldwide. With the publication of the World Commission on Dams' report in 2000, a new source of documentation of the problems of large dams became available for dam critics.

The general critique of large dams

Patrick McCully's "Silenced Rivers" is the most comprehensive and updated summary of the arguments against large dams. It was originally published in 1996 and a second and updated edition came in 2001 (McCully 2001). McCully attacks the "model of development" behind large dams, and emphasises their symbolic value:

> "Massive dams are much more than simply machines to generate electricity and store water. They are concrete, rock and earth expressions of the dominant ideology of the technological age: icons of economic development and scientific progress to match nuclear bombs and motor cars." (McCully 2001:2)

The critique against large dams has focused on three main issues. Firstly, on the dams' negative *social* effects on submerged communities. Secondly, on the dams' negative *environmental* effects, both on submerged areas, downstream ecologies and the environmental side-effects of excessive canal irrigation. And thirdly, on their poor record in *performance* and cost overruns.

Dam-induced displacement has evicted tens of millions of poor and powerless people from their homes and lands, destroying their livelihoods and cultures. Largely, dam oustees are already marginal, indigenous peoples whose livelihoods depend on the riverine ecosystem and the forests surrounding the rivers. "These legions of dam 'oustees', as they are called in India, have, in the great majority of cases, been economically, culturally and emotionally devastated," McCully writes (2001:66). Not only reservoirs, but also the construction sites and the canal networks displace people, and these have rarely been taken into account as project affected and entitled to compensation. The compensation policies are usually meagre and poorly implemented, and resettlement policies are failures, both because of the difficulties of finding suitable land for resettlement, and the near impossibility of rehabilitating

indigenous people's livelihoods and culture (McCully 2001). Another human cost of dams is the increase in water borne diseases accompanying reservoirs.

There are numerous negative environmental effects of dam projects. The main environmental impacts of dams listed by McCully (2001) are: that the ecosystem upstream in the dammed river is changed, that the altered sediment load of the river causes changes in downstream morphology of the river bed, that downstream water quality is changed, and that all these three changes, in combination with the blocked migration routes for organisms, lead to a reduction of biodiversity. In the command area of canal networks, water logging and salinisation are the main problems, caused by excessive application of water in soils not suitable for this. With the increased knowledge and awareness about the dangers of global warming which has come after the first publication of "Silenced Rivers" in 1996, the effects of dams on global greenhouse-gas emissions have become an issue. While dams provide renewable energy, their reservoirs are known to emit carbon dioxide and methane because of the decomposition of submerged organic material (McCully 2001).

Not only are there numerous negative *side*-effects of dams. Dam critics also argue that dams generally do not perform as intended. The benefits of dams are nothing but empty promises (McCully 2001). Overestimation of river flows in the planning phase makes it hard to fulfil the projected irrigation and power benefits; rapid sedimentation of the reservoir drastically shortens the lifespan of most dams; and ignorance of basic geological features of dam sites cause technical problems for building and operation of the dams. These problems cause massive cost overruns in the construction phase, and poor performance in the operation phase of a dam (McCully 2001).

How, then, does the anti-dam movement explain the fact that dams are being built despite their poor performance, escalating costs, and negative effects on the environment and human societies? The anti-dam movement generally does not accept as an explanation only developing countries' lack of human, financial and technical resources for proper feasibility studies and planning processes. Nor is wishful thinking or misplaced optimism a sufficient explanation, because the dam industry is seen as demonstrably unwilling to learn from past lessons. Instead, McCully argues that a 'building bias' is the impetus behind dam construction:

> "the dam industry makes money by building dams (and usually pays none of the costs of their poor performance) and considerations of whether or not their projects make good technical or economic sense are inevitably secondary to the desire to build." (McCully 2001:101)

In addition, powerful potential beneficiaries of power and irrigation water lobby for dams:

> "Regardless of promises made before the dam is complete, the priority given to its various functions will invariably be based on political and economic power. If the farming lobby is politically strong, diverting water for irrigation may be given priority over hydropower. More often, the easily collected income from electricity production and the political power of electricity consumers will tilt the dam operators toward maximizing the amount of water flowing through their turbines." (McCully 2001:133)

Large dams are the material results of a 'disease of giganticism', and the only real beneficiaries of large dams belong to the corporate sector, including environmental consultancies and electricity-intensive industries like aluminium. These are

> "not just passive recipients of government largesse but actively persuade politicians and bureaucrats to build more dams. Such 'lobbying' routinely involves bribery: the massive costs of large dams means that they are an almost uniquely effective channel for kick-backs, greatly increasing their attractiveness for business executives, aid bureaucrats and politicians. In recent years dams have been at the centre of major corruption scandals in Britain, Malaysia, Kenya, Japan, Italy, Brazil, Paraguay and Argentina." (McCully 2001:20)

This line of explanation, in essence focusing on the vested interests of powerful builders and politicians (and, interestingly, aid bureaucrats), is a continuation of the early dam critique formulated by Goldsmith and Hildyard, for example in 1984 in a paper titled "The Politics of Damming". The evidence presented by Goldsmith and Hildyard suggests that the many documented negative side-effects of dams and canals are *wilfully* disregarded, and they conclude that the reasons for the continued dam building are *political*:

> "Indeed, it would appear that those who stand to gain politically and financially from the building of a large dam are willing to go to inordinate lengths to ensure that it will be built." (1984a:21)

For example, argued Goldsmith and Hildyard, despite the established wisdom that a drainage system is necessary to avoid water logging in artificial irrigation systems, drainage systems are neglected in most large canal-irrigation projects. This is because the builders are so eager to construct the dam that they will underestimate costs in the planning phase in order to get a project approved. The costs of such wilful neglect will be borne by someone else in the future. They cite an inquiry-committee report into an Australian hydro-electric bureaucracy. The

report argued that it functioned as a state within the state and might be considered as "the archetype of the kind of government instrumentality (which has been) described as a 'guild authority'", and that "such organisations are ill equipped to handle problems which involve multi-objective planning, environmental considerations or interdisciplinary co-operation" (quoted in Goldsmith and Hildyard 1984a:20).

Goldsmith and Hildyard argued, based on the collected evidence from dam-opposition groups all over the world, and in particular from the case of the Aswan Dam in Egypt, that there are certain elements in common for large dam projects all over the world: Firstly, they are initiated based on authorities' "political and psychological fears" of a water crisis and consequent loss of power; secondly, the dam builders pursue their task with "messianic fervour", i.e. with great hopes of salvation from traditional ills in the modernized future, and thirdly, the dam builders are unwilling to contemplate criticism. The designers and planners are driven by the desire to impress their colleagues, and the politicians "need to 'nurse' their power base" (Goldsmith and Hildyard 1984a:7)[53].

The role of Sardar Sarovar in the anti-dam movement

Not only was the course of the Narmada project's history altered by the transnational anti-dam movement, as detailed above. The influence has gone the other way as well. In particular the Sardar Sarovar Project has played a pivotal role in the transnational anti-dam movement.

Ashish Kothari from the environmental organisation Kalpavriksh knew Edward Goldsmith personally and sent him the Kalpavriksh report on the Narmada ("Narmada Valley Project: Development or Destruction?" (Kothari and Bhartari 1984)) in time for inclusion in The Ecologist along with the other dam critiques (Khagram 2004). The Kalpavriksh report on the Narmada was one of the case studies in volume II of "Social and Environmental Effects…" (Goldsmith and Hildyard 1986). In turn, "The Social and Environmental Effects…" was used by Kalpavriksh and the Narmada-movement in India when they lobbied the central Department of the Environment against the SSP (Khagram 2004).

[53] Page reference is to a printout of the article from the internet: http://www.edwardgoldsmith.org/page93.html , accessed 15.06.09.

The background for Patrick McCully's "Silenced Rivers" (2001, first edition 1996) is, among other things, McCully's experience as an activist with the Narmada Bachao Andolan and with the International Rivers Network. As he writes in the book's acknowledgements:

> "The inspiration to write *Silenced Rivers* came from the unshakeable commitment and integrity of the Narmada Bachao Andolan and the deceitfulness of the backers and builders of the Sardar Sarovar Dam." (McCully 2001:viii).

Throughout its pages, examples from the SSP process are used to support the arguments of the book. McCully is currently the campaigns director for the International Rivers Network, an international activist network working against dams "and the development model they represent" and for the protection of rivers and the communities depending on rivers (see www.irn.org). He was introduced to the problems of large dams by Edward Goldsmith and Nicholas Hildyard who first advocated that he update their book, and then supported his decision to write a book of his own (McCully 2001).

Goldsmith et al. highlights the problems of the Sardar Sarovar Project in volume III of "The Social and Environmental Effects", the literature review. They describe scandalous human displacement without proper compensation, "equalled only by the sheer technical incompetence" with which the project is planned and executed (Goldsmith, Hildyard et al. 1992:vi). The benefits accrue to the institutions promoting the project: "the lending institutions, the state and national governments, the contractors, the bureaucrats, the engineers, the makers of heavy machinery and big turbines" (Goldsmith, Hildyard et al. 1992:vi-vii). The words are harsh:

> "While one does not want the odium of asserting that plain corruption, self-interest, greed and stupidity underpin the motivation to build schemes like those of the Sardar Sarovar, the evidence before us suggests these factors cannot be insignificant, even if their workings are tacit and covert." (Goldsmith, Hildyard et al. 1992:vii)

Incompetence dogs every aspect of the project, they write:

> "There are serious doubts whether the schemes will deliver the water to anywhere it is needed; (…) Why proceed then with what appears, by any standards, to be a monumental folly? It has to be concluded that such a project is of benefit to someone, because, as we know, the World Bank had overridden the recommendation of its Review Committee and decided to continue in the financing of the Sardar Sarovar projects. Yet it is already certain that the projects will *not* benefit the people in whose name they were justified, and are now being built." (Goldsmith, Hildyard et al. 1992:vi-vii)

There is a stark contrast between the development perspective of the international anti-dam movement and the perspective of the governments and institutions promoting dams as a tool for development. The point I want to raise in this dissertation is that the SSP does *not* appear to be a monumental folly "by *any* standards", as Goldsmith claims, but the project may be judged misguided by the new standards gradually winning terrain during the rise of environmental and social awareness in the 1980s. These standards were forcefully promoted by the transnational anti-dam movement, and the SSP was a critical case in their struggle to redefine the development debate.

The World Bank and its critics

Targeting the World Bank has been important for the anti-dam movement. One motive is quite straightforward as attacking the funding sources was one important way to disrupt the project. International anti-Narmada campaigners based in wealthy countries, in particular Britain and the United States, also knew they had much more leverage with the World Bank, where their countries wield a significant proportion of the voting power, than with state and central governments in India which could more easily dismiss their objections as undue foreign meddling. Throughout the late 1980s and 1990s, however, anti-dam campaigners became part of a much wider struggle against the World Bank.

Lending for dam projects has been an important part of the World Bank's portfolio since its inception. The first IBRD development loan was given in 1948 for a hydroelectric and irrigation project in Chile[54]. Major infrastructure projects, including dams, were among the most important receivers of World Bank loans in its first decades of operation. In the 1980s, the World Bank broadened the scope of its lending, reflecting a new hegemony of neoliberal ideas about development known as the "Washington Consensus". The structural adjustment programmes (SAPs) were grounded in a neo-liberal ideology emphasising the importance of market reforms for a well-functioning economy and economic growth. The SAPs entailed reduction in public spending in recipient countries and subsequent worsening availability of important public services for poor people depending on them. During the 1980s, the critique against the World Bank increased on several fronts. Structural-adjustment critique and anti-

[54] http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/EXTARCHIVES/0,,contentMDK:20035657~menuPK:56307~pagePK:36726~piPK:437378~theSitePK:29506,00.html

dam campaigns were only two components in a loose, transnational alliance of diverse civil-society and labour organisations.

An important environmental campaign against the World Bank had been launched in the US in the 1980s, in which the NGOs the Environment Defense Fund and the Sierra Club were central. A series of hearings on the environmental and social performance of infrastructure projects funded by multilateral institutions were held before six sub-committees of the US Congress between 1983 and 1987 (Wade 2004). The US Treasury was an equally important target for environmental NGOs wanting to get at the World Bank[55]. The Sardar Sarovar Project was one of the landmark cases in the NGO campaign against the Bank, along with the campaign against the Polonoroeste highway project in the Brazilian Amazon. The SSP was used as a lever to achieve important institutional and practical changes in the World Bank's lending policy (see Wade (2004) for a detailed description of the role of the environmental cause in changing the World Bank). Wade argues that the Narmada became the focal point of the NGO campaign against the Bank because it had characteristics that strengthened the NGOs' general opposition to the World Bank: forced displacement, victimised indigenous people, well-organised local opposition, charismatic local leadership, internal critics to the project within the World Bank, an energetic international campaign, and a location in India where English-language information was widely available. The *timing* of the SSP also contributed to the significance of the project in relation to the World Bank:

> "What did make Narmada unusual was its timing, which put it in a set of 'hinge' projects. It was prepared, appraised, and approved at about the same time that the Bank introduced quite new directives on 'non-economic' criteria – resettlement and the environment." (Wade 2004:89)

After the cancellation of the World Bank loan agreement for the Sardar Sarovar Project, the World Bank withdrew support for another controversial dam under consideration, the Arun III-project in Nepal. This seemed to be the end of the "big dam" era in the Bank. Many people in the World Bank felt that "there was just too much controversy and bad publicity around such projects" (Bøås and McNeill 2003:109). However, in 2003, the Bank resumed lending for dams as part of a renewed focus on infrastructure lending (IRN 2007).

[55] In the US Congress and Treasury, the financially conservative Republicans became the environmental movement's uncomfortable allies, as the two had quite incompatible reasons for wanting to stop or suspend dispersement of US tax-payers' money to the multilateral institutions (Bøås and McNeill 2003).

Here it is important to note two things: Firstly, that the anti-dam movement and the anti-World Bank movement benefited from each others' strength. For the anti-Narmada movement, it was important to cancel foreign funding as they hoped that this would disable the Government of Gujarat and the Central Government from continuing the Sardar Sarovar Project. For the anti-World Bank movement, the SSP was an important symbolic issue in a larger struggle. "The fact that the Sardar Sarovar Project underscores chronic institutional problems within the World Bank made it a good target for an international campaign," writes Lori Udall (Udall 1995:204), and Bruce Rich states that "[m]ore than any other project, Sardar Sarovar came to embody the Bank's inability to change" (Rich 1994:150) both from the Environmental Defense Fund. Secondly, in large parts of the public sphere, the extensive campaigning succeeded in establishing both the Narmada and the World Bank as forceful symbols of the insensitivity, lack of transparency, and destructivity of modern developmentalism. The names "Narmada" and "World Bank" became charged with negative connotations to the extent that in certain parts of alternative-development discourse, one would immediately know that a hypothetically unknown Bank was bad if one found out that it funded the "Narmada Project", and vice versa - that a Project was bad if it was funded by "the World Bank".

The consolidation of the transnational anti-dam movement

As Khagram (2004) points out, Goldsmith and Hildyard's "The Social and Environmental Effects of Large Dams" was the first systematic collection of the main arguments against big dams published for an international audience. It integrated social and ecological concerns and argued that the negative effects were inherent in the technology itself. The *Ecologist* was a widely read journal in environmentalist circles worldwide, and the arguments put forward through the book series and the journal fostered the transnational network against dams which was under formation. The International Rivers Network was established in 1987, formalising the activist "International Dams Newsletter" volunteer group that was started in 1985, on the occasion of the 50th anniversary of the Hoover Dam.

During the next decade, the various local and national struggles against concrete dam projects grew into a transnational alliance against large dams and in particular World Bank funding policies and procedures for large dams. The pressure, not least applied through the massive

campaign against World Bank funding of the SSP, led to a review of World Bank-funded big dams carried out by the bank's semi-autonomous Operations Evaluation Department (OED)[56]. Their report, completed in August 1996, acknowledged the change in views on dams and development which had happened in the course of the 1970s and 1980s, and that the peak came with the Sardar Sarovar project in India. The members of the anti-dam movement argued that the OED review was insufficient and biased in favour of dam building, and demanded an independent commission to review the effects of dam building in general. The organisation of the First International Conference of Peoples Affected by Dams, in Curitiba, Brazil, in March 1997, added momentum to the transnational alliance (Khagram 2004). The demand for an independent commission on large dams was voiced by Patrick McCully at a meeting of the various interests in the dam debate held to discuss the OED report in Switzerland in April 1997 (Khagram 2004). The agreement at the meeting was to work for the establishment of a World Commission of Dams with the mandate to review the development effectiveness of large dams, assess alternatives and develop internationally acceptable criteria and guidelines for dams (WCD 2000).

The World Commission on Dams

The World Commission on Dams (WCD) began work in 1998 and released its report in November 2000. The Commission arrived at five key points about which "there can no longer be any justifiable doubt" (WCD 2000):

1) Dams have made an important and significant contribution to human development, and the benefits from them have been considerable
2) In too many cases an unacceptable and often unnecessary price has been paid to secure those benefits
3) Lack of equity in the distribution of benefits has called into question the value of many dams
4) By bringing together to the table all those whose rights are involved and who bear the risks associated with different options for water and energy resources development, the conditions for a positive resolution of competing interests and conflicts are created

[56] The OED reports directly to the Bank's Board, and is thus independent of the Bank's operational departments. Still, critics often claim that the OED is not sufficiently objective.

5) Negotiating outcomes will greatly improve the development effectiveness of water and energy projects by eliminating unfavourable projects at an early stage, and by offering as a choice only those options that key stakeholders agree represent the best ones to meet the needs in question.

The Commission proposed a framework for decision-making based on five core values: equity, sustainability, efficiency, participatory decision-making and accountability. They reviewed in detail eight case studies of large dams and the country cases of India and China, surveyed 125 large dams, and did 17 thematic reviews. The resulting knowledge base showed that a considerable portion of dams fall short of physical and economic targets, and has had a "marked tendency towards schedule delays and significant cost overruns" (WCD 2000:14). On the positive side, many dams continue to generate benefits even after 30-40 years of operation.

Regarding the environment, the WCD found that large dams have led to the frequently irreversible loss of forests, wildlife habitats, and aquatic biodiversity, and that the ecosystem impacts are more negative than positive. Like natural lakes, reservoirs emit greenhouse gases, but the scale is highly variable and more studies are needed to determine the impacts of dams on global warming.

The negative impact of dams on humans has frequently been neither adequately assessed nor accounted for. Forty to eighty million people have been displaced by dams worldwide, and people living downstream have suffered from loss of livelihoods. The social and environmental costs of large dams are borne disproportionately by the poor and other vulnerable groups, and the WCD emphasised that this makes the 'balance-sheet' approach to the adding up of costs and benefits unacceptable on equity grounds. The commission proposed a set of guidelines for the decision-making process of proposed dam projects based on a "rights-and-risk approach". By this, they mean that rights, in particular basic human rights, should be the fundamental reference point in any debate on dams, and that all projects should be subject to an assessment of the risks of not only developers/investors but also of the involuntary risk bearers related to the project (WCD 2000).

The anti-dam movement welcomed the report of the World Commission on Dams, as it corroborated many of the claims that the movement had forwarded for more than a decade. However, the WCD Report did not conclude that large dams are inherently destructive and are symptoms of a failed and inherently unjust model of development. Medha Patkar, who was a member of the commission, therefore demanded that a comment from her was attached to the report before she signed it. In this, she argues that "some fundamental issues" are missing from the report, and that these have to be addressed "to reach an adequate analysis of the basic systemic changes needed to achieve equitable and sustainable development and to give a pointer towards challenging the forces that lead to the marginalisation of a majority through the imposition of unjust technologies like large dams" (Patkar 2000:321).

McCully has included a chapter on the World Commission on Dams in the updated edition of "Silenced Rivers". The report as a whole vindicates the arguments of dam opponents, he says, even though there are plenty of political compromises in the report for them to criticize. His comments illustrate the difficulty of getting research findings accepted as "neutral facts" in a political setting with competing interests and values. For example, McCully casts doubt on the reliability of the studies that find no significant emission of greenhouse gases from reservoirs[57]. McCully argues that there is a pattern in the scientific disagreement, where the scientists who claim that reservoir emissions are lower than those from thermal power are "largely funded by Hydro-Quebec and Brazilian hydropower interests", whereas those warning against large emissions are "affiliated to various universities and research institutes" (McCully 2001:xxxii), indicating what he sees as the greater reliability of the warnings of reservoirs being part of the problem rather than the solution to global warming. The preparation of the India Country Study for the WCD similarly illustrates the politically charged nature of the "science" of dams and the problems of arriving at any kind of widely acceptable "scientific" conclusions about whether dams are beneficial or not, and the introduction to the study speaks for itself on this issue:

[57] About this, the WCD writes: "However, the quantity of each GHG emitted, their spatial and temporal distribution, whether they exceed background levels and the methods to measure these variables are all topics of debate among the few experts in the field. This means that the argument is not about seeking alternatives that emit zero GHGs, but to opt for those with significantly lower GHG emissions on a life cycle basis" (WCD Secretariat 2000:vii).

> "It became clear at an early stage that for various reasons this could not be a joint report of the group as a whole, but would have to be a collection of papers by the different members on various aspects. (...) The authors are not necessarily in agreement with everything that is said in papers other than their own." (Rangachari, Sengupta et al. 2000:1)

The team, however, did write a joint concluding chapter of 14 pages with more or less the same conclusion as the WCD itself: that large dams in India do have beneficial impacts, but that these have largely been overestimated, and that the costs and damages have been underestimated and unaccounted for in the planning process of past projects.

Some remarks on political strategy

A full review of the WCD Report and a comparison with the arguments and perspectives forwarded by the transnational anti-dam movement is beyond the scope of this dissertation. What is more relevant here is to note the influence of the new agenda of development set by among others the transnational dam movement, and the instrumental role of the Sardar Sarovar Project in this. This put the struggle for the river Narmada and the displaced people of the valley in a whole different setting and shifted the stakes of the conflict.

With the benefits of hindsight, some of the supporters of the NBA have questioned whether the strategy of total non-cooperation and no compromise was the right one. Amita Baviskar writes in the postscript to the second edition of "In the belly of the river" (Baviskar 2006):

> "Ten years ago, when I finished writing this book, I ended on an upbeat note. The anti-dam movement was at its height. (…) Now, in 2004, the situation is reversed. (…) Where did we go wrong? In this unequal battle, did we misjudge our strength? Did our resistance ever have a chance of succeeding? Should we have done things differently? (…) the present does illuminate the past in a different light. (…) Now it becomes important to recall that not everyone committed themselves so whole-heartedly to the anti-dam cause. (…) Like those who moved, [the people of Anjanvara] too [think they] should have allowed the government to survey their property, ensuring that they received compensation. They should have ascertained that their sons' names figured on the list of [Project Affected Persons] eligible for compensation. Village leaders like Khajan find it hard to defend past strategies now that they have proven unsuccessful. The gains of the Andolan – its power in the world, educating, inspiring, and transforming the terrain on which battles over other dams will be fought, offer cold comfort to villagers in Anjanvara. (…) What if the Andolan had waged a more modest, focused human rights campaign against displacement? Would the Supreme Court have been more sympathetic?" (Baviskar 2006:276-278)

In his talk "The beauty of compromise", given at the symposium "60 years after Gandhi. Can Civil Society Civilize the World?"[58], Ramachandra Guha talked about the lost opportunities for compromise in conflicts, citing the Narmada conflict as one of three examples in which an important window for a compromise was lost. If the NBA in the Supreme Court case had claimed a reduction in dam height, and thus in the scale of damage, along the lines of the compromise suggestion of the engineers Paranjyape and Joy (see Paranjyape and Joy 1995) instead of the no-dam position, they would have stood a much better chance of winning, he argued. But as it were, they maintained their no-dam position, maybe for reasons of pride, dogma or not wanting to admit failure, and refused to bulge (Guha, lecture, 29.8.2008).

However, with the expansion of the Narmada conflict to a transnational conflict and the shift in the battlefield from India to the transnational scale, the possibilities for compromise had also been minimized. The SSP was by then no longer just one dam on one river in one country, but had become a symbol of all dams everywhere. Metaphorically speaking, a compromise strategy might have won the Sardar Sarovar battle, but lost the dam war. Whether a compromise strategy would have been more successful in securing just compensation for the displaced people of the valley will forever be a counterfactual question. And the impact of Medha Patkar and other anti-dam activists is acknowledged by Sanat Mehta (first Chairman of the SSNNL) to have been important for securing the rights of the displaced. "When I started the work in 1988, Medha Patkar, Anil Patel, Harivallabh Parikh, they were all on the dam site," he told me, and "that *was* important for pushing the government" (interview 2006). It also became clear during field research that the threat of the opposition works as a pressure towards getting irrigation water spread in the entire command area as per the plans.

Narmada as a research case

The Sardar Sarovar Project and the long-lasting conflict that it sparked off have attracted international scholarly attention. The Narmada Bachao Andolan became world famous for its persistent struggle against the dams on the Narmada, and during the decade from 1990 to

[58] The annual symposium of the Arne Næss Chair in Global Justice and the Environment organised by the Centre for Development and the Environment, University of Oslo, August 29th 2008

2000 the movement was growing and had worldwide influence. Ramachandra Guha calls the NBA India's "most celebrated tribal assertion in the 1990s" (2007:612).

During the 1990s, the momentum of the conflict seemed to be in favour of the resistance movement, and the seeming victory of David over Goliath interested critical scholars internationally. The World Bank loan agreement had been cancelled, the Bank changed its funding policies for dams and other large infrastructure projects, and the public interest litigation filed by the NBA in the Supreme Court led to a five-year standstill on the construction of the Sardar Sarovar dam. In addition, an independent world commission was established to review the experience with large dams globally.

As a 'case', many researchers have used the project and the conflict as a lens through which they could highlight and explain various aspects of the struggles over development (for example Fisher 1995; Vajpeyi and Zhang 1998; Drèze, Samson et al. 2000; Turaga 2000; Whitehead 2000; Routledge 2003; Khagram 2004; Mehta 2005; Ruet 2005; Baviskar 2006; Dwivedi 2006; Levien 2006; Nilsen 2006; Wood 2007). As the following overview of the most important studies will show, common to most of the Narmada research is that it has had its empirical and analytical focus on the Narmada valley and the issue of displacement and resistance. Most scholars therefore analyse the situation and perspective of those displaced and/or of the resistance movement. Few, if any, have dealt with the impacts in the project's command area or looked closely at the planners' perspective.

An overview of perspectives and findings

Within the Marxist political-economy framework adopted by Alf Nilsen (2006; 2008), Narmada is seen as a case of the dynamics of capitalist development. He argues in *The Valley and the Nation - The River and the Rage*[59] that the Narmada conflict illustrates how capitalism is based on a process of "accumulation by dispossession" and of intensified commodification of nature. The NBA is, to Nilsen, a case of a social movement of modernisation from below, demanding and asserting the rights of the displaced vis-à-vis the state. Working with Kaviraj's notion of India's "passive revolution", during which the main structures of rural property ownership remained intact, he argues that the dispossession taking place in the

[59] Uunpublished PhD dissertation at the University of Bergen, Norway. Forthcoming as a book.

Narmada Valley is an example of a generic development in India where productive resources are concentrated in the hands of already dominant social groups. The SSP, he argues, is "primarily propelled by domestic dominant classes, political elites and the state" (Nilsen 2006:441). He further argues that this is a geographically uneven process of further marginalization of regions in the Narmada Valley to the benefit of already economically and politically powerful regions in South and Central Gujarat. The NBA lost the case in the Supreme Court not because the court found that the benefits of the dam were greater than the costs but because the resistance to the SSP "struck against the heart of the dynamic of resource transfer and the balance of class power underpinning this dynamic" (Nilsen 2008:319). Although there were "cracks and fissures" in the state system, the dominant proprietary classes and their representatives closed ranks when their vested interest in the Narmada water was threatened. In the words of Nilsen, the "accumulation by dispossession" of the SSP

> "occurs through the expropriation and concurrent pressure towards the proletarianization in Gujarat, Maharashtra and Madhya Pradesh, and similarly the expropriations of caste Hindu farming communities who engage in petty commodity production in the Nimad region of western Madhya Pradesh. Simultaneously, it will transform property rights in water in favour of dominant proprietary classes in industry and agriculture in Central Gujarat." (Nilsen 2008:305)

Despite these claims about the likely results of the SSP in the command area, the main focus of Nilsen's research was the social movement of the Narmada Bachao Andolan, its strategies and struggles, and not the motivations for damming the Narmada and diverting its water to Central and North Gujarat. He shows how the NBA sees itself as a social movement for *alternative* development, not rejection of development or modernisation as such. The NBA "can best be understood as a 'modernization offensive from below', directed at the exclusions of the 'entrenched capitalist modernity' engendered by the National Project as a modernization offensive from above", he writes (Nilsen 2006:395).

Sanjeev Khagram (2002; 2004), like Nilsen, focuses on the social movement against the SSP. In the book *Dams and Development: Transnational Struggles for Water and Power*, he applies a "new transnationalist" perspective on the case of opposition to big dams. Noting the remarkable decline in dam building globally in the 1990s, he asks: "Why have historically weak and marginalized actors been increasingly able to prevent far more powerful interests and organizations from constructing big dams?" (Khagram 2004:3). Early dam and river-

valley projects in India were also met with resistance, but these were domestic and isolated struggles. This changed with the Narmada Bachao Andolan, who actively sought, and were sought by, a transnational alliance working for the rights of indigenous peoples and the environment across the world. This transnational alliance, and the increasing legitimity of its cause provided by the global spread of norms on human rights, indigenous peoples, and the environment, was crucial for the success of the NBA, he argues. The international agenda had by the late 1980s changed, and a powerful critique of the dominant development model had been raised. The institutionalisation of the new norms both at the international and domestic levels had enlarged the political opportunity structures available to transnationally allied actors, and made possible the success of the NBA and other anti-dam movements in other countries. Although published in 2002 and 2004, Khagram regrettably ends his discussion of the SSP with the Public Interest Litigation which temporarily stopped the construction on the dam in 1994 and he does not mention that the Supreme Court ordered in favour of the dam construction in 2000. The construction has continued without major limitations since then, and the NBA has altered its strategy towards more demands for just rehabilitation of the displaced.

A more critical, although still sympathetic, analysis of the social movements against dams is provided by Amita Baviskar (1995; 2003; 2006). In her book *In the Belly of the River: Tribal Conflicts over Development in the Narmada Valley* (Baviskar 2006 (2nd ed), first published 1996) she analyses the livelihoods, culture, and relationship with nature of the *adivasi* (Bhil and Bhilala) inhabitants of the upper reaches of the Narmada Valley. Their villages and livelihoods were to be submerged by the reservoir created by the Sardar Sarovar dam. Her first rounds of field research were done in 1992, during a crucial period in the movement's opposition to World Bank funding. Her research brings out the complex relationship between *adivasi*s and the environment, and questions the romanticised picture of *adivasi* livelihoods which are often the result both of the work of social movements campaigning on their behalf and also reflected in scholarly writing.

The NBA articulates a development critique which brings out the insensitivity of the state towards the cultural values and needs of the *adivasis*. Their aim is to highlight the value of what stands to be lost when the *adivasi* societies of the Narmada valley are submerged. However, for Baviskar, the resulting representation is an essentialised and reified version of

adivasi culture and livelihoods. In the process of political collective action, resistance is articulated and led by urban political activists who represent and speak on behalf of the *adivasis*, but "in trying to demonstrate that the critique of development actually exists in the lives of *adivasi*s, intellectuals end up creating caricatures" (Baviskar 2006:240). "We cannot frame the *adivasi* past (or present) as a 'natural economy' – a starting point for a historical process that is a counterpoint to development," she argues, "we have to come to terms with its disordered reality to create a more equal basis for co-operation" (Baviskar 2006:243).

Baviskar (2006) points out that in order to create a strong and unitary movement, conflicting interests and ideas between the members of the movement had to be moved to the background. She proposes a more nuanced understanding of *adivasi* environmentalism. "While people revere nature in all its forms, and religiosity suffuses their everyday lives," she writes, "these beliefs do not translate into a set of sustainable resource use practices" (Baviskar 2006:17). There is a difference between the beliefs and practices of *adivasi*s and of those who claim to speak on their behalf, she argues. There is a need to explore how these differences may be united, "in a synthesis which gains from the normative vision of the intellectuals and, at the same time, incorporates a more realistic view of *adivasi* life" (Baviskar 2006:238). In another article (Baviskar 1995), she examines the construction of the 'tribal' as an essentialised category both within the World Bank Independent Review Report and within the SSNNL, arguing that there lies a danger in basing the opposition to the dam on the *cultural* rights of the *adivasi*s as a distinct cultural community. The danger lies in the difficulty of knowing which cultures are worthy of protection and which are not. Instead, the opposition should be organised around their *political* rights as individual citizens within a state, she argues.

> "If we examine the decision-making process about the SSP to see the extent to which it has accommodated the concerns of affected people, and their rights as citizens to information, participation and choice, we come up with an even more devastating indictment of the project than the Morse Commission." (Baviskar 1995:94)

The sociological categories are always double-edged, she warns, and sociologists (or any social scientist for that matter) "must walk the tightrope between the twin perils of essentialising difference and obliterating it" (Baviskar 1995:99).

Paul Routledge (2003) examines the repertoires of resistance employed by the NBA. In particular, he highlights how discursive resistance – academic analyses, peasant testimonials and slogans – complement the more material strategies like *satyagrahas*, rallies, and hunger strikes; boycott and non-cooperation with the government in the process of resettlement; and the creation of new services like NBA-run schools and micro-hydroelectric projects in the areas to be submerged. Routledge argues that the development model pursued by the Indian state through the SSP means economic, ecological, cultural and political erasure (Routledge 2003). Like Nilsen and Khagram, Routledge points to the importance of the development of a counter-expertise to the government's claims about the benefits of the project, and the role of the transnational alliance in backing the struggle. And like Baviskar, he acknowledges the existence of internal ambiguities within the movement. The discursive resistance "articulates a unity that effaces internal difference, contradiction and ambiguity" (abstract), and social movements "frequently suppress their own internal heterogeneities and subgroups in the interests of some broader strategy" (Routledge 2003:265).

Lyla Mehta (2001; 2003; 2005) is one of the few Narmada researchers who have studied parts of the command area and the proposed beneficiaries of the project, in a part of Kutch in North Gujarat. This is the driest part of the command area. In her book *The politics and poetics of water: The naturalization of scarcity in Western India* (Mehta 2005) she argues that it is highly unlikely that Kutch will receive dependable Narmada water, and secondly, that equitable water distribution in Kutch (and elsewhere) will require a much more partisan distributional water policy, curbing wasteful water use by the rich and ensuring water access for the poor. She explores the "sociology and political ecology of water scarcity in Kutch" and "examines the competing discourses of scarcity, their underlying social and power relations and the resulting water management practices in the region", asking "what makes water a 'scarce' resource and how [is] scarcity (...) constructed differently by different actors" (Mehta 2005:4). Her field research was done mainly in 1995 and 1996, many years before the canals were expected to be completed in this area. She tries to understand the all-pervasive support for the SSP in the region, despite the many studies and reports which have questioned the feasibility of giving dependable Narmada irrigation water to Kutch. Kutch is in the tail end of the canal network, and most canal projects in India have had problems serving their tail ends. She relies on the evidence brought forward by project critics: the establishment in the

early 1990s of several new sugar cane factories[60] along the initial reaches of the Narmada Main Canal in Central Gujarat[61], the promotion of new industries in the industrial "Golden Corridor" running southwards from Ahmedabad and largely situated in the SSP command area, and the lack of plans for the drinking water component of the project. She concludes that most of the water "will be disproportionately appropriated by the politically strong Gujarat districts of Bharuch, Kheda and Baroda, situated in the initial reaches of the SSP command area" (Mehta 2001:2035). She asks: "Despite all this evidence, why is there so much belief in the ostensible bounty of the SSP?"

To this, Mehta ventures the explanation that "the State and its supporters have succeeded in manufacturing perceptions or myths concerning the SSP" (Mehta 2001:2035). The manufactured myth is that of 'scarcity': that water in Kutch is scarce and that the region must be served by the transfer of external water for which the only source is the Narmada. Her field research show that the large and rich farmers in this "water scarce" region are well served with water from their own borewells, so that lush, green fields do exist among the dry patches of land even in a low-rainfall year (Mehta 2005). A related myth, propagated by the manufacturers, is that of dwindling rainfall. The people of Kutch are convinced that every year, the rainfall is less, although Mehta's analysis of rainfall data shows that this is not the case. The rainfall is variable and erratic, but there is no downward trend in the amount of rain received (Mehta 2005). The main manufactured myth of the state is that there is no alternative to the SSP, and Mehta claims that the main aim of the manufacture is to serve "the interests of business, engineering, bureaucratic, "development" and political elites" (Mehta 2001:2036). The result has been the massive popular support for the Sardar Sarovar Project in Gujarat.

Mehta identifies four groups of Gujarati actors who take part in this manufacture: the politicians in power, for whom promises of water are important vote-grabbers; the mass media, who rarely carry critical articles on the SSP; NGOs like the Centre for Rural Care and the Arch-Vahini "who helped the state in the resettlement and rehabilitation of the displaced populations" (Mehta 2001:2035); and academic institutions that are tied to government

[60] I have only seen this claim repeated in all SSP-critical literature, but never found the source of it.

[61] The experiences of the Ukai dam in South Gujarat are important for the arguments of the Narmada critics. Here, canal irrigation gave boost to a thriving sugar-based economy, creating great wealth for many farmers and sugar cooperative shareholders, but simultaneously leading to immiseration of the marginal landowners and the landless labourers because they were displaced by more docile migrant labourers (Breman 2007).

funding and therefore have "written reports that have offered legitimacy to dominant state discourses concerning the project" (2001:2035).

The manufacture of scarcity serves to legitimize the controversial Sardar Sarovar Project, and to undermine alternative solutions to the limited amount of water available for the different water users of Kutch, argues Mehta. Less invasive solutions would be local water harvesting methods, policies to curb wasteful water use by rich irrigators and industrialists in semi-arid climates, and land-use policies that may be more suitable to low rainfall areas like Kutch for example rangeland and grazing rather than agriculture (Mehta 2005). She argues that environmental narratives "tend to serve certain socio-political agendas and/or reflect the world-views of their advocates instead of being rooted in local realities" and "obscure plural readings of landscape use practices":

> "The notion of the bounty of the SSP and its contribution to Kutch's and Gujarat's development is a classic "development narrative" which has a programmatic character and has the objective of getting its listeners to believe or do something." (Mehta 2001:2038)

The manufactured notion of scarcity, Mehta explains, further obscures how inequalities shape access to and control over water, and it hides the fact that water scarcity is not mainly a natural situation but one with anthropogenic causes due to bad water management and overuse (Mehta 2001).

Two volumes have been published which bring out the arguments of both sides in the conflict, "Towards Sustainable Development" edited by William Fisher (1995) and "The Dam and the Nation" edited by Dreze et al (2000 (orig. pub. 1997)).

The Dam and the Nation (Drèze, Samson et al. 2000) is a collection of papers originally presented at a workshop on the Narmada projects held at the Centre for Economics and the Institute of Economic Growth in New Delhi in December 1993. The workshop brought together scholars and activists with different perspectives on the issue[62], and the book aims at providing a detailed investigation of the issue of displacement and resettlement in the Narmada Valley. Satyajit Singh concludes in his introduction that the studies presented in the

[62] Contributors are Amita Baviskar, Bela Bhatia, Vasudha Dhagamwar, Roxanne P. Hakim, Vidyut Joshi, S. Parasuraman, Anil Patel, and the institutions Centre for Social Studies Surat, the Independent Review Team, and Tata Institute of Social Sciences.

book "give little reason for comfort", and that the problem of displacement in the Narmada Valley "remains largely unsolved" (Singh 2000:22). Regarding the benefit side of the project, Singh points out the massive popular support for the project in Gujarat is only *partly* due to the pro-dam propaganda from the government: "the dam has also been supported in Gujarat by many popular organizations with a credible record of opposition to the government in other contexts" (Singh 2000:2). The conflict is rather between different sections of the people and different branches of the state than between the people and the state, he argues.

The Fisher volume, *Towards Sustainable Development,* sprang out of a conference about the SSP held at Columbia University, New York, in March 1992. The book is divided into seven parts and in each part, both sides in the conflict present their views and analyses, they "speak for themselves" as Fisher says. The contributors all represent actors in the conflict or at least have a clear normative stand either for or against the dam. The Government of Gujarat, the World Bank, the Arch-Vahini, the Narmada Bachao Andolan and the American Environmental Defence Fund are all represented[63]. The six thematical parts of the book cover overviews of the project, histories of resistance, resettlement and rehabilitation, technical and environmental concerns, the Independent Review, and politics and development. Note the plural tense of 'overview' and 'history' in the first two part headings. Providing an overview and a history of the project and resistance that both sides could agree on, was impossible. Indeed, the aim of the book is to show how the sides differ in their conceptions of 'sustainable development'. Fisher points out,

> "The perspectives of the authors vary greatly as do their interpretations of the facts. As a consequence, the overall result is not consensus but open and unabashed disagreement. (…) And their criticisms generally fall into one of the two basic analytical approaches toward development: they assume either the positive potential of the development process or its oppressive nature." (Fisher 1995:39)

Fisher points out the directions for a third analytical approach that can be based on the two sets of rather simplistic assumptions laid out in his book, an alternative approach focusing on "what actually happens in the development process above and beyond the stated intentions and goals of the development planners" (Fisher 1995:40).

[63] Contributors from the more or less "pro-SSP" side: C.C.Patel, Thomas Blinkhorn and William Smith, Anil Patel, M.S.Gill, Y.K. Alagh, D.T.Buch, and Ambrish Mehta. From the "anti-SSP" side are: Rahul Ram, Shripad Dharmadikary, Medha Patkar, Lori Udall, Vasudha Dhagamwar, Enakshi G. Thukral, Mridula Singh, Ashvin Shah, Bradford Morse, Thomas Berger and Smitu Kothari.

Ranjit Dwivedi (2006) was another of the rare scholars who refused to take a normative stand on the Narmada issue. The book *Conflict and Collective Action: The Sardar Sarovar Project in India* is a revised and posthumous edition of his PhD dissertation from 2001. Dwivedi studied the conflict around the SSP as an instance of the unfolding crisis and continuing changes inherent in development processes. "A crisis relates to whether or not a sphere of action or, for that matter, a system, ought to continue," explains Dwivedi, and continues, "it is caused when criticisms and contradictory claims can no longer be accommodated or assimilated" (Dwivedi 2006:354). He explores "the circumstances and processes that cause and sustain the crisis, the ways these forces work and take political form" (Dwivedi 2006:343). He argues that the case of the Sardar Sarovar Project begs the question of "whose reality counts" for making judgements about the Narmada conflict, and carefully outlines and scrutinizes the diverse strands of arguments, claims and counterclaims of the different sides and parts in the Narmada conflict. His purpose is to establish "how claims emerged, how experiences and interests fuelled them, and how actors mobilised power and resources to sustain them" (Dwivedi 2006:4). The pursuit of interests and values influence the planning, evaluation and implementation of a project in complex ways, he argues, but the normative evaluation of the SSP remains difficult as he concludes that there is no agreed standard against which to measure the goodness or badness of a project like the SSP (Dwivedi 2006).

The most recent addition to the Narmada studies, is political scientist John R. Wood's *The Politics of Water Resource Development in India. The Narmada Dams Controversy* (Wood 2007). Like Dwivedi, he attempts a neutral account of the Narmada conflict, also presenting the pro-dam arguments without normative judgments. The book is an analysis of the politics of water in India, with an emphasis on the dispute-solving mechanisms of inter-state water tribunals and judgements in the Supreme Court. He wants to contribute an analysis of three aspects that have been lacking in the Narmada literature: in addition to politics, the role of the law, and of the history of the project. Wood also explores the new model of participatory management of irrigation, by briefly examining its implementation through NGOs working in four irrigated villages in four canal command areas other than the SSP. He argues that one of the positive outcomes of the controversy has been a re-examination of India's water policy and an exploration of alternatives to large dams, and hopes that the paradigm shift behind water management transfer and watershed development will help overcome water conflicts in

the future. However, he concludes that politics decide the outcomes of conflicts over water, even when dispute-solving mechanisms are in place, and that water will continue to be an increasingly political resource in the future. Decisions about water are inherently political, he argues, and the responsibility for their implementation have to lie with the politicians. Although Wood chronicles the events of the controversy since 1946, and outlines the views of the different parties in it, he does not give much attention to motives other than political self-interest and concern for (re)-elections in fuelling the wish to dam the Narmada. The bureaucrats at the state-level, he says, "for the most part only followed the wishes of their political masters" (Wood 2007:239), and at the field level, government officials play a role in exacerbating the conflict due to corruption.

Assumptions about command area development

The general consensus in the Narmada scholarship is that the Narmada water will most likely benefit already well-off sections of Gujarat's population, in particular the rich farmers and industrialists of central Gujarat.

"Irrigation benefits will probably be monopolized by rich farmers in central Gujarat to grow cash crops such as sugarcane," says Baviskar (1995:94), a claim which is echoed by Routledge (2001:114): "Most water will in truth irrigate the sugar farms of wealthy Gujarat farmers". Lyla Mehta claims that "[m]ost of the water in the command area of the project will be disproportionately appropriated by the politically strong Gujarat districts of Bharuch, Kheda and Baroda, situated in the initial reaches of the SSP command area", most likely for sugarcane cultivation (2001:2035). Water which might actually reach Kutch will meet "the needs of industrial residents and rich farmers, rather than those in drought-prone areas" (2001:2034). Nilsen (2006) quotes Mehta and the NBA-activist and journalist Sanjeev Sangvai, who claim that a major share of the water will flow to already water-rich areas in Gujarat's industrial "Golden Corridor" from Vapi to Ahmedabad, and argues that the SSP "will transform property rights in water in favour of dominant proprietary classes in industry and agriculture in Central Gujarat" (Nilsen 2008:305). Khagram does not make direct claims about the beneficiaries of the SSP, but more indirectly states that an important reason for the overwhelming political consensus behind big-dam building in the post-Independence development strategy of India, is "that these projects satisfied the interests of what has been

termed India's "dominant coalition of proprietary classes": irrigation to rich farmers, electricity to industrialists, and good-paying and prestigious work to skilled professionals" (Khagram 2004:35).

The negative view of dams in general and the SSP in particular, with assumptions about benefits to rich farmers and a view of mainstream development projects as state violence, are carried forward in other recent analyses of India, as in Corbridge and Harriss' book "Reinventing India" (2003):

> "Large dams along the river Narmada which aim to produce cheap power or irrigation for the richer farmers in Gujarat and Maharashtra are just one manifestation of the connections between economic and political power, on the one hand and environmental destruction on the other." (Corbridge and Harriss 2003:207)

As the beneficiary side of the equation has rarely been the focus in the studies of the Sardar Sarovar Project[64], there is rarely any substantial investigation into *why* or *how* the rich farmers of Central Gujarat are most likely to get a disproportionate share of the benefits of the dam. Dwivedi (2006) devotes a chapter to the cost-benefit analyses of the SSP, and tries to map the likely winners and losers in the SSP. He is the only researcher who attempts to explain the causal chains which are likely to make industries, rich farmers, and sugarcane producers the biggest beneficiaries of the project. The reasons are mainly in terms of the head starts that those with financial and knowledge capital can get when the water starts coming, by strategically investing in prime locations and products. Some of the other scholars point to the experience of previous canal-irrigation projects which have been a crucial part of the agricultural modernisation processes in India, and argues that these have lead to marginalisation of the poor rather than poverty reduction. The dominating received wisdom within the left wing and socially concerned sections of India is that agricultural modernisation led to a polarisation process in which large farmers were able to consolidate their economic position further by taking advantage of the new technologies and new market opportunities, whereas small farmers were marginalised into pauperized and proletarianised conditions. The polarisation thesis was most influentially put forward in 1976 through a study by K.N Raj and led to an endless debate on whether or not agricultural growth has reduced poverty in India,

[64] Except for Lyla Mehta's study of Kutch, but she does not explore nor explain in detail the processes presumably leading to a disproportionate share of water going to the rich in central Gujarat.

and therefore also whether it will in the future (Rudolph and Rudolph (1998:346-354) presents in detail the arguments and evidence used in this debate).

A continuation of the polarisation argument is that these dominant proprietary classes are the main drivers behind projects like the SSP, and that they do so in order to serve their own vested interests. In its crudest version, this is a simple conspiracy thesis which is used by the anti-dam movement and its sympathisers everywhere to dismiss any argument in favour of large dams and canal irrigation as a cover for hidden agendas. I encounter the story regularly when I explain my study to people familiar with development studies. "Ah, Narmada, isn't that the dam which is meant to give water to the swimming pools of the middle class in Gujarat?" said one student who had read about this in Vandana Shiva's book "Water Wars" which was on the curriculum in her development-studies course at a university in Norway.

Academic neutrality, sympathy and critique: a fine balance

Much of what has been written about the Narmada was researched and published during the 1990s. At this time, there was virtually a war going on, a war about truth and about predictions about the future: The opponents argued that rehabilitation would not be possible and that the water would be cornered by already rich and powerful groups. The pro-dam camp (largely in Gujarat) claimed that because of superior technology and planning, the SSP would solve or bypass all the problems and low performance which had accompanied previous dam projects in India. Facts and academic arguments become ammunition in such a war, and the battle was therefore not only fought on the ground, in the media and in the Supreme Court, but also in scholarly journals. Widely-held academic ideals of neutrality and objectivity are challenged in a conflict setting where ones sympathies and ideals are at stake.

Baviskar describes the dilemma she found herself in, when she discovered that the *adivasi* realities were more complex than those presented by the NBA:

> "During the process of writing, I have felt anew the painful contradictions of my position. The greater the intimacy, the greater the danger of betrayal. I was treated with warmth, openness and generosity by my friends in the [Narmada Bachao] Andolan and the [Khedut Mazdoor Chetna] Sangath. How could I pay them back with criticism? Who would trust me again? Who should I be true to – my friends or some obscure intellectual ambition?" (Baviskar 2006:15)

Many of the researchers who approached the Narmada case with academic interest had a background as open supporters of or activists in the NBA. Some, like Routledge who joined the NBA's struggle in 1999, adopted an action-research strategy:

> "For three months of that summer, I conducted preliminary research on the construction of a multidam project in the Narmada Valley, India, and participated in resisting its construction." (Routledge 2001:113).

He calls it "collaborative methodologies" and says this will enable critical researchers to 'deconstruct state/elite discourse and practice' and offer 'material engagement' with reality.

Baviskar's deconstruction of the concept of "tribal" culture and environmentalism was noticed by the SSP proponents. Selectively and strategically they referred to her research, for example in the critique of the World Bank Independent Review (ignoring that her critique was even harder on the SSP planners and builders). In an article in the Lokayan Bulletin in 1991 ("The Researcher as Pilgrim"), Baviskar had outlined arguments about the diversity of the communities in the submergence zone, and the SSNNL spent two and a half pages in the booklet "No Cancelling Tomorrow" on summarising Baviskar's arguments about the essentialising effects of the NBA's use of the cultural rights of *adivasi*s in the Narmada Valley. The SSNNL writes:

> "Amita Baviskar is quoted at length only because she is a friend of the Andolan and a scholar cited by the IRM [Independent Review Mission]. But she is by no means the sole source for these perceptions. Myth making is an ancient hobby." (Page 11 in SSNNL 1992)

In the deeply bitter struggle around the SSP in the beginning of the 1990s, there was little room for nuance on either side of the trench, and Baviskar is known to have faced troubles for her careful critique of the NBA strategy.

When Gail Omvedt, sociologist and human-rights activist, criticised Arundhati Roy for conveying a romanticised myth of *adivasi* livelihoods in the Narmada Valley in 1999 (Omvedt 2003), she was heavily criticised for this by supporters of the NBA, for example Ashish Kothari. He criticised not only the contents of her critique, which he found flawed, but the *timing* of it in the middle of a fight on life and death:

> "One last word. I, like many other supporters of the NBA and critics of big dams, am not starry-eyed about the ability of movements like the NBA to solve all the ills plaguing our society. They have failings, like we all do. They must be offered firm but

> constructive criticism, criticism that helps them to evaluate themselves just like we must be able to evaluate ourselves based on questions they are asking. But to denigrate them with sweeping statements and biased generalisations, AND TO DO SO WHEN THEIR MEMBERS ARE IN THE MIDST OF A DESPERATE STRUGGLE AGAINST DROWNING, is to not only be insensitive, but to play right in the hands of the repressive state which Ms. Omvedt otherwise so rightly criticises. That is the tragedy of the content and timing of her "open letter"." (Kothari 1999)[65]

Routledge worries that academic focus on internal ambiguities in the discourse of a just social movement may undermine the fight of the movement: "it is insufficient for academics to merely dissect a movement's discourses and practices, stressing ambiguity and contradiction, in order for such insights to be published in academic journals", he argues (2003:266). Signifying your own academic criticality is of little use to people "who are faced with economic and cultural erasure" (2003:266).

> "Writing about resistance formations in scholarly journals needs to tread a fine line between support for a social movement and the professional and ethical requirements to be constructively critical while also not providing help to the movement's opposition." (Routledge 2003:267)

These are indeed difficult ethical waters to navigate, and I am grateful that I am writing at a time when the stakes on either side of the conflict are not as high, and there is more room for reflection and open analysis. I think it is important to acknowledge the importance of academic distance, an open mind, and self-reflexivity even when we study causes we sympathise with or disapprove of; not in order to "signify your own academic criticality", but in order to have any chance of coming closer to some sort of truth. This is especially challenging when studying existing social movements, as these are invariably parts of ongoing conflicts.

The direct affiliation or deep sympathy with the NBA held by the scholars who have analysed the Narmada case have a tendency to shine through in the texts, not only in open acknowledgements of their position in the forewords and introductions, but in the treatment of the pro-dam arguments. Journalistic texts are used as evidence for claims about poor planning and future destructive effects of the project and many assumptions stand unsubstantiated in the texts. Sympathy for a movements' cause should not absolve anyone from the necessity of carefully considering the validity, reliability and bias of sources.

[65] This is the last paragraph of the letter. It is published on the web, and I therefore do not have a page reference. http://www.narmada.org/debates/gail/ashish.response.html

Goldsmith and Hildyard's "The social and environmental effects of large dams" and McCully's "Silenced rivers" do not pretend to be independent, value-free research, but were fact-finding projects with a clear political and ideological aim. At the outset, the authors of these works knew what they were looking for, and found it. The fact that they are referred to as evidence of the negative effects of large dams, and not as parts in an ideological conflict, is a sign of the influence and authority that the relatively radical environmental critique had reached in the discourse on dams[66]. From being marginal and radical environmental critics, they have ended up framing much of the dam debate.

Concluding remarks: Narmada and the Western destruction narrative

The Sardar Sarovar Project and the conflicts around the Narmada issue have become world famous. Outside India, a narrative of the conflict is established and seems to live its own life independently of the origins of the story's components and many complicating details. In this story, the insensitive state in India is collaborating with the World Bank to construct several dams on the Narmada with utter disregard for the indigenous people who live along this holiest river in India. The tribals are not informed or taken into consideration until Medha Patkar appears in the valley in 1985 and forms the most powerful local social movement in the history of Independent India. Western anti-dam activists and writers tend to emphasise the sanctity of the Narmada River much more than do Indian writers, pointing out that it is "the holiest river in India", holier even than the Ganges[67]. "It is tempting to think of Medha Patkar as a kind of pilgrim, or even as Narmada herself," writes journalist Jaques Leslie (2005:43), and reports that he shivered when he learned that the Narmada was holier than the Ganges. The holy river and its tribal people are sacrificed to give water to rich people in the rich state of Gujarat. The narrative is presented in documentary books like Catherine Caufield's "Masters of Illusion: The World Bank and the Poverty of Nations" (1997) or Leslie's "Deep

[66] As for example in Lyla Mehta's introductory chapter: "Today, there is growing awareness of the high social and environmental costs attached to large dams, especially in tropical areas (McCully 1996; Goldsmith and Hildyard 1992; WCD 2000; Singh 1997)." (Mehta 2005:3).

[67] This is claimed in the early Kalpavriksh report on the Narmada Valley project, which is probably the source of this statement in later anti-dam literature. Outside the anti-dam literature, I have not come across statements that question the primacy of the Ganges as the most sacred river in Hinduism. In Hinduism, all rivers are sacred (Brockington 1991). However, as far as I know there has been little Indian mobilisation based on *religion* against hydraulic engineering interventions in river flows.

Water" (2005), and in the brief presentation in readers in development studies or social movements that mention the Narmada as a case of social movements and conflicts around development and the environment in the late 20th century (two examples are Robinson 2002; Amoore 2005).

There are elements of the Narmada story which do not fit this smooth narrative of destruction: the droughts and poor farmers of Gujarat, the early work of Anil Patel and Arch-Vahini, the diverging strategies of the Gujarat-based NGOs and the Narmado Bachao Andolan, the fact that some *adivasi*s actually wanted to accept a compensation package from the state and move, the detailed planning of the SSP and the unprecedently good rehabilitation policy finally achieved in Gujarat, the World Bank's possible role as a watch-dog for human and environmental rights in the SSP. None of this is known to those who get their information about the conflict from Arundhati Roy's "The Greater Common Good", Vandana Shiva's "Water Wars" or the brief presentations of the issue in readers in development studies.

Furthermore, as the academic literature on the Narmada conflict with few exceptions focus only on displacement and resistance, a large and important part of the conflict remains obscure: the views and perceptions of the planners and proponents of the project. The focus on the immediate victims of a development project and on a remarkable resistance movement is understandable. But the case of the Sardar Sarovar Project has more to offer students of 'development' if we broaden our vision and include the views of the planners and the intended beneficiaries of the project.

6. Methodology

Field research for this dissertation has been carried out through three periods of fieldwork in Gujarat, India, from 2004 to 2006, over a total of nine months. I stayed in Ahmedabad in March 2004, visiting various parts of the command area of the SSP and interviewing government officials. I then returned in September 2004 and stayed for six months in Ahmedabad and two villages until the end of March 2005. Lastly, I returned in February 2006 for six weeks, staying partly at the Institute of Rural Management in Anand and partly in Ahmedabad, as well as in the two case villages "Krushigam" and "Motugam"[68].

In addition, I have acquired valuable cultural knowledge and personal networks in India, and particularly Gujarat, over the last fourteen years through numerous educational, personal and professional visits to the country. In particular, a five month long period of fieldwork in Ahmedabad carried out for my M. Phil. thesis in 1998 has been important. Two educational visits to the Sardar Sarovar Dam and Project sites in 1998 and 2000 as part of study tours to Gujarat also gave important preparatory lessons for this PhD work, although I did not know it at the time.

The data material

A straightforward listing of data material and its sources is deceptive. It may give the impression that the data was collected easily and systematically according to a pre-decided plan, in which research questions and strategies for finding answers to them were clearly set out before I ventured into "the field". As mentioned in Chapter 1, this was not the case. The first research question, regarding the idea of development in the SSP, was not part of my initial research project. From the SSNNL, I first wanted 1) maps and lists of beneficiary villages in order to select case study sites, and 2) descriptions of prescribed water-management procedures in order to check to what extent they were being implemented in the beneficiary villages. The original intention was to study how local power relations may affect access to the Narmada water, and whether and how the new resource – irrigation water – was

[68] All names of villages and villagers in the dissertation are pseudonyms.

altering existing power structures. Exploring the ideas of the SSP planners and proponents was not my intention.

However, although media had announced to the world that the SSP had started water delivery in 2002, village reality turned out to be different. After visiting parts of the command area north of Gujarat in March 2004, and talking to the planners, I revised the research questions. What appeared to be particularly interesting was the discrepancy between the different stories of the Sardar Sarovar Project and the experienced reality of the intended beneficiaries. The Western story of the SSP, of an insensitive and megalomaniac project which would take from the poor tribals and give to the rich farmers, did not correspond to the story I encountered in the plan literature and during interviews with the planners. And the government and planners' story of poverty reduction and a grateful beneficiary population eagerly waiting for Narmada water did not correspond to the realities of the villages in the command area. Gradually, this was the direction to which I turned the project.

Sources on the planning process and ideas of 'development'

For the analysis of the ideas of 'development' in the Sardar Sarovar Project, I rely on several kinds of sources: interviews with participants in the planning process, unpublished archive material from the Narmada Planning Group (NPG) and the Sardar Sarovar Narmada Nigam Ltd (SSNNL), published documents and books from the planning process, and communications material from the government. The bulk of the material is from 1980 and onwards, as this is the period in which the Sardar Sarovar Project was planned in detail and on which I focus. The following section will present this material in more detail and discuss issues of reliability and validity.

I have interviewed some of the important former Ministers in the Government of Gujarat and some of the members of the Narmada Planning Group (NPG)[69]. The most central informants are Professor Yoginder K. Alagh, who designed the planning process, chaired the NPG and selected the professionals who planned the project, and Sanat Mehta, former Minister of Finance in the Government of Gujarat (1980-85) and Chairman of the Sardar Sarovar Narmada Nigam (1988-90, 1992-94). A complete list of informants is found in Appendix 1.

[69] Appendix 1 has a complete list of informants.

Unpublished archival material from the planning process was made accessible to me by Sanat Mehta in 2006. Whereas I was never allowed to enter the archives of the Narmada Planning Group in the government quarters in Gandhinagar, Mr. Mehta gave me access to the large personal archive from his years of involvement in the project. This material filled a wall of bookshelves in his office, roughly sorted into boxes according to topic. I only had a couple of hours one afternoon to go through them. Had my project been a pure historical study of the SSP, I would have needed more time to go through all the boxes. Still, the material I found and xeroxed during those few hours allowed me to piece together a picture of the planning process hitherto unknown to the public. The archive contained internal documents which were written by members of the NPG and circulated within the planning and executing agencies of the project. These often have notes and scribbles handwritten in the margins and on cover letters which indicate the use and importance of various documents and ideas.

I have further collected most of what has been published about the Sardar Sarovar Project by the planners and government bodies during the period covered by this study, from the Tribunal's Award in December 1979 to today. The planning period can be divided into two phases. The first lasted from 1980 to late 1988. The second period starts with the split of the resistance movement and the formation of the Narmada Bachao Andolan in August 1988. The NBA's "No Dam at Any Cost"-standpoint and the mounting international criticism of the Narmada projects forced the Government of Gujarat and its SSP planning agencies to respond in new ways, and publications about the project multiplied. Many of the books and articles were published in 1991, when the World Bank Independent Review team was carrying out its investigations, and explicitly refer to the criticisms of the SSP. Very few planning documents from the first phase, 1980-1988, are available, because little was published. What I have are: one of the socio-economic benchmark studies which were commissioned by the Narmada Planning Group for the entire command area of the SSP (CEPT 1981); the cost-benefit analysis of the SSP which was carried out by Tata Economic Consultancy Services in 1982 and published as a book in 1983 (TECS 1983); and one chapter of volume 1 of the SSP Development Plan (Narmada Planning Group 1983). This master plan of the SSP was

published in 1989, as a book with the title *Planning for prosperity*, in response to accusations of intransparency from the critics[70].

Some of the published books are available from academic bookshops in Ahmedabad, but most of them are out of print and only available through libraries. Some reports were never published for resale. I collected books and reports from the libraries of the *Centre for Environmental Planning and Technology*, the *Indian Institute of Management*, and the *Sardar Patel Institute of Social and Economic Research*, all in Ahmedabad, and the *Institute of Rural Management* in Anand.

The books and reports were published with the aim of showing that the SSP planning process had been an open and inclusive process, in which all critical voices were heard and suggestions seriously considered[71]. As such, their existence can also be seen as part of a larger counter-campaign by the government against the mounting opposition. But the contents of some of the publications reveal a more nuanced discussion than what is frequently claimed by the critics. The government has also issued several booklets and brochures as part of a more open campaign to foster support for the SSP, several of which have been given to me when visiting the dam site as a student and when asking for more substantial planning material as part of this PhD research. [72]

While not all of the historical sources on the SSP used in this dissertation can be relied on as *accounts* about the situation they describe, all of them have significance as *relics*, i.e. material evidence of the near or distant past. Relics are also called "silent" sources, as they are non-speaking products of their time[73]. They are of interest not as factual descriptions of or

[70] Alagh writes in a foreword to *Sardar Sarovar Project. A Promise for Plenty* (Pathak 1991): "Baba Amte one of its critics has kept up the fiction that the project is a secret. I had sent him details and published references and to nail this lie the Narmada Planning Group has published the Plan in a 566 page printed book - Narmada Planning Group, Planning for Prosperity: Sardar Sarovar Development Plan, Gandhinagar, NPG, 1989" (p.v)

[71] Mahesh Pathak says in the introduction to the published proceedings from two seminars on SSP organised in 1991 and 1992: "Both these seminars were attended by a large number of professional experts, senior administrators, policy-makers and noted activists. Lists of participants who attended the seminars are given at the end of this book. The proceedings of both these seminars provide documentation of historical significance for the on-going debate on SSP. Hence it has been decided to publish these proceedings" (Pathak 1995c:xxxix).

[72] A list of the published planning documents and public relations material used in this study is provided in Appendix 5.

[73] In Scandinavian historical research the conceptual pair "*levning*" and "*beretning*" is a tool for clarifying the status of historical sources. There are to my knowledge no parallel concepts in English historical terminology or official translation of the Scandinavian concepts. Here, I use "relic" for "levning" and "account" for "beretning".

accounts of historical events, but because they by their mere existence tell us something about the author and the situation in which he/she was operating (Dahl 2002). For instance, the existence of numerous published pamphlets and brochures about the SSP is a sign of increasing resistance and opposition to the project. The books and reports from the seminars are not only interesting because of their contents, but as evidence in themselves of the fact that seminars were organised and of who participated in them. And the existence of, for example, several articles on Participatory Irrigation Management in Sanat Mehta's archive, with notes in the margins and underlined paragraphs, sheds light on the importance of ideas of new management practices among the planners.

The compilation and analysis of this data will contribute new knowledge and understanding about the controversial issue of the Sardar Sarovar Project. To my knowledge there are no other analyses of the documentary sources collected for this dissertation[74]. Given all the attention to the Narmada conflict in academia and activist circles, the lack of interest in the government's view of the problem is remarkable[75]. The government and planners felt that they were unfairly attacked by the NBA and its international allies, and published their views to defend themselves. This aim has to be kept in mind when reading their accounts of the planning process and their intentions. However, seen together with the unpublished documents and reports, it is possible to achieve a critical analysis of the main arguments and ideas embedded in development projects such as the Sardar Sarovar Project.

Government data on implementation

The data material in addition comprises maps and implementation documents collected from the SSNNL offices in Gandhinagar, Baroda, and Jambusar town. I interviewed several leading officials in the SSNNL. For a complete list, see Appendix 1. I also participated in two functions organised by the SSNNL. One was a function on the occasion of the completion of the first part of the command area in 2005, which was the ceremonial transfer of the

[74] Dilip D'Souza (2002) provides the only attempt I have seen at a detailed reading and analysis of the government's arguments for damming the Narmada, but his polemic analysis is limited to a selection of communications brochures from the SSNNL.

[75] An important exception is William Fisher's edited book, *Toward sustainable developmen* (Fisher 1995). However, Fisher largely lets the sides in the conflict speak for themselves, without a closer analysis of their views.

management rights and responsibilities from the government to the first Water Users' Associations. The second was a training and discussion function organised for farmers in Karjan in 2006.

Implementation of a project like the SSP is influenced by what happens at the interface between beneficiaries and field staff of the government and contractors. I interviewed both field staff and the leader of the local Nigam Office in Jambusar, as well as contractors constructing canals in the area. In the case of Motugam, which is not a part of the command area, and not entitled to Narmada water, I interviewed the Member of Legislative Assembly who was the main target of the Motugam farmers' struggle to be included in the command area.

I have also interviewed researchers and NGO professionals in the field of water management and rural development about the water situation in Gujarat in general and their views on the SSP in particular (Appendix 1).

Snowballing for government informants

The selection of informants who had been actively involved in the planning process was based on the so-called snow-balling method, where one informant led on to another, and by looking for people who evidently played an important formative part in the process in the Narmada Planning Group literature. The final list of interviewees was constrained by time and place, as some had moved out of India or were residing in Gujarat but too far away for my time schedule.

Interviews with officials in the SSNNL were more constrained by distrust than by time and place. The controversies around the SSP and the involvement of foreign activists in the struggle have made the SSNNL suspicious of the intentions of foreigners who inquire about the project. It took numerous phone calls and brief meetings before I was able to establish trust with some officials in the head office in Gandhinagar, and before they were willing to share information and personal views and experiences. I tried in vain to get factual information about the project from the SSNNL during the first stay in Ahmedabad in March 2004. The then Director of Command Area Development was reluctant to even meet me in Gandhinagar, as he was afraid of rousing suspicion if he was seen talking to or handing over

any document to a foreigner. I was finally, during the winter of 2005, able to convince my contacts in the SSNNL that my intentions were genuinely academic, and that I was not an activist in disguise. They then expressed satisfaction that someone was interested in their side of the story and hope that my dissertation would show that the government "is flexible and encourages and adopts new progressive ideas. The picture is that the government is always slow and unflexible, you may convey to your country that this is not always so"[76]. During one interview in Gandhinagar, a high-ranking officer in a neighbouring office called me in to interrogate me about my intentions. "You know, we have had so much trouble with foreigners who are opposing this project," he explained, but was convinced by my presentation of the research questions and the support from his colleague. With trust established, I was invited to the SSNNL's functions for farmers in the command area. Still, the SSNNL officers refused the use of a tape recorder during interviews. A decree had been issued by the Chairman that no SSNNL employee should give interviews on tape.

Village case study

Data on people's reception of the SSP and impacts of the project in the command area was collected mainly through field studies from two villages, Krushigam and Motugam in, different parts of Central Gujarat.

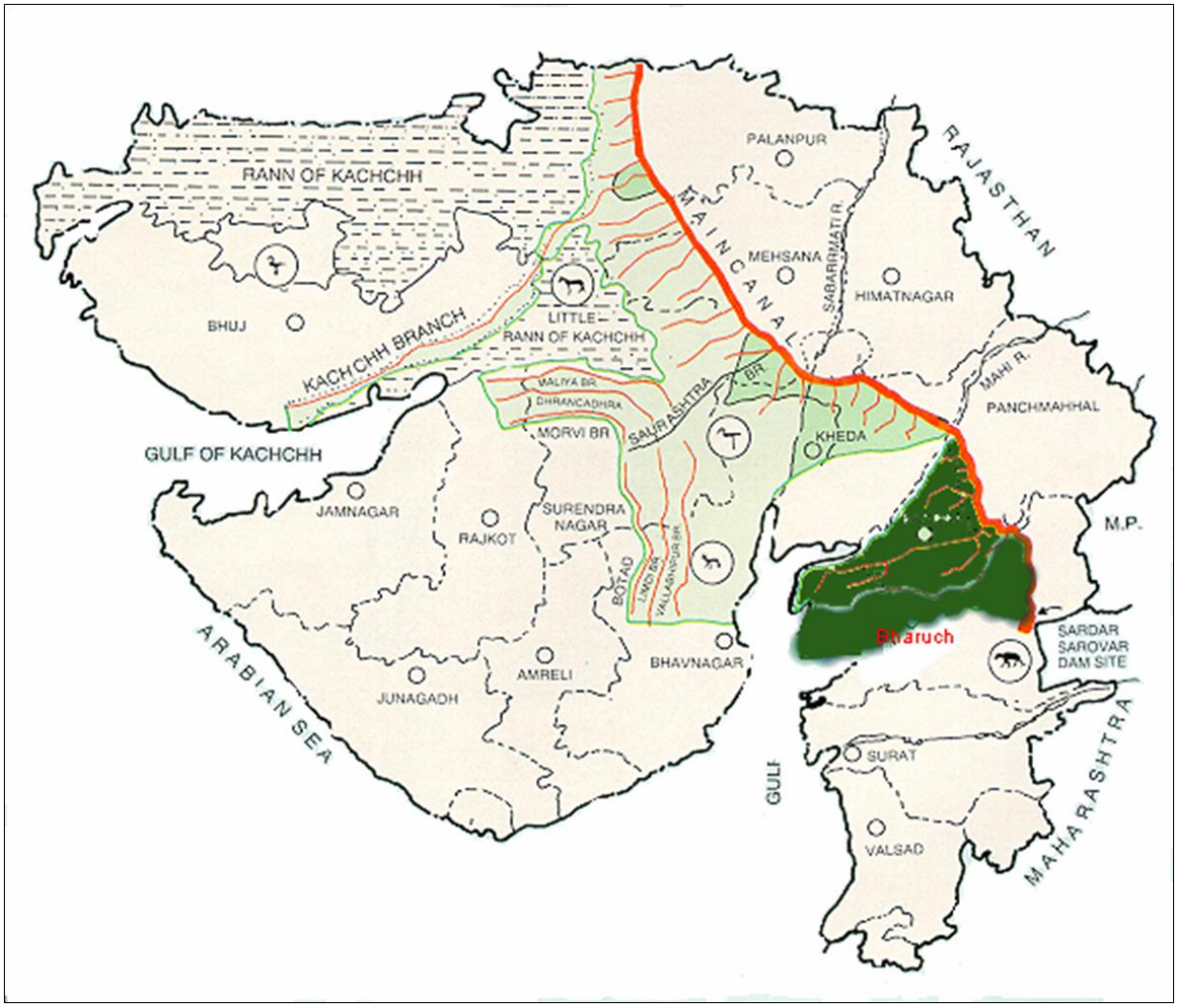
Selecting case villages

In the beginning, I wanted to compare villages with high and low resource endowments in terms of water sources, livelihood opportunities, and degree of caste heterogeneity. I wanted initially to do the study in North Gujarat, which is the more drought-prone part of the state. In March 2004 I discovered that the canal network was not completed in North Gujarat, and shifted the study southwards, to Phase 1, after being assured by the SSNNL that canal irrigation would commence in this region by June 2004. The second plan was then to compare one village in the driest and poorest area of Phase 1 in Central Gujarat with a village still waiting for water in Phase 2 of the command area, north of Ahmedabad.

[76] Interview, Executive Engineer, Command Area Development Wing, March 2006.

In March 2004, it was impossible to get either a list of beneficiary villages or a map of the command area from the Nigam. I had to use the combination of a road map of Gujarat and a crude map of the command area downloaded from a conference presentation found on the internet (Map 5) in order to identify villages falling in the command area of the SSP. I hired a car and an interpreter and drove around central Gujarat looking for villages receiving Narmada water.

Map 5. Simple map of command area of SSP[77].



One NGO, SAVE (Saline Areas Vitalization Enterprise), told me they worked in Jambusar, a *taluka* (sub-district) which suffers from salt-water intrusion and is also identified in official

[77] The dark green area is Phase 1 of construction . Source: http://www.iwmi.cgiar.org/iwmi-tata/FILES/ppt/PIM/Jayesh_Jan.ppt

government statistics as backward, in 1974 it was even the "most backward" *taluka* of Gujarat (Pathak, Desai et al. 1974). We drove to the SAVE office in Jambusar town to check out the conditions in Jambusar and the status of the SSP there. A farmer and associate of SAVE was present and suggested Krushigam would be a suitable village to study, as Narmada water had arrived there. He called his contact in Krushigam and prepared him for our visit. This contact turned out to be one of the richest farmers in Krushigam, living in an enormous modern house. He said I was welcome to stay in Krushigam when I returned the following autumn, and offered to help find accommodation. However, whereas Narmada water had rightly arrived in the Baroda Branch Canal which traversed the village fields, the minor canals were dry and the sub-minor canals not yet constructed. The farmers had been told that the irrigation system should be functioning by the coming monsoon, but doubted it.

In March 2004, I decided to compare Krushigam with another village I had visited just north of Ahmedabad near Kadi town. This decision had to be revised in October 2004, when I arrived in Krushigam and experienced that the sub-minor construction had not started, that the Water Users' Association was not working, and that the Narmada water was only available to farmers with access to diesel pumps and pipes. There was no clear contrast between the situation in a village waiting for Narmada water and a village having received Narmada water. On the contrary, in most parts of Phase 1 of the command area, there was a long-lasting period of conflict and negotiations between the villagers and the government about the implementation of the project. This period had already lasted a couple of years, and I arrived in the middle of it. I therefore decided to contrast the findings in Krushigam with a case study of Motugam, where the farmers were stealing water supported by their political networks.

Motugam was found in the list of villages from the same conference presentation in which I found the crude map of the command area[78]. I located it in March 2004 by combining the road map and the simple command-area map. On arrival, we discovered that Motugam was actually not part of the command area, although located on the left bank of the Narmada Main Canal, within the larger command area of SSP. I had probably found the wrong Motugam. Because this Motugam was part of the command area of another canal irrigation project, the Panam Scheme, it was not entitled to Narmada water, despite hardly ever receiving water

[78] http://www.iwmi.cgiar.org/iwmi-tata/FILES/ppt/PIM/Jayesh_Jan.ppt

from Panam because of its tail-end location. The villagers had therefore installed three large pipes which siphoned water (called *baknari* in Gujarati) from the Narmada Main Canal into the Panam field channel network, formed a *baknari*-organisation, and were vehemently fighting for the right to water from Narmada. The *sarpanch* of Motugam welcomed us and told us that as he was *taluka*-level leader of the BJP, no government official would dare remove his village's *baknari.* I figured that this would make an interesting case for exploring how power structures affect the implementation of a project like the SSP.

Motugam and Krushigam were good contrasts also on other terms: The first is a relatively remote, poor, agricultural village, with no irrigation source and few services. Not even a ration shop, where households with BPL[79] ration cards can buy subsidised rations of rice, wheat, sugar and kerosene, was available in Krushigam. Motugam has twice the population, is centrally located on the Interstate highway between Ahmedabad and Indore, is visibly richer with paved streets, streetlights and numerous small shops and banks, and the income structure is not entirely agricultural based, but also based on several stone quarries and services related to the highway such as tea stalls and garages. And more importantly, the village is endowed with irrigation resources from groundwater and river as well as the new Narmada Main Canal.

From a data-collection viewpoint, the difference in resource endowments of the villages also translated into different availability of village statistics. Whereas Motugam had a staffed panchayat office which held maps, land records, and lists of households below the poverty line, this was not available from Krushigam. I was told that the BPL-list was located either in the ration shop or with the *gram sevak,* but neither was available when I called for a visit. My own survey was therefore a necessary tool to bring forward important village statistics.

Village field research

Village-level data was collected following a triangulation strategy, by a combination of quantitative and qualitative methods. A 25% sample survey of all households in both *panchayat* villages was done in the fall/winter of 2004/2005. In Krushigam, this gave a sample of 105 households, and in Motugam, 196 households. The "*panchayat* village" is the smallest administrative unit in the Indian governmental system, and typically includes a main

[79] Below Poverty Line

village with surrounding hamlets. The aim of the survey was to identify socio-economic structures, political organisation and participation, and people's perceptions of the SSP. Households were selected by starting at a random house and then going to every fourth house in each hamlet of the panchayat village and each neighbourhood of the hamlet. The neighbourhoods would generally be laid out along a street or around a courtyard, so this was the easiest way to aquire a random probability sample. If no adults were at home in the sampled house, I would return at a later time to ensure a probability sample. The variables in the survey are mostly at the household level, and I tried to get the head of household, which meant the main earning man, to be the respondent. Sometimes, the respondent would be the housewife or an adult son. At times, an interview would start with the housewife, and if she did not know everything about the farm or other income-related issues, I would return later to get more information from her husband.

I interviewed selected leading persons in each village, such as the present and previous *Sarpanch*, *Talati*[80] and members or leaders of village organisations. Semi-structured interviews were done with people from different strata of the population, i.e. from different caste and occupation groups, such as landless labourers and shepherds. Frequently, a survey interview would evolve into a more unstructured conversation or interview about interesting subjects regarding life and social relations in the village outside the fixed survey questions. As such, the survey method was a good, although time consuming, way of identifying interesting people and subjects in a village.

I spent around seven weeks in each village in 2004/2005, over several shorter periods ranging from 7 to 12 days each, and returned for four days in each village in 2006. Together, this gave me the opportunity to observe practices, chat informally with villagers, and gain the confidence of the local population. As well as being the source of important knowledge which sheds light directly on the research question, such informal chit-chat and observations were important as a basis for interpreting the information I acquired during the more structured part of the data collection.

[80] The *Sarpanch* is the head of the panchayat, which is the elected village council. The *Talati* is the accountant and keeper of village records. The talati is employed by the district panchayat, and may sometimes work in several villages.

In addition to interviews, I collected available village level statistics from the *talati*'s office, and *taluka* and district-level information and statistics from the Census of Gujarat. Although the bulk of the village data material is from the two villages Krushigam and Motugam, visits were also made to other villages in other parts of the command area. I also drove through the central parts of the command area, visited briefly seven other villages, and talked to farmers from various villages at functions organised by the SSNNL. I visited the village which the SSNNL presented as a success story in farmers' participation in canal construction, and a village where an NGO where preparing and training the villagers for participatory irrigation management on a subcontract from the SSNNL. The information from the other villages indicated that the socio-economic conditions, farming practices, and the reception of the SSP in the case study villages are not unique.

Reliability and validity of household survey

A large part of the data collection from the villages was done through a household sample survey. In both villages, I began field research with the survey early, after a few introductory walks in the village with my hosts and a few semistructured interviews with villagers in different neighbourhoods in the village. A survey can be a useful research method in the beginning of field research to get an overview of the major groups, issues, and living conditions in the village, to get a basis on which to develop a more qualitative approach. Alternatively, it can be useful towards the end of field research, *after* knowledge about major issues and conditions have been aquired through more qualitative methods[81], and in order to test the frequency and covariation of phenomena that have appeared to be important. I chose the first approach. Firstly, I had good experience with the survey method from field research for my MA-thesis, when I experienced that I got a good introduction to the broader picture of the research area by systematically interviewing every *n*'th house, and that it was easier to explain to people what I was doing when I had a systematic approach dictated by "my professor". I also found the survey interview a good opening to more qualitative and "thicker" information, as many survey interviews would evolve into longer qualitative interviews when the respondents had interesting viewpoints and stories to tell. Secondly, because of the problems with finding interpreters, I was short of time, and needed to focus on the survey

[81] For example observation, informal chats, and semi-structured individual and group interviews.

early when I knew I had the interpreter(s), as a half-done survey would be of little use statistically.

The drawback of starting with a survey was that the questionnaire was made with regard to the original research questions which intended to explore water access in a completed canal system. In the case of Krushigam, the conflicts surrounding implementation only gradually dawned on me, and during the course of the survey I realised that many of the questions might not yield useful information. The questionnaire used in Motugam is slightly different from the one in Krushigam; first of all it had to be adapted to the issue in Motugam of bordering but not being part of the SSP command area, and secondly, I improved some of the questions from the Krushigam questionnaire to make them more precise. Both in Krushigam and in Motugam, the survey gave useful information about ownership of productive resources, variations in poverty and income sources, and participation in the social and associational life of the village. Much of this information has been used more as a basis for further analysis and reflections around the relationship between planners' and government officials'view of villagers and the problems of implementation, than it will appear in the dissertation in the form of crosstables or comparisons of means.

I regard most of the data from the household survey as fairly reliable, as most respondents seemed to trust my intentions as a student. Response rates were good, and very few refused to participate. In Krushigam, one sampled household could never find time to answer my questions, but no interviews were interrupted because of drunkenness or other interferences. In Motugam, two sampled households were never home, two households refused to give more information than name and caste, and two interviews were only half-completed as one respondent was too drunk and in the other house we only met the wife and she did not know much about the farm. A response rate of 97% is nevertheless good. Many respondents hoped that I could be the opening to some kind of foreign funding and benefit and asked me directly about it, but they seemed to believe me when I explained that I was a student. However, I know that people quite often underestimated the size of their holding and ownership of resources during the survey. This is particularly true among the larger landholders, especially those owning more than the maximum holding allowed in the land-ceiling laws. As time went by and they got to know me better, some respondents told me that they had underreported their resources during the interview. However, it is safe to assume that the underreporting is

done systematically in approximate proportion to the actual holding (an owner of 12 acres may say 8, while an owner of 100 may say 80), and the *pattern* of land distribution will therefore give a meaningful picture of village inequality, even if individual information is not accurate. For the question of landholdings, official statistics are not more reliable as they will overestimate the number of small holdings and underestimate the number and size of large landholdings. It is widely known and openly acknowledged that large landowners will divide their holding on paper onto various close relatives to avoid the land ceiling laws. Other questions were more difficult in terms of validity, and I realised that the question was actually measuring different aspects for different respondents. In those cases, the questions have not been used as the basis for quantitative analyses, but have nevertheless added to my general knowledge about life in the village[82]. Some of the questions touch upon sensitive and personal issues, for example questions about death of children and lack of food. Regarding the first question, I included a question about child mortality to have some measure of the severity of poverty experienced in the village. I had experienced in informal talks that the loss of children and death in general was a much more common experience for people in the villages than they are in contemporary Norway, and not a taboo subject. However, I was sensitive to the context when asking this question, and in some households that had recently lost one or several family members, or where the respondent was clearly in distress, I would skip the question. It was useful to be accompanied by my interpreter in such situations, and I am grateful to them for their social skills in these matters.

The statistical analyses employed are of a basic character, as I do not think the data material is sufficiently unambiguous for sophisticated multivariate analyses. The aim of the quantitative analyses has been descriptions of the present rather than predictions about the future. I have used tests of significance (t-test of means and chi-square of crosstables) and generally been cautious about drawing strong conclusions from small differences in frequencies. Because of the relatively small sample sizes, some crosstables would not give reliable chi-square tests,

[82] For example, in Motugam, I included the question "Is your household's living standard now *better, the same, or worse* than 10 years ago?" in an attempt to measure variations in improvement over time within various social groups in the village. The answers to the follow-up question "why", however, revealed that many related the first question to their own life-cycle, and that it therefore could not be used as an indication of improved poverty over time for different groups. Many would answer that it is better now because the children have grown up and are now earning. It would be wrong to conclude from such an answer that this household has climbed the socio-economic ladder.

and I relied on my own common sense in assessing whether the differences found could be seen to detect real and meaningful differences in the population.

I will discuss the validity and reliability of individual variables from the survey where I use them in the analyses of the chapters of Part 3 of the dissertation. Overall, I find the survey data to be reliable and useful for an understanding of the village social structure and of the challenges in implementation of the SSP.

Complicating factors in field research

Coming to an Indian village as a stranger and foreigner is an awkward experience. People regarded me with a mixture of enthusiasm, curiosity, and scepticism[83]. The receptions in Krushigam and Motugam were different. Krushigam inhabitants were not used to strangers, and word would have it that I and my husband were the only Western foreigners ever to visit the village. There was thus much more fuzz around me in Krushigam than in Motugam where many people had travelled abroad and at least to major Gujarati cities many times, and were used to strangers and even foreigners because of the location near the highway. This made people in Krushigam more curious about me, it was easier to get to know more people here than in Motugam, but also more difficult to find time to rest and think, as my room would often be filled with people who would come only to look at me for an hour or so, at least in the beginning of my stay. This never happened in Motugam, were the upper castes, among whom I lived, were more used to strangers.

The village research was done with the help of interpreters. Although I took private lessons in Gujarati and can understand quite a bit, my command of the language is far from good enough to manage on my own. For several reasons, I worked with four different interpreters during the long fieldwork in 2004/2005, and another two different interpreters for the return visits in 2006. Unfortunately, the command of English in Gujarat is not good compared to other states in India[84], it is therefore hard to find English-speaking people willing to live in a village, and whose time is not tied up in higher education or a job. Many young, unmarried women are not

[83] However, with a noteworthy absence of hostility.
[84] Gujarat, like many other states, in India is founded on linguistic borders and had for long an active nationalistic movement against teaching English too early in primary school.

allowed to stay away from home overnight, thus the pool of suitable candidates is reduced. Finding interpreters who were willing and able to stay with me in a village for a longer period of time was one of the most frustrating and time-consuming parts of the field research. The length of our stays in the villages was frequently limited by professional, familiar or educational commitments of the interpreters. Before the stay in Motugam in January 2005, I had found two female MA-students from MS University in Baroda who were able to work with me up to early February, but who then needed to return to university. I therefore asked my husband, who accompanied me to India at the time, to join as a research assistant and take part in the survey with one of the interpreters. This worked well, we worked as a team, and discussed the interviews over lunch and at night, and my husband's experiences and knowledge of the research also accompanied me back to Norway and has been available for consultation.

By coincidence, the interpreters in Krushigam were always male and the interpreters in Motugam always female. Although I would have preferred only female interpreters in order to avoid any misunderstandings about our relationship, this was not possible due to the constraints mentioned above. When I returned to Krushigam in 2006 with the third male interpreter, our hosts reacted with hostility. I did not understand at first why the father in the house acted so unfriendly, but in the end he came out with his worries. He told the interpreter to tell me that I was welcome to come back any time, but next time I must bring a girl with me and not a boy. His daughters were growing into young women, and he had to protect them from strange young men.

Gender is a factor also for the researcher. I found myself in an ambivalent position, biologically a woman and thus not a sexual threat to young women in the village, but culturally (or socially) neither man nor woman, and therefore difficult to place for the villagers. Male colleagues have obtained valuable information in village studies by sharing in male practices of tea or liquor drinking in evenings in public spaces. This option was closed to me, as neither the men nor I would feel comfortable with my participation in this. On the other hand, as a white, Western woman, I was sometimes offered and accepted a drink in the evenings within the private space of the house, and my hosts were curious about gender rules and other customs of Norway. Knowing which rules of behaviour to observe and which to break was a difficult balancing act. I dressed conservatively in salwar-kameez, which helped

support a picture of me as a decent woman, not like the half-naked white women shown on television. On the other hand, I broke caste rules of purity and pollution, an easy decision for me, but disapproved of by my upper caste hosts. I never refused a meal or tea during interviews, as accepting such hospitality is an important gesture of respect. This is important in itself, but also of instrumental value for successful interviews. My hosts told me in a gentle way that I should be careful about the lower castes as they are not good people, and complained to my interpreter that I drank tea from low, unclean people.

I would have wished to spend even more time in each village, but due to time constraints this was not possible. One factor was the dearth of interpreters, which meant that I had to travel between the city and the village more frequently than originally planned. I also fell sick in the village and had to return to the city to recover. The journey from Ahmedabad to Krushigam took 7 hours or longer with two different buses and then whichever vehicle (jeep, truck or bus) happened to leave from Jambusar to Krushigam once it was filled with enough passengers and goods to make the trip worthwhile for the driver. On some occasions I hired a car to take me there, but I tried, possibly in vain, to avoid being associated with the image of carelessly spending money. Despite the rapidly growing middle class and emerging consumerism in India, an ideal of economic prudence is still pervasive.

As mentioned earlier, the realities of the field were different from what I had prepared for. One further surprise that met me in Krushigam in October 2004, was the resettlement colony Navagam of Narmada oustees that was part of the Krushigam *panchayat* village. One of the main decisions for this research project was that I would *not* focus on the issue of displacement, resettlement, and rehabilitation, but on the beneficiaries in the command area. I was therefore in a dilemma about what to do with the people of Navagam. I included them in the survey on the same terms that I had included other villagers, and I also interviewed some of them about the displacement and resettlement experience. However, this dissertation is not focusing on these experiences as this topic is beyond its scope.

Identification or anonymity of informants and case villages

I have chosen to protect the anonymity of the villagers by making up pseudonyms for the names of all villages and villagers mentioned in the dissertation. The districts and sub-districts are identified because it is necessary for the reader to know the region from where the

material comes. It would be quite easy for anyone with detailed knowledge of Jambusar and Godhra to find out where I did my research, for example, rumours of my presence were spread widely in Jambusar between 2004 and 2006, but the pseudonyms will nevertheless protect my village informants' identity from the larger public.

I have also chosen to omit the names of the lower-level engineers, or where it was necessary for the flow of the narrative, to invent pseudonyms for them[85]. A list of SSNNL informants is provided in Appendix 1, and also here I have chosen to use pseudonyms or omit the names of the lower-level informants whom I did not ask specifically about whether they wanted to remain anonymous. I have also invented pseudonyms for the contractors I interviewed, as well as the company they work for.

Case study as research strategy

This project follows a case study approach. However, there is no guarantee that simply calling it thus will convey to the reader what is meant by the term "case study". On the surface, it seems like there is a consensus about what a "case study" is. Yin, for instance, provides a much-quoted definition of a case study as "an empirical enquiry that investigates a contemporary phenomenon within its real-life context when the boundary between phenomenon and context is not clearly evident" (Yin 2003:13). This minimal definition of a case study is hardly disputable, but a closer look at the literature on case studies reveals several epistemologically grounded disagreements. This section will discuss different definitions of case studies, competing views on case study research design, and the epistemological basis of case studies.

One way to try to come to grips with the concept "case study" is by seeing *what it is not*, that is, to compare it to other methodological traditions or research strategies within the social sciences. However, this does not clarify matters much, as there is a complete anarchy in the categorization of research strategies in the social sciences, as can be seen by comparing a few relatively recent methodology textbooks. Creswell (1998) contrasts case study with biography, phenomenology, grounded theory, and ethnography; Yin (2003) contrasts it with

[85] Some of their titles are so long that I prefer to invent for example the name "Madrasi" rather than repeat "Additional Assistant Engineer" throughout the text.

experiments, surveys, histories, and archival analysis; and Bryman (2004) contrasts it with experiment, longitudinal design, cross-sectional design, and comparative design. What then shall one make of my study which calls itself a case study, and employs surveys, histories, archival analysis, and a comparative design? The important thing here is to distinguish between the broad research strategy and the concrete methods of data collection. The first encompasses the purpose of the study as well as its epistemological foundation, and the latter refers to how the researcher acquires the necessary empirical material for answering the research questions. A case study may best be defined as a *research strategy* and not as a *method of data collection*, which may vary according to the needs of the research question.

Mitchell (2002) provides the following definition of "case study": "a detailed examination of an event (or series of related events) which the analyst believes exhibits (or exhibit) the operation of some identified general theoretical principle" (Mitchell 2002:170). He argues that an empirical investigation has to be set in a larger theoretical context in order to qualify for the term "case study". It makes sense to limit the term "case study" to a study of something which is seen as a "case" of something, of a larger phenomenon, process, type, or problem. The question remains whether the theoretical context and the larger phenomenon are necessarily known at the outset, or are inferred from the empirical findings of the research. I will return to that question later, but first I will turn to the classifications of different types of case studies, and what we can infer from these typologies about case study as research strategy.

Types of case studies

One of the main characteristics of case study research is the purposeful sampling, or rather *selection*, strategy, where cases are selected according to predefined criteria. This is in contrast to statistical analyses of survey data where the units of analysis are a representative sample of the universe or the population.

Several authors have developed typologies of case studies dependent on the purposes served by different types of studies. As with the different conceptualisations of how a case study differs from other research designs, the typologies of different kinds of case studies vary between different authors. Table 1 summarizes case typologies based on the purpose of the

study in a few methodological textbooks and articles. The table is not meant to provide a complete list of types of case studies, but to exemplify variations in the focus on and conceptualisations of case study as research strategy.

Table 1. Types of cases found in Bryman (2004), Creswell (1998), Flyvbjerg (2003), and Yin (2003).

Type of case	**Purpose**	**Listed by**
Intrinsic	Of interest in itself	Creswell
Instrumental	Used instrumentally to illustrate a particular issue	Creswell
Extreme/deviant/unique	Studied because of its intrinsic interest	Flyvbjerg, Bryman, Yin
Maximum variation (two or more very different cases)	Give "information about the significance of various circumstances for case process and outcome"	Flyvbjerg (:426)
Critical	Confirm, extend, or challenge a preconceived theory	Flyvbjerg, Bryman, Yin
Paradigmatic	"Develop a metaphor or establish a school for the domain that the case concerns."	Flyvbjerg (:426)
Revelatory	Give information on an issue previously inaccessible to analysis	Bryman, Yin
Exemplifying	Provide a suitable context for answering certain research questions	Bryman
Representative/typical	Gain knowledge about typical or commonplace situations	Yin
Longitudinal	Give information about how things change over time in the same case	Yin

The differences between the types of cases listed above are not always clear, and Flyvbjerg (2003) points out that cases may indeed serve several purposes, depending on the aim of the

study. Furthermore, some purposes of a case study, in particular its function as a paradigmatic case, may be impossible to determine in advance, as the singularity and significance of a case will often not become apparent until a late stage of case study research (Flyvbjerg 2003; Bryman 2004). In practice, there will often be a pragmatic aspect to case selection, as can be seen in Bryman's (2004) category of "exemplifying case", a case which provides a suitable context for answering certain research questions. Frequently, cases are selected because they were the ones which were practically feasible to study, e.g. this was the organisation which welcomed you, or a village where the monsoon had not played havoc with the access roads, or it was the unit which fitted most of the criteria/factors you wanted your case to shed light on.

Implicit in a process of categorization of types of cases like the ones above, is the assumption that the cases are not only interesting pieces of evidence on their own right, but representations of something else, samples of a bigger universe. This is at the core of case study as a research strategy. Especially the terms "critical case", "deviant case", and "exemplifying case" clearly alludes to a larger universe of phenomena about which findings from the study of a particular case can provide knowledge and understanding. Walton (1995) explores this particular issue of case study research. In general, Walton argues that the crucial defining question during a case study is "A case of what?" This may be a question we struggle with throughout the research. A case study is not only a study of an empirical instance, but involves broader claims about reality and about representing a universe of a phenomenon to which we can generalize based on the chosen case. This leads us to the question of how we can generate theory from case studies.

Theoretical generalization from case studies

How can we draw inferences about theory based on empirical observations? As far as I can see, there are two main discussions regarding how we can generate theory from case studies. The first is what kind of research design is most appropriate, i.e. whether a single-case study or multiple-case study is most fruitful and for which reasons. The second question, which is related to the first, concerns whether the theoretical understanding of a case must be clear at the outset of the study, or is developed during the course of the study.

The question of single- vs multiple-case studies is related to different epistemological approaches to social science. Some authors advocate a quasi-experimental research design involving multiple cases. Yin (2003) and Eisenhardt (1989; 1991) are examples of this position. The logic behind doing multiple case studies, according to Yin and Eisenhardt, is replication, analogous to the logic underlying multiple experiments. "For example," Yin says, "upon uncovering a significant finding from a single experiment, the immediate research goal would be to replicate this finding by conducting a second, third, and even more experiments" (2003:47). The same is valid for multiple case studies, he argues. Eisenhardt (1989) similarly outlines a recipe for case study research based on a combination of both hypothesis-testing approaches and experimental-replication logic. Eisenhardt (1989) even argues that as many as *four* cases are a minimum requirement to achieve the goal of theoretical development through case studies.

This has been contested by for instance Dyer and Wilkins (1991) who argue that this is a "hybrid" between qualitative and quantitative ways of analysis, and risks losing the particular strength that case studies have of providing rich and detailed contextual material and narratives which describe "general phenomena so well that others have little difficulty seeing the same phenomena in their own experience and research" (Dyer and Wilkins 1991:617).

The reasoning underlying the quasi-experimental design for multiple case studies resembles hypothetical-deductive methodology and nomothetic science. It is an attempt at constructing a closed system in which to test theories which aim at general, universal explanations. The replication logic described above allows for falsification of theoretical claims and aims at strengthening, if not verifying, existing theories. Yin maintains that the inferences drawn from this design involves "analytic generalization" as an alternative to statistical generalization. Analytical generalization is done when "a previously developed theory is used as a template with which to compare the empirical results of a case study. If two or more cases are shown to support the same theory, replication may be claimed" (Yin 2003:32-33). Campbell, in the foreword to Yin's book, holds that this approach is similar to a "randomized-assignment-to-treatments model" in an experiment where rival hypotheses are specified and specifically controlled for. He attributes Yin's "insistence that the case study method be done in conformity with science's goals and methods" to Yin's background in experimental psychology (2003:x). This is plausible. Researchers with other disciplinary backgrounds, like

anthropology or human geography, may be less inclined to base their research design on a model which strives to achieve the ideal of *ceteris paribus* conditions.

The rigorous quasi-experimental design advocated by Yin and Eisenhardt is not the only kind of design which provides alternatives to statistical generalization. Mitchell (2002) discusses the epistemological basis of case studies. Like Yin, he contrasts this to statistical generalization (or "enumerical induction" as Mitchell calls it). Statistical generalization means to draw conclusions about frequencies and correlations between variables from random, representative samples to parent populations. However, as is highlighted in any introductory text on statistics, the decision on whether correlation between variables is spurious or not rests on a different kind of logic. "Sometimes it becomes more a matter of common sense than of statistical application to determine if an observed correlation can be practically interpreted or if it is spurious," say Bhattacharya and Johnson in *Statistical Concepts and Methods* (1977). Even in statistical analyses, inferences about the relationship between variables cannot be based on enumerical or probability logic at all, but has to be based on theoretical thinking and logical deduction, argues Mitchell:

> "The inference about the *logical* relationship between the two characteristics is based not upon the representativeness of the sample and therefore upon its typicality, but rather upon the plausibility or upon the logicality of the nexus between the two." characteristics. (Mitchell 2002:175)

Whereas in statistical analyses both enumerative and analytical/logical inferences must be used, in case studies, inferences are only analytical. Contextual knowledge can guide our "common sense" in this matter. Based on this, Mitchell further argues that there is nothing to gain by looking for a typical case, or defend your case in terms of typicality. Concern with typicality is to confuse enumerative and analytic modes of induction. Cases should rather be selected based on their explanatory power (Mitchell 2002).

Comparative case studies need not be based on the replication logic advocated by Yin and Eisenhardt. A comparative design will also allow contrasting findings to act as "a springboard for theoretical reflection" (Bryman 2004). Bryman (2004) suggests that a useful design may be a comparison between very different cases, for instance a successful and an unsuccessful case. Similar findings from contrasting cases can be just as important and interesting as differences. Given the impossibility of controlling the "laboratory" environment in a study of

the real world, it may not be the most fruitful strategy to try to achieve the scientific ideal of experiments in a closed system. For example, no two villages in India are identical, and it is impossible to control for all the confounding factors in an analysis of the struggles over Narmada water in two Indian villages. *Ceteris paribus* conditions are thus not possible. A comparative case study may explicitly acknowledge this difference, and the aim may be to explore how the same phenomenon/a (or the Narmada project, in my case) is playing out in different circumstances or localities. For this, a "maximum variation" set of cases may be chosen.

The second question regarding theory generation relates to how and when we know the answer to the question "What is this a case of?" In quasi-experimental research designed to test existing theories, we need to know in advance what the case represents. Yin argues that the ambiguity of cases is a vulnerability of case studies, and that we have to carefully "investigate the potential case to minimize the chances of misrepresentation" (2003:42). The frequent change of perspectives, research questions, and theoretical ideas during the course of case study research, is a weakness according to him, and he argues explicitly for rigour in designing the research:

> "[Y]ou need to avoid such unsuspected slippage; if the relevant research questions really do change, you should simply start over again, with a new research design." (Yin 2003:45)

Others see the flexibility of case studies, that they by design are more open to surprise and available for multiple purposes, as a strong point:

> "[C]ase studies, especially those which start with the case in its own right rather than as an instance, are more likely to uncover unanticipated findings as the details are explored." (Platt 1988:177).

Yin's demand for rigour is not only sometimes practically unfeasible for lack of time and funds, but may also, for some research problems, be theoretically problematic. Several researchers have described how they, during the course of their investigation, discovered that the case they chose to study was not best understood as a case of what they thought it would be at the outset (f.ex Flyvbjerg (2003) and Walton (1995)). Walton argues that a case is not selected based on a pre-existing universe that it represents and of which it later provides explanations and theories. On the contrary, our perceived universe is referred from cases,

either from your own case, or from other case studies, in a dialectical process involving both inductive and deductive reasoning. In order to frame our case, we need to make "theoretical choices about the causal forces that distinguish and critically affect the case" (Walton 1995:124).

Walton (1995) uses his own experience of research on the Owens' Valley Rebellion in the USA in the 1920s to argue for the theoretical case. This project turned out to be a study of something quite different than what he set out to study:

> "The Owens Valley study began with the ambition of probing in more depth the causes of rebellion analyzed in previous cross-national case studies. In the early going, my assumption that the Owens Valley presented a case of something familiar in U.S. history or in the sociological literature on social uprisings was frustrated. The episode belonged to no known universe from which typological distinctions could be drawn and causal explanations hypothesized." (Walton 1995:135)

Instead of a case study which would provide a theory of causes of rebellion, he changed it to an analysis of how collective action was shaped by the particular configuration of the state in given periods of time, a longitudinal case study of "the changing role of agency in history" (1995:133). He concludes from this that case study research is a thoroughly theoretical exercise:

> "The question of cases, their designation and reformulation, therefore is a theoretical matter. The processes of coming to grips with a particular empirical instance, of reflecting on what it is a case of, and contrasting it with other case models, are all practical steps toward constructing theoretical interpretations. And it is for this reason, paradoxically, that case studies are likely to produce the best theory." (Walton 1995:127).

Although it might be too strong to claim that case studies are likely to produce the "best theory"[86], I follow Walton in seeing the reformulation of research questions, methods of data collection, and case boundaries, as intrinsic parts of the theorisation process itself, and not as weaknesses. If we always knew at the outset what a case study was about, and how a case was to be understood and conceptualized, theory development would indeed be a narrow and limited exercise.

[86] What kind of method that will produce the best theory will depend on a range of issues, like the research question, the status of knowledge on the particular question or topic, and the kind of theory one is aiming for.

SSP, Krushigam and Motugam – what kinds of cases are they?

My case study can be seen as an intrinsic case study of the Sardar Sarovar Project, which is of interest in and of itself. This is a case of a larger universe of large-scale development projects, initiated in a top-down manner from the state, and criticised for lack of sensitivity to local knowledge, ecology, and culture. As described in Chapter 5, large dams have aquired the status as critical symbols of a flawed development model, and the Sardar Sarovar Project is one of the most important of these symbols. Within this case, I am doing an instrumental comparative case study of two villages. They are selected because they provide good contexts for certain research questions to be answered, and as such they can be seen as "exemplifying cases". In Krushigam, I explore the implementation of the SSP in a poor and water deficient setting where caste heterogeneity prevents collective action and organisation. In Motugam, I explore how leaders with political power are exerting pressure on the government to alter the decided policy for water allocation and the challenges of collective organisation of water resources. In addition, the two villages are selected as contrasting cases of maximum variation in resources, both human/organisational and economical/natural.

I do not claim that this design enables me to tell the full and complete story of what influences the implementation and potential impacts of the Sardar Sarovar Project. But they will allow me to thoroughly explore important aspects of this, and draw conclusions about possible implications for other villages in the command area. This study will also allow, at a more abstract level, reflections about the development potential of mega-projects like the Narmada/Sardar Sarovar Project, and the validity of the arguments of strong critics or proponents of such projects.

As is clear from the account of the research process in this study in the first part of this chapter, a level of pragmatism was necessary when defining and designing the study. Like Walton (1995) and Flyvbjerg (2003), I had to reformulate research questions and research design following unanticipated findings during the course of the research. I have concluded that social theory building and conceptualization is basically a hermeneutic process, i.e. a constant dialectic in the mind where initial hypotheses, concepts and ideas are scrutinized, adjusted, or disposed of after facing empirical data and experiences.

Epistemological issues – pragmatism and hermeneutics

Methodological debates in the social sciences have often suffered from a logical fallacy: Because a positivist epistemology implies the analysis of quantitative data, quantitative analysis is seen as a sign of a positivist epistemology. This fallacy rests on a flawed understanding both of positivism and of quantitative analysis. A positivist position implies more than the testing of empirical regularities in a particular setting. Most notably positivism restricts "science" to a limited activity (the analysis of empirical regularities, based on what is believed to be the methods in natural sciences), and a limited goal (the development of more or less universal laws.) Within positivism, observation is the basis of scientific knowledge; this follows from its anti-metaphysical stand. Speculation about abstract forces and causal relations are beyond the scope of science in the positivist ideal. Scientific activity implies the testing of hypotheses against empirical realities either for the purpose of verification or, after Popper, falsification. The aim of science is the growth of knowledge; explanation is sought through the "covering-law model", also called the nomological-deductive model of explanation, which is built on a correspondence criterion of truth where sense data represent a mind-independent external reality (Smith 1998; Mjøset forthcoming). The scientific ideal is to separate facts from values, because values are subjective and non-scientific. Smith (1998) also emphasises the nominalist position of positivism, i.e. that the concepts we use are simply names and pure reflections of things as they are.

One contrast to positivism is an *interpretative* approach. The basis for this approach is the fundamental difference between social and natural sciences in terms of their objects of analysis. One of the early proponents for such an approach was the sociologist Herbert Blumer who founded the school of "symbolic interactionism". Blumer (1954) argued that concepts are "sensitizing" and not "definitive". They guide our interpretations and understandings of the world, and are thus important for our theory building even if they are not the only true representation of a pre-existing reality independent of the mind. Blumer's approach is grounded in the unique, empirical world of social phenomena. Social theory, according to him, "is primarily an interpretation which orders the world into its mold, not a studious cultivation of empirical facts to see if the theory fits" (Blumer 1954:4).

Other philosophers make similar arguments. Taylor (1985) argues that the positivist epistemology has limited applicability in social sciences: "these notions about the sciences of man are sterile, (…) we cannot come to understand important dimensions of human life within the bounds set by this epistemological orientation" (Taylor 1985:21). He argues that the social sciences are basically hermeneutic sciences, and "a successful interpretation is one which makes clear the meaning originally present in a confused, fragmentary, cloudy form. But how does one know that this interpretation is correct?" (Taylor 1985:17). The answer can only be more of the same, argues Taylor. We have to stay within the hermeneutic circle, show how our interpretation makes sense out of the original nonsense: "What we are trying to establish is a certain reading of texts or expressions, and what we appeal to as our grounds for this reading can only be other readings" (Taylor 1985:18).

Hacking (1999) makes a related argument about the differences between social and natural sciences: The "kinds" (i.e. concepts, classifications, labels) used in the social sciences are *interactive*. Because humans are aware of the labels attached to them, they interact with them, start to think of themselves in a new and particular way, and even change with the awareness of being of a certain kind, for example "untouchable", "labour class" or suffering from "ADHD". The objects of the natural sciences, on the other hand, are indifferent towards their classification, they have no awareness of whether they are classified as horse or quark. Thus, the positivistic assumption of nominalism, that our words and concepts are simple reflections of empirical or non-empirical reality, is challenged. Our classifications are parts of our "world-making" and theorizing, and our concepts serve important purposes.

Furthermore, the "interactiveness" of the kinds and categories of social science implies that they may actually change people's perceptions of themselves and their societies. As exemplified by Taylor, "we often experience in ourselves or others how achieving, say, a more sophisticated vocabulary of emotions makes our emotional life, not just our description of it, more sophisticated" (1985:26). Following this argumentation, critical theorists focus on the way concepts can serve both emancipating and oppressive purposes, and what this means for social researchers' participation in society (Mjøset forthcoming). Social constructionists take these arguments the furthest, and argue that all knowledge is socially constructed (Hacking 1999). I find myself in a kind of intermediate position, and find support for this both

in Taylor (1985) and Hacking (1983, 1999). Taylor cautions that even though ideas and concepts matter,

> "not just any definition can be forced on us, nor can we force it on ourselves; and some which we do gladly take up can be judged inauthentic, or in bad faith or just wrong-headed by others. (…) Thus, neither the simple correspondence view is correct, nor the view that thinking makes it so." (Taylor 1985:26)

So then, what is the role of empirical data, regularities, and correlations in an interpretative social science? Their role can be seen as parts of the sense-making process of a hermeneutical circle[87]. Just as observations, personal experiences, and in-depth interviews are bases for forming a valid interpretation of social phenomena, quantitative data on empirical regularities discovered in surveys are legitimate and often necessary information. And in an analysis of quantitative data, it is useful for interpretation to analyse correlations by also making use of tests of significance. There are thus elements of the "scientific method", as idealized in positivism, which are valuable in interpretation-based social research. Although in the end it may be impossible to break out of the hermeneutical circle by referring to empirical data, some kind of empirical "tests" may strengthen our arguments, and make our explanations of the world more plausible. Indeed, even constructionist researchers refer to "facts" to support arguments about the world. The difference from a positivist position is that there is more to the story than the empirical facts and their regularities.

Theory as explanation

The aim of this research is to explain how and why the Sardar Sarovar Project got the form it did; first, in the planning phase and later, in the implementation phase in rural Gujarat. The research is driven by an interest in the particular project, not by an interest in developing universal theory of the covering-law type. The aim is to provide a plausible explanation of the way the Sardar Sarovar Project has unfolded in Gujarat. However, a detailed case study of this highly controversial development project will tell us something about the broader issue of 'development' and its relationship to changing ideas.

I agree with Flyvbjerg who argues that good case studies consist of narratives that come near the complexities and contradictions of real life. He quotes Nietzsche on saying that scientists

[87] The same argument is made by Ulmer and Wilson (2003).

should not wish to "divest existence of its rich ambiguity" (Flyvbjerg 2003:429-430). I did not approach the empirical material of the study - the planning material and the villages - equipped with a set of theoretical tools for analysing it. Instead, I let the empirical findings guide me to the explanations I needed to seek. Therefore, this dissertation does not have a separate chapter which presents the theory I am using to analyse the material. Instead, I draw into the analysis different theoretical perspectives as I move through the narrative of the dissertation, following the Narmada water and SSP canals from the ideas of the plan to the fields of the farmers. On the one hand, this is a disadvantage, as I draw on a range of theories, and am not able to present and discuss each one, and their wider implications, in detail. On the other hand, this approach is an advantage, as it enables me to give a richer and more complex picture of an invariably rich and complex reality. Like Flyvbjerg advises, I have tried to "tell the story in its diversity", in order not to close the case and claim that the final truth has been found, but to leave it open for other researchers who may take up the lose ends in my narrative, and bring our understanding of the Sardar Sarovar Project and development conflicts further.

Part Two.
The Sardar Sarovar Project and changing ideas of 'development'

7. Development, growth and modernisation

"I believe in the great potentialities for wellbeing of the machine and technology and science," said "Mr TVA", David Lilienthal. He was not alone. This chapter will describe the dominant ideas of 'development' of the 1940s, 1950s, and 1960s, in which technology and science had an important role[88]. Although this was also the beginning and peak of the Cold War and intense ideological conflicts reigned, the period was characterized by many shared ideas and visions about how to improve the human condition. Despite dissenting voices of various kinds[89], a core idea of *state-led modernisation for economic growth* was hegemonic during most of this period. This chapter will present the central features of the ideas of what is known as modernisation theory and their relationship with Indian development planning after independence. These are the development ideas and strategies that were accused of being inherently unjust and destructive by the growing development critique in the 1970s, 80s, and 90s, for example by the international anti-dam movement described in Chapter 5.

Modernisation theory

A precise date is often identified for the befinning of an "era of development": President Harry Truman's inaugural speech on 20th January 1949 in which he announced a 'bold new programme for development'. In the decades that followed, immense intellectual and political efforts were directed towards the improvement of economies and living conditions in the "third world". The concept 'development' in one sense refers to this intentional project of bringing the poor countries of the world up to the level of material prosperity enjoyed in the rich, industrialised countries. Another meaning of 'development' refers to immanent historical processes of capitalism: geographically uneven and profoundly contradictory processes of technological, social, and political change (Cowen and Shenton 1995; Hart 2001). 'Development' thus refers both to an immanent process and an intentional intervention. Both kinds of processes produce social, cultural, and material changes. This makes the concept of

[88] There is no exact beginning or end to this period as such ideas aquire and lose hegemonic status gradually. I see certain events that mark the beginning and end of the period in which state-led industrialisation and modernisation were the hegemonic development ideas. Markers of the beginning are the New Deal and the TVA in the USA in 1933, and the publication of Keynes' theory of equilibrium in 1936, and markers of the beginning of the end are Rachel Carson's book *Silent Spring* from 1962 and the student revolts in Paris in 1968.
[89] I am thinking of for example Friedrich Hayek, Peter Bauer, and Mahatma Gandhi.

‘development’ tricky to handle, as it conceals contested values and political ideas. The word is used both descriptively and normatively, and refers to both a process and a goal, which sometimes leads to confusing circular arguments. It does not help that there is considerable disagreement about the goal itself, and about how to get there. The growing critique of the concept of development since the end of the 1960s has thus challenged ‘development’ as a *process* of economic growth and cultural homogeneization, not as an *aim* of a society where children do not die from diaorrhea and villagers do not starve when the rains fail.

Like ‘development’, ‘modernisation’ is also a term with different and blurred meanings. Hettne (1995) identifies three: modernisation as 1) the continuous unfolding of universal historical forces, 2) a specific historical transitional process (the change from feudalism to capitalism in the West), and 3) a specific development policy in the Third World prescribed by “modernisation theory”. The three meanings are usually blurred; for example, the implicit assumption of most modernisation processes prescribed by modernisation theories (meaning 3) is that the universal historical processes are progressive and leads to ever-higher stages of civilization and economic well-being (meaning 1). Hettne (1995) summarizes the modernisation approach as one that sees development as a spontaneous, irreversible process implying structural differentiation and functional specialization, a process that can be divided into distinct stages, and that can be stimulated by external competition or internal measures supporting modern sectors and technologies. Defined such, Marxism also represents a modernisation approach to development, as can be seen from Marx’s preface to the first edition to Das Kapital:

> “The country that is more developed industrially only shows, to the less developed, the image of its own future.” (Karl Marx quoted in Nederveen Pieterse 2001:23)

Although what is known as “modernisation theory” categorically distanced itself from Marxism (Nederveen Pieterse 2001), their shared visions of modernisation, industrializaton, stages, and progress illustrate an important point: the more or less taken-for-granted assumptions of the developmentalism of the post-War and post-colonial era.

An immediate impetus for post-war intentional development efforts came from the Cold War context in which poverty was feared as a breeding ground for communism, and from the post-colonial context of more and more independent countries in Asia and Africa. However, the

idea of intentional development has a longer history. Brookfield (1975) specifically mentions three roots. The first is the so-called ethical turn in colonial policies from the late 19th century, a shift that strengthened the perceived altruistic elements of colonial policies; the second is a renewed sense of world interdependence accentuated by the efforts to rebuild world trade after the Second World War; and the third is the reconstruction of capitalism that started between the two world wars and emphasised the economic role of the state, as seen for example in New Deal programmes such as the TVA and other Keynesian policies. Cowen and Shenton (1995) trace ideas of intentional development to the 19th century and to "doctrines of trusteeship and progress" expressed in the projects of utopian-socialist Saint Simonians and the philosopher John Stuart Mill in response to the negative side-effects of industrialisation such as rapid urbanization, poverty and unemployment. As we saw in Chapter 2, part of the composite of reasons for construction of irrigation works in British India were humanitarian and development concerns; recall the statement of the founder of Thomason College of Civil Engineering at Roorkee in 1851: "The government has embarked with all the energies it can command in the noble work of improving the condition of the people and developing the resources of the country". Clearly, ideas of development as interventions with the aim of progress existed before 1949. Such intentional development is part of what Scott (1998) described as "high modernism" which was a ruling ideology born out of the Enlightenment and therefore dates back to the late 18th century.

Development economics

'Development' in its post-war modernisation version was literally synonymous with economic growth. The influential development economist Sir Arthur Lewis, for example, says in *The theory of economic growth* (Lewis 1956):

> " 'Growth of output per head of the population' is rather a long phrase to repeat over and over again in a book. Most often we shall refer only to 'growth' or 'output', or even occasionally, for the sake of variety, to 'progress' or to 'development'." (Lewis 1956:10).

Growth was a prerequisite for social improvement and increased well-being; the benefits of economic growth would multiply and "trickle" down and out through society, through classes as well as regions. Most importantly, without growth, no improvement was possible, as there would simply not be enough resources to distribute. The problem for un-developed countries

was their low-level-equilibrium economies and lack of dynamism. The first two decades after World War 2 saw impressive growth rates in the un-developed countries, but by the mid-1960s the growth rates slowed down and agricultural growth could barely keep pace with population growth. The development efforts up to that time seemed "too little and too slow" writes Brookfield, and points out:

> "It was also not yet clear that economic growth, by itself, was insufficient as a prescription for development and this did not become clear for another decade." (Brookfield 1975:41)

'Development' in these years was the domain of economists, and the emerging science of *development economics*, with its growth theories and models, was the main arena where 'development' was defined. Keynes' theory of equilibrium from 1936 had inspired a new generation of post-war economists to develop models of growth for un-developed countries. They modelled the relationship between capital investments and output: investments would create employment, which would create demand and increase the amount of capital available for reinvestment, - a virtuous cycle of economic growth. The hope of the modellers was "to find in capital investment something like a development-vending machine: you put in the money, press the button, and get growth" (Brookfield 1975:29). The central problem was to understand which "buttons" to push: to determine the required amount of savings, estimate the ratio of capital to output in different sectors, and find the best pattern of investments in order to move from a low-level equilibrium to an equilibrium of high output and high savings.

For an economy to escape stagnation, large increases in savings and investment were necessary. A gradual approach would not suffice, argued many economists, but a 'big push' towards industrialisation was required. The models became influential for economic policy making in many countries. Development economists manned the planning institutions of many developing countries, and new statistical institutions were established to collect and process necessary data for economic modelling and planning (Brookfield 1975).

Walt Rostow's *The stages of economic growth* (Rostow 1990) is considered the classic of modernisation theory (Nederveen Pieterse 2001). His work carried these development ideas to a broader audience than the technical work of the development economists of the 1940s and 1950s; Rostow was widely read and influenced a generation of students of development, to the extent that "the 1960s can almost be described as the Rostow period in the history of

development studies" (Brookfield 1975:38). In brief, Rostow's theory is that all societies will pass through the same stages on their way to development, which is defined as the society of mass consumption, more or less identical to that of the United States of the 1950s. The five stages on the journey towards mass consumption are 'traditional society', 'preconditions for take-off', 'the take-off to self-sustained growth', 'the drive to maturity', and "the age of high mass-consumption', of which the "pre-conditions"-period is a crucial and turbulent phase during which the risk of catching "the disease of communism" is substantial (Rostow 1990).

Universalistic assumptions

The theory of the stages illustrates clearly the universalistic assumptions of modernisation theory. It assumes that all countries pass through the same stages in their development process, and the aim of development is largely the same for all: industrialisation, accumulation and economic growth for increased material prosperity. The main means were state intervention and planning (Brookfield 1975; Nederveen Pieterse 2001). The general prescription of the development economists was massive government investment in infrastructure such as roads, ports, power networks, and dams, or what the development economists called "social overhead capital". These projects were not seen as likely to attract private investments because of their character as public goods and natural monopolies. The characteristics of social overhead capital "decree that governments must generally play an extremely important role in the preconditions period" concluded Rostow (1990:25). Investment in infrastructure was regarded as a government task for the major part of the twentieth century[90], up to the neoliberal turn in the 1980s[91]. But even a liberalist like Deepak Lal argued as late as 1985 that infrastructure has to be the responsibility of the government:

> "There are numerous essential tasks for *all* governments to perform. One of the most important is to establish and maintain the country's infrastructure, much of which

[90] One exception was W.A. Lewis who in *The theory of economic growth* from 1955 argues that infrastructure may just as well be provided by private entrepreneurs. His theory was developed before the theory of public goods was first formulated in 1954 by Paul A. Samuelson in the paper "The Pure Theory of Public Expenditure".
[91] The contrast with today's neoliberal hegemony can be seen from this excerpt from an article in *The Economist* in 2007: "India's government has ambitious plans to increase total infrastructure spending to 8% of GDP over the next five years. This will involve some increase in government spending, but the idea is for the bulk of it to be financed by public-private partnerships. That will be hard. Private investors, especially foreign ones, still shy away from sectors like electricity and roads because they are uncertain of earning a reasonable return. Only about half of all electricity generated is paid for, because power is stolen and bills are left unpaid." *The Economist* Feb 3rd 2007 on "Briefing India's economy", p. 67.

> requires large, indivisible lumps of capital before any output can be produced. Since the services provided also frequently have the character of public goods, natural monopolies would emerge if they were privately produced." (Lal 1985:13)

In addition to government investment in infrastructure, countries in transition to a higher development level had to channel resources to classes of people who would invest them in productive activities, the entrepreneurial classes. These men tend to come from the higher-middle strata of the social hierarchy, said Lewis (1954), from the capitalist classes who receive profits or rents, not labourers or middle classes living on wages. The dominant classes in "backward economies" – "landlords, traders, moneylenders, priests, soldiers, princes" are not concerned with investing capital productively, but are inclined to spend their income on "prodigal consumption" (Lewis 1954). Rostow argued the same:

> "The income above minimum levels of consumption, largely concentrated in the hands of those who own land, must be shifted into the hands of those who will spend it on roads and railroads, schools and factories rather than on country houses and servants, personal ornaments and temples." (Rostow 1990:19)

The resources made available by the saving class must be directed towards the entrepreneurs of society, those willing to take risks and put innovations to productive use, mainly in industry, but also in agriculture, farmers who are willing and able to "respond to new techniques, land-holding arrangements, transport facilities, and forms of market and credit organisation" (Rostow 1990:51-2). The role of the saving class is one of the reasons why Lewis, for example, regarded a radical redistribution of the ownership of productive resources counter-productive to growth. On the contrary, he regarded widening income inequalities a prerequisite for growth (Brookfield 1975).

Another necessity for economic growth in poor, traditional societies is a deeper cultural transformation of entire societies. Traditional values, attitudes, sectors and individuals need to give way to their modern varieties. "A wider-based revolution in outlook must come about", writes Rostow (1990:51-2), new views of men, society, and nature are necessary. Men must be valued "not for their connexion with clan or class, or, even their guild; but for their individual ability to perform certain specific, increasingly specialized functions" (Rostow 1990:19). A new relationship to nature must be established: The physical environment need not be regarded "as virtually a factor given by nature and providence, but as an ordered world which, if rationally understood, can be manipulated in ways which yield productive change

and, in one dimension at least, progress" (Rostow 1990:19). And societies must reorient their social, political and economic arrangements from "relatively small – mainly self-sufficient – regions" towards "the nation and to a still larger international setting" (Rostow 1990:19).

Modernisation as ends or means?

The modernisation theorists were concerned with the means (economic growth through industrialisation) rather than with the aims of 'development'. Rostow took the aim more or less for granted to be a version of the age of mass consumption where scarcity would be eliminated. The means of development was economic growth. In *The stages of economic growth*, Rostow states explicitly that economic growth is merely the means, and not an end in itself:

> "economic progress is a necessary condition for some other purpose, judged to be good: be it national dignity, private profit, the general welfare, or a better life for the children." (Rostow 1990:6)

But he does not specify what the end is, leaving this for someone else to decide as long as it is "judged to be good". His suggestions could satisfy a range of value systems. Thereby, he avoids the difficult ethical questions implied in "development": what is "good" and what is "bad"? Whether it is explicitly recognized or implicit in the assumptions made, the analysis of development is inherently a normative and ethical field of studies.

Where Rostow avoids the ethical discussions of development, his contemporary Lewis actively raised the issue of means and ends (Lewis 1956). The means were clear to him: they were economic growth or increased output per head, with no further discussion about the desirability or need for what was produced. However, in the epilogue to *The theory of economic growth*, Lewis asked "Is economic growth desirable?" This text is an interesting ethical discussion, different from the technical economic modelling exercises typical of the development economics literature. Lewis here acknowledged that a modernisation process is a major disruption:

> "The opposition of reason to authority, the movement from status to contract, and the change from social stability to vertical social mobility all upset existing relationships, whether in the matter of class, religion, political obedience, or family ties." (Lewis 1956:432)

The transition from a society in an old, static equilibrium to a new dynamic, equilibrium "which is in every sense superior to the old" is painful and people may not end up being more happy, he says (1956:421). But happiness is not the right test of good or bad:

> "What distinguishes men from pigs is that men have greater control over their environment; not that they are more happy." (Lewis 1956:421)

Growth is desirable because it gives men freedom to choose greater leisure or more goods, it gives us more services and less drudgery, we get the opportunity to appreciate and practice the arts and "indulge in the luxury of greater humanitarianism" (Lewis 1956:422-3). "The case for economic growth is that it gives man greater control over his environment, and thereby increases his freedom", argued Lewis (1956:421). In particular, economic growth is important for *women*, he argued,

> "Women benefit from these changes even more than men. In most under-developed countries woman is a drudge, doing in the household tasks which in more advanced societies are done by mechanical power – grinding grain for hours, walking miles to fetch pails of water, and so on. Economic growth transfers these and many other tasks – spinning and weaving, teaching children, minding the sick – to external establishments, where they are done with greater specialization and greater capital, and with all the advantages of large scale production. In the process woman gains freedom from drudgery, is emancipated from the seclusion of the household, and gains at last the chance to be a full human being, exercising her mind and talents in the same way as men. It is open to debate whether economic growth is good for men or not, but for women to debate the desirability of economic growth is to debate whether woman should have the chance to cease to be beasts of burden, and to join the human race." (Lewis 1956:422)

The passage is worth quoting at length because it spells out clearly the emancipatory ideas which one can assume inspired most development economists but which are not very visible in their writings[92].

[92] However, it is worth noting that not everybody shared Lewis' *feminist* inclinations. Rostow, f.ex., meant *men* literally, and not as a synonym for "humans". For example he wrote about what "men" would do with their time when scarcity was eliminated by modernisation, and mention women only in a revealing parenthesis: "(Parenthetically, we doubt that half the human race – that is to say, women – will recognize the reality of the problem; for the raising of children in a society where personal service is virtually gone is quite ample human agenda, durable consumers' goods or no. The problem of boredom is a man's problem, at least until the children have grown up.)" (Rostow 1990:91).

Poverty as a residue of the past

Poverty reduction in itself does not figure as a central topic in modernisation theory. Rather, it is present as an attribute of backward and traditional societies which is assumed to disappear when the development process gets started. There is little room for the idea that poverty may be produced by the development process itself. In Rostow's theory of the stages, for example, only progress is possible, except for the possibility of derailing into the blind alley of communism in the vulnerable phases of precondition to take-off and early take-off (Rostow 1990). The term "poverty" only appears twice in Rostow's "The stages of economic growth": the first time in his contemplation of what men will do when they have reached the age of mass consumption and don't have to struggle any more, and the second time in a comment on why Malthus was wrong[93]. In Lewis', *The theory of economic growth* from 1956, 'poverty' does not have an index entry. As an economist, his concern is growth, but in the epilogue to the book he acknowledges that economic growth will not necessarily reduce the poverty of the masses. However, he says, most people would condemn as immoral economic policies that leave the masses in poverty (Lewis 1956).

Fifty years later, few books if any on development are published without placing poverty reduction at a much more central place. The means of development are rarely discussed without explicit reference also to the end, for which poverty reduction is the least common denominator in the diverse value positions. This is also noted by Fields, who discusses the relevance of Lewis' model 50 years after its birth:

> "Lewis' welfare economics was primarily in terms of growth, with only limited attention to inequality and poverty. Today's analyses would place much more emphasis on the poverty-reduction effects of Lewis-type economic development than Lewis did." (Fields 2004:733)

Around the turn of the millennium, the term "pro-poor growth" has emerged on the development arena, with large projects in the research departments of for example the World Bank devoted to the operationalization of the concept and identification of strategies for *pro-*

[93] The words appear in these sentences: "are poverty and civil strife a necessary condition for a lively human existence?"(page 92, after a reflection on the "fact" that well governed and well administered people like the Scandinavians (!) are "bored to death"), and on page 154: "Moreover, the fact of mass progress itself, ruled out in Marx's analysis, made men rethink the calculus of having children; and it yielded a non-Malthusian check on the birth-rate: a check based not on poverty and disease but on progress itself."

poor growth (Lopez 2004; Ravallion 2004). For the early development economists, this was not on the agenda. While the modernisation writers obviously recognized poverty as an evil, the aim of their strategies and models was economic growth, not direct improvement of present quality of life which was assumed to follow automatically or regarded as the concern of other professions. The sacrifices imposed on the present are assumed to benefit all, and not acknowledged as potentially marginalizing, poverty-producing processes.

The technocratic and economic focus of modernisation theory and modernism leaves little room for an analysis of power. Rather, the deliberate location of the development process, its planning and execution, outside the political sphere (Brookfield 1975; Scott 1998), reveals an assumption that it is possible to avoid the interference of power games and political battles in the process of social change altogether.

Growing development critique

Important critiques of the modernisation approaches to development were raised early, especially from structuralist and radical thinkers emphasising the exploitative processes of modern capitalism: that the accumulation of wealth in the rich parts of the world and the rich classes in society was based on the exploitation and impoverishment of the poorer areas and classes. This dependency perspective, which is attributed to the work of Latin American structuralists and 'dependistas' starting in the 1950s, had its earlier parallell in India: the "drain theory" elaborated by Dadabhai Naoroji in 1876 became a powerful economic argument against colonialism by showing that the British were draining India of resources (Masselos 1993).

Throughout the latter half of the 20th century, especially from the 1970s, the critique of the economic-growth and massive-industrialisation recipe became stronger. Like Gandhi had done in India, people questioned whether the society of mass consumption was really desirable and sustainable. The inevitability of the development process as growth and industrialisation was challenged. Some called for an "alternative development", for example E.F. Schumacher in "Small is beautiful" with its programme for "appropriate" technology more sensitive to the needs of people and nature (Schumacher 1973). Others questioned whether growth by itself would trickle down to all parts of society and eradicate poverty.

Empirical evidence suggested otherwise, and in the 1970s, a "basic needs strategy" for development gradually won terrain in the international aid and development circles, focusing on government provision of basic needs such as food, shelter and work for all which economic growth alone did not ensure[94] (Hoadley 1981).

Later, from the late 1980s, there were broadly speaking two movements redefining the concept of development. The first was a broadening and specification of the normative contents of the concept to include political and social processes of participation and empowerment (Friedmann 1992). Through Amartya Sen's political philosophy, the idea of development was specifically broadened to include also *freedom*, not only from drudgery and the constraints of nature as in Lewis' arguments half a century earlier, but political freedoms and democratic rights. Indeed to Sen, material improvement without freedom is not "development" (Sen 1999). The second movement was the post-development shift in which even more critical circles denounced the word "development" altogether and argued that development is failing because it destroys traditions, normalizes living conditions along Western criteria, and restructures entire societies. The most famous example is Escobar (1992; 1995) who argues that the scientific gaze of the West is producing a new truth about the so-called Third World, representing and thus recreating the people and landscapes of Asia, Latin America and Africa as imperfect, abnormal or diseased entities. This development discourse has created the possibilities for a "lucrative industry for planners, experts, and civil servants" who although their work "might have benefited people at times" (Escobar 1995:46) has been most successful as "instruments of power and control" (1995:42). A post-development turn parallell to (both influenced by and influencing) the one in the West happened in India in the early 1980s, criticizing the violence and destructivity of Indian development policies (Rajan 2005). This line of critique is not only a critique of mainstream development theories, policies, and underlying values, but as pointed out by Nederveen Pieterse, is a critique of *science* understood as "Cartesianism, Enlightenment thinking and positivism, an instrument in achieving mastery over nature" (Nederveen Pieterse 2001:102).

[94] The basic needs strategy was at its strongest after it was accepted by the ILO and the World Employment Conference in 1976.

The anti-dam movement was fuelled also by these most radical critics of development, and we can see the similarity between the works of Escobar and the post-developmentalists, and the works of Wittfogel, Worster, and even Scott, described in Chapter 2, in their concerns about 'development's primary function as instruments of power and control. In India, dam-critique was an important part of the post-development critique of writers like Shiv Visvanathan, Ashis Nandy, and Claude Alvares (Rajan 2005). For example, an important contribution in the Narmada debate was Alvares and Billorey's book "Damming the Narmada: India's Greatest Planned Environmental Disaster" (Alvares and Billorey 1988).

Changes in perspectives and concerns

There are certain profound changes in perspectives and concerns from the modernisation theories described above to the perspectives dominating the international development agenda since the emergence of the critique of mainstream development. One fundamental shift is towards a new environmental ethics which to a much larger extent acknowledges the value of nature and the rights of future generations. The instrumental use and valuations of nature is one of the defining features of modernisation theories or the ideology of high modernism. Already in the 1940s, environmental concerns were raised, for example the question of whether industrialisation would deplete the world's resources. I think Lewis' dismissal of this argument is an example of a dominant worldview that does not find as much legitimacy today: he argues that the question "assumes that future generations have an equal claim to the world's resources", and continues:

> "Why should we stay poor so that the life of the human race may in some centuries to come be extended for a further century or so? Is there not a good case for the present generations to make the best of the resources they find, and to leave the distant centuries to look after themselves?" (Lewis 1956:424)

One can easily argue that for example Lomborg (2001) comes close to Lewis' perspective, as do the numerous persons and political groups that prioritize economic growth over environmental conservation. However, my point is that the main discourse on, i.e. the dominant understandings of, the environment has changed and so has the role of the environment in the development discourse: environmental issues and sustainable development that does not jeopardize future generations has a much more central place.

Secondly, there is a change in the spatial orientation of the development discourse with much more attention to the local level. Whereas the modernisation theorists were concerned with *nation-building*, one may say that today's development discourse emphasises *community-building.* Rostow, as we have seen, stated that societies must reorient themselves from relatively small, self-sufficient regions towards the nation and to an even larger international setting, a position completely opposite to Gandhi's vision of village republics. During the 1970s and 1980s, Gandhian ideas of self-sufficient village communities gained a much more prominent place in the development discourse. Thirdly, as I described in Chapter 2, tradition and the past are no longer seen as impediments to progress, but as sources of valuable knowledge and practices well-adapted to local environmental conditions and local needs. Fourthly, the temporal emphasis of development has shifted. The implication of a focus on *poverty* instead of 'development' implies a shift in the temporality of ideas as well as policies, argues Sindzingre (2004). The time-frames for results are shorter, they are here and now or in the near future. In modernisation theory, sacrifices (such as painful cultural transitions, displacement, modesty in consumption patterns, etc) are imposed on the present for a greater common good in the future. Short-term evils are regarded as temporary and necessary for a long-term reconstruction of society and economy (Brookfield 1975). The modernisation approach has therefore also been called "postponement theories" and been associated with Weber's protestant ethics (Rudolph and Rudolph 1998:215-216). The necessity and inevitability of short-term sacrifices are no longer as readily accepted, as can be seen by growth in number and strength of the many social movements that mobilise on the grounds of inequitable distribution of costs and benefits of development projects. And lastly, the state is not to the same extent seen as the primary actor in development. During the 1980s, the state was challenged from several angles: The ideological right criticized it for inefficiency, rent-seeking behaviour, and distortion of markets and economies, and the ideological left and new social movements challenged it for representing the interests of corporations and dominant classes and destroying communities and environment, a critique that incorporates the communitarian turn described in Chapter 2.

Denis Goulet sees development as a "two-edged sword" which creates benefits, but also losses and value conflicts (Goulet 1992). Among the benefits, according to Goulet, are improved standards of living and material well-being for large number of people, techno-

logical progress, increased freedom of choice, greater worldwide interdependence, and a higher degree of tolerance for diversity. The losses include "the shattering of the dynamism of desire which kept all societies in cultural equilibrium". Goulet argues that before development promised infinite material benefits for all, societies constrained the desire for material possessions of individual members and subordinated these to the requirements of the common good. Other losses are increased vertical dependence among nations, increased anomie or social alienation for members of society, destruction or dilution of cultures, erosion of meaning systems which provide explanations of the significance of life and death, and new value conflicts over the meaning of the good life (Goulet 1992). We can see that these benefits and losses do not occur in separate spheres, but are two sides of the same coin: aspirations for infinite material possessions are a consequence of improved standards of living and material well-being; increased anomie and social alienation may be an inseparable consequence of increased freedom of choice following the transition from ascribed to open roles in society; vertical and unequal dependence between nations is a negative consequence of greater worldwide interdependence; and erosion of meaning systems embedded in religious and cosmic symbols may be the downside of a higher degree of tolerance for diversity. Therefore, development is inherently a contentious process, posing continuous challenges to humankind.

Modernisation theory and India

The ideas of modernisation theory pervaded Indian development policies in the first decades after Independence. Prime Minister Jawaharlal Nehru was a modern, secular socialist with a firm belief in economic planning, which he hoped would "heal the schisms of caste, religion, community, and region" (Guha 2007:218). The Gandhian development critique was not more influential in practical policy-making in the homeland of the Mahatma than it was globally. Gandhi's emphasis on the voluntary limitation of wants, self-reliant village republics, and respect for nature were regarded as utopian and unscientific by the leading intellectuals and politicians of India (Chatterjee 1986; Chakravarty 1987). Traditional, low-technology village society was not seen as a model for the future of Independent India. "Gandhi and his disciples looked more like moralizing old men than like people who could be expected to change the direction of society," writes Chakravarty (1987:8). Lack of modern infrastructure was

regarded as a major bottleneck in the necessary development process, as we can see from the description of rural problems by the economist D.K. Rangnekar in 1958:

> "It is perhaps no exaggeration to state that basic facilities of nearly all sorts are virtually absent in the villages. Such an elementary communication service as a road system is deplorably deficient in most villages and totally absent in many (…). Some of the big villages and semi-urban centres are connected by some sort of metalled or semi-metalled roads, and motor transportation facilities are available. But the agrarian economy is primarily served by the age-old bullock carts operating on crude earth tracks. In many villages even bullock carts find it hard to operate, and transportation has to rely on such primitive modes as manual labour (head-loads), pack asses, bullocks, and possibly horses. In such conditions, other modern facilities such as electricity, for example, can hardly be expected to penetrate." (Rangnekar 1958:18)

The universal goal to be pursued scientifically by the development planners of India was removal of mass poverty and underemployment through industrialisation and modernisation. The aims and means of development were not "political questions to be solved in the battlefield of politics," writes Partha Chatterjee, they were regarded as universal truths, "the world standards had been set by history" (1986:159). He describes Nehru's socialism as one not based on class struggles and politics, but a "business of rational management of productive resources" with the help of "the most advanced operational techniques provided by the sciences of economic management" (Chatterjee 1986:160).

In fact, the relationship between development economics and Indian development planning was two-way. Indian planners looked to development economics for theories and strategies of economic policy making and the development economists regarded India as an exciting laboratory for applying and testing their models. Many great economists accepted the invitations to participate in the planning activities of India in the 1950s (Chakravarty 1987; Saith 2008). In the words of Saith: "A veritable who's who of the world of top statisticians, scientists, planners, economists and econometricians arrived through the portals" of Delhi School of Economics, established as a centre of excellence for economic planning in India in 1949 (Saith 2008:1121). The imaginations of most Indian intellectuals in this time were "immersed in the imperative of planned industrialization," writes Saith,

> "it was a *sine qua non* of India's advancement. The entire nation, as a community, was deemed to agree; the only remaining question was how to achieve this in the most efficient manner – hence scientific planning, a grand exercise of national economic engineering." (Saith 2008:1123)

The strategies chosen by the Indian government was a variant of Arthur Lewis' development model, differing mostly by assigning a major role to the state and its development bureaucracy and limit the space for private capitalists (Chakravarty 1987). Although the Indian government was ideologically committed to a goal of equality (Chatterjee 1986), unequal distribution of income was tolerated if it could be seen to result in a higher rate of growth, as prescribed by the Lewis model: "a precipitate transformation of the ownership of productive assets was held to be detrimental to the maximization of production and savings," writes Chakravarty (1987:10).

P.C. Mahalanobis described the development of the Second Five-Year Plan (Mahalanobis 1963), and his words echo with the core ideas of the modernisation hegemony. India has a "large pool of idle man-power", and "large resources of water for hydro-electric and irrigation projects; coal, iron ore and other important materials; forests, fertile land and cattle," he wrote. "The aim of planning must be to utilize these resource to increase rapidly the level of production and thus national income" (Mahalanobis 1963:91). Land reforms were necessary to "transfer a part of the national income from recipients who use it largely for luxurious consumption to recipients who will use it for productive purposes and for raising their low standard of living" (1963:93-4). He specifically highlighted the potential for utilisation of river water: "India has a large number of big and small rivers and the quantity of water that annually flows along India's rivers is estimated at nearly 1400 million acre-feet. Of this volume only 5.6 percent is used for irrigation works and power generation and the rest runs to waste." (Mahalanobis 1963:13)

Dams in modernizing India

River water projects with dams, canals and powerhouses were an important developmental instrument in the economic modernisation of India. "Irrigation and multi-purpose [river] projects at present constritute one of the biggest nation-building activities in the country", wrote economist D.K. Rangnekar in 1958, "In significance they are probably second only to the railways" (Rangnekar 1958:26)[95]. Inspiration and expertise for the dam projects of India

[95] In this book, Rangnekar actually criticises the emphasis on and scale of investments in the big river schemes, as reports had already then shown that due to poor financial and structural planning the schemes did not deliver

came both from the USA and the Soviet Union. Indian intellectuals were great admirers of the Tennessee Valley Authority and the massive multi-purpose projects of the Soviet Union (Guha 2007). The two competing ideologies, communism and capitalistic liberalism, shared in the hegemonic development idea of the time: industrialisation and modernisation through state planning and investments. Big dams represented, in the words of Klingensmith, "the triumph of science, technology, foresight and centralized government over politics, petty local authorities and powers, ignorance, superstition, and backwardness" (quoted in Guha 2007:220). The Bhakra-Nangal dam in the Punjab was the first large dam project of Independent India, partly a form of compensation for the refugees from West Punjab who had to flee their canal colonies on the Pakistani side of the border (Guha 2007). The presentation of the Bhakra-Nangal Project in the *Indian Journal of Power and River Valley Development* in 1956, described by Ramachandra Guha, illuminates the modernizing zeitgeist of the 1950s. A set of four photographs of the construction process opens the issue:

> "The first showed the densely wooded site before work began; it had the caption: "River Sutlej at Bhakra in its primeval splendour – the site as it was." The second showed crane-like structures in the water and a low bridge slung across the gorge: this was "Exploratory drilling in riverbed with drills mounted on pontoons – the first invasion." The third photo, apparently taken in the dry season, showed hillsides by now quite bare, with trucks and bulldozers on the riverbed: "Concreting of the Dam begins – man lays the foundation for changing nature." In the last photo, the dam had begun to rise, aided by machines of a shape and size never before seen in India: "Excavation with heavy machines in progress in pit-area – the struggle with nature." (Guha 2007)

The issue was a tribute to the Bhakra-Nangal Dam, but had we not known the source and date of these pictures and captions, they could just as well have been used in an anti-dam publication in the 1980s. "Primeval splendour", "invasion", "the foundation for changing nature", and "the struggle with nature" are words which carry completely different connotations after the rise and influence of the environmental movement in the 1980s. In the 1950s, the "primeval splendour" of the river did not make it worthy of protection, and human invasion of and ability to change and struggle with nature was a technological triumph and a sign of progress.

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the projected benefits. Minor irrigation works, overshadowed by the big schemes, would cost less and yield quicker results (Rangnekar 1958).

In the modernisation ideologies of the early and mid-twentieth century, the technological mastery of nature was a development goal in itself, as we saw in the writings of David Lilienthal (described in Chapter 2). The physical environment, said Walter Rostow, has to be seen not as "a factor given by nature and providence," but "an ordered world which, if rationally understood, can be manipulated in ways which yield productive change and, in one dimension at least, progress" (Rostow 1990:19). In modernisation ideology, tradition is a hindrance for progress and improvement, and the future holds the answers. This was the ruling zeitgeist at the dawn of Indian Independence and the context for understanding Nehru's much-quoted words at the opening of Bhakra-Nangal dam in 1954:

> "As I walked round the site, I thought that these days the biggest temple and mosque and gurdwara is the place where man works for the good of mankind. Which place can be greater than this, the Bhakra-Nangal, where thousands and lakhs of men have worked, shed there blood and sweat and laid down their lives as well? Where can be a greater and holier place than this, which can we regard as higher?" (Nehru at the opening of Bhakra-Nangal 1954, quoted in Rangachari 2006:56)

Rather than expressing blind, religious reverence for technology, his words are both a celebration of the potential of modern technology and a hidden critique of the constraints to progress posed by religious fatalism and fanatism. The ardent secularist Nehru also had ample reason to be critical of the worshipping of temples and mosques, having lived through the terrors of communalism which threatened to tear the new nation apart[96]. The technological optimism of Nehru and the belief in the promise of progress that these projects represented were shared by a large number of Indians in this period (Guha 2007).

Summary

This chapter has outlined the dominating ideas of development in the mid half of the twentieth century, and the challenge to these ideas from the growing critique from the end of the 1960s and onwards. Development is a contested concept, heavy with connotations and often unspoken values and assumptions. What we may call post-second-world-war "development-alism", in both its capitalist and communist versions, has certain characteristics and ground assumptions. It regarded the need to transform nature into productive resources through the

[96] Ramachandra Guha recounts how Nehru refused to inaugurate the newly restored Somnath temple in Gujarat in 1951 and how he disapproved strongly of President Prasad's decision to do so. Nehru was of the conviction that public officials should never publicly be associated with religious faiths (Guha 2007).

use of modern science and technology as fundamental, and aimed at a deeper transformation in the outlook of humans, as we also saw in the words of Lilienthal in Chapter 2: to release men from fatalism and make people demand the fruits of technology and resources.

The development economists played a crucial part in shaping the development agenda of this period, manning the planning institutions of newly independent post-colonial countries around the world and providing the economic models that guided policy. State investment in infrastructure was a core feature of most strategies for development, and dams and canal irrigation among the most important projects. In modernisation theory and for many development economists, poverty was a feature of the past, assumed to disappear when the growth process took off. Economic growth was a precondition for poverty reduction in the long run, and not seen as a process that could produce poverty and marginalize already vulnerable groups. By and large, development planning and policy making was seen as a scientific and technical task, located outside the political sphere of power games, political battles, and conflicts of interest. Modernisation theory and development economics provided the defining ideas of development for Independent India, an important country for trying out the theories of the most influential development economists in the 1950s. Construction of dams and other river projects were key in India's development strategy.

The growing critique against development as modernisation grew to prominence from the 1970s as it became clear that the promised prosperity materialised much slower than the modernisation theorists had predicted, and that some groups and often the already poorest were left out of the development process altogether, being further marginalized as they were often the ones who had to sacrifice their present meagre livelihoods. The dominant perspectives and concerns changed over the 80s, and a key change is found in the valuation of nature and the environment. Other reorientations were from a national perspective to the smaller geographic scale of the community; in the views on the past and on traditions as sources of valuable knowledge rather than impediments to progress; and temporally from the future to more concern for the present living conditions and immediate consequences of for example infrastructure projects on the world's poor. The next two chapters will show that these changes in perspectives, values, and ideas affected the Sardar Sarovar Project.

8. Planning for everything – the Sardar Sarovar Project plan

This chapter presents and analyses the perspective of the *proponents* of the Sardar Sarovar Project, in particular the academic experts and government officials who planned it. There exists a quite extensive body of literature written and published by the SSP planners - books, pamphlets, articles, lecture transcripts - and surprisingly few references to these texts in academic (or, for that matter, activist) writings and analyses of the project; if anything, the Narmada literature only refers to some of the public relations brochures of the SSNNL. By analysing this Narmada-planning literature, this chapter will complicate the conspiracy-like theory which pervades so much of the existing literature on the Narmada conflict, the idea that the project and all the justifications for it was only a cover for the hidden agenda of the already rich farmers and industrialists of Gujarat. I argue that the planners act on a certain set of ideas about 'development', ideas that dominated the development discourse in the 1950s, 1960s, and 1970s. An analysis of the development ideas behind the SSP is necessary to understand the SSP and the conflicts it created. A history of the SSP planning process can be seen as a history of a shift in ideas of development in India, as well as globally. The chapter will show how the changing norms and ideals in development thinking described in Chapter 2 and Chapter 7 surprised and challenged the planners.

The Narmada Planning Group

When the Narmada Water Disputes Tribunal reached its final Award on December 12th 1979, the Government of Gujarat had already begun the planning of the use of their share. They had decided on the main features of the Sardar Sarovar Project, the height of the dam and the length of the main canal, and the main principles of water conveyance and allocation. The main features of the command area of the project were fixed by the Tribunal based on the plans already developed by Gujarat for the Narmada water (Narmada Planning Group 1989). The Government of Gujarat had approached several donors, including the World Bank, for funding of the project, and was told to improve the planning of the project. In 1980, Yoginder K. Alagh was approached by the new Chief Minister of Gujarat, Madhavsinh Solanki of the

Congress Party (who had come to power in early June 1980) and was asked to lead the planning group of the SSP, the Narmada Planning Group. Alagh had just returned to his position as an economics professor at the Sardar Patel Institute of Economic and Social Research in Ahmedabad after a five-year position as advisor to the Indian Planning Commission in New Dehli. He agreed to meet with the leader of the World Bank Mission visiting Gujarat at the time, the Swede Mr Per Ljung, who told him that they could see no proper plan for the project, "nothing more than lines on a map" (Alagh, interview, 1.12.2004).

Alagh agreed to lead the Narmada Planning Group on certain conditions: He demanded the right to handpick his planning-committee members and executing staff, and the right to raise policy issues directly with the highest levels of government (Alagh interview, 1.12.2004). In addition to the NPG, the Government established a Coordination Committee for the Narmada Project headed by the Chief Minister. Members were the Finance Minister Sanat Mehta and the Irrigation Minister Amarsinh Chaudhuri and Alagh was convenor. The Government of Gujarat decided that the leader of the opposition should be involved in the process because it would involve financial allocations and would come under legislative scrutiny. Alagh points out that the "planning process would have been impossible if every Rupee had been contested in the State Assembly" (Alagh, interview, 1.12.2004). He met with the then leader of opposition, Keshubhai Patel of the BJP, in 1981 and 1982 to discuss the planning progress (personal communication, Y.K.Alagh, email 4.9.2009). Keshubhai Patel had earlier been deeply involved in the Narmada issue as he was Irrigation Minister in the Janata Government from 1977 to 1979. The work of the Narmada Planning Group itself was financed by the UNDP and the World Bank (World Bank 1994).

In Gujarat, all major political parties (the Congress, the BJP, and the Janata Dal) have strongly supported the Sardar Sarovar Project through all the years of project planning, implementation and conflict, and the main line of conflict between the parties have been when the opposition accuses the sitting government for not completing the project fast enough, or for claiming undue political credits for bringing Narmada water to Gujarat[97].

[97] As in 2004, when Congress claimed to have a "lion's share in the progress of the dam", and that "most of the hurdles in expediting the project, were cleared by the then Congress governments." ("Cong claims lion's share in progress of Narmada dam", *Times of India*, Ahmedabad edition, March 21, 2004).

The Narmada Planning Group (NPG) was a multi-disciplinary group of experts working part time or full time. Their task was to make a detailed and feasible plan for the use of the Narmada water in Phase 1 of the command area, and a reconnaissance plan for Phase 2 of the command area. They were also responsible for analyzing the financial and economic benefits of the project, in close collaboration with World Bank staff (World Bank 1994). The NPG was a rather small group, but it made use of the expertise of numerous research institutes within and outside Gujarat and India, and commissioned a range of studies investigating the physical and social aspects of the command area, as well as environmental and resettlement concerns (World Bank 1994). Eleven preparatory studies were done in the years 1981 to 1983 (SSNNL 1999) and formed the basis on which the master plan for the SSP was developed[98]. This plan was ready in early 1983 and sent to the World Bank for approval. The project appraisal was carried out by the World Bank during 17 months between March 1983 and August 1984, and the project was approved by the World Bank board in March 1985. The Narmada Planning Group worked as an independent expert group under the Government of Gujarat in collaboration with the Narmada Development Department (NDD). In May 1988, the responsibilities of the NDD were transferred to a new government-owned institution, the Sardar Sarovar Narmada Nigam Ltd (SSNNL) (World Bank 1994). The Narmada Planning Group continued its work into the mid-1990s, until its functions were gradually taken over by the Command Area Development Wing of the SSNNL, and the NPG "died a natural death" (Alagh interview 1.12.2004)[99].

The studies done by the NPG were not intended to explore *whether* the Sardar Sarovar dam and canal irrigation project was a good idea, or whether other alternatives could solve the problems in question at lesser cost. The Government of Gujarat had fought for a large share of the Narmada water for almost 35 years and was convinced that the Narmada water was the only option for securing the water needs of the state. The main features of the project had already been decided. The purpose of the NPG was to develop a plan for the best possible utilization of the Narmada water allocated to Gujarat in the Tribunal Award, while at the same time complying with the standards and conditions for World Bank funding.

[98] The planning studies continued through the 1980s and 1990s, 21 studies were completed in the 1980s and 21 during the 1990s (SSNNL 1999).
[99] The last publication I have from the Narmada Planning Group is a paper presented at the Silver Jubilee Conference of Gujarat Economics Association (Narmada Planning Group 1995).

According to Y.K. Alagh, the planners went to the task with enthusiasm, often working into the early hours of the morning (Alagh 1991b):

> "There was only one ambition. Sardar Sarovar was western India's and Gujarat's last great real physical resource. It must be used in the most socially productive manner." (Alagh 1991b:56)

V.M. Patel, former Director of Perspective Planning in the Government of Gujarat and advisor to the NPG, says that the benefits of the project were understood to be so obvious that a benefit-cost analysis was not considered necessary at first:

> "[t]he benefits, especially the irrigation benefits to the drought-prone areas and domestic water supply to the water-scarce areas were so attractive and large that the project was considered as economically viable at its face value even without a detailed economic analysis." (Patel 1991c:101)

However, the World Bank required a benefit-cost analysis and the consultancy TECS was commissioned to do one in December 1981. Their results were ready by April 1983, and a favourable view of the project is evident also in their report; they write that the Sardar Sarovar Project is a "mighty" project (TECS 1983:80) and concludes happily that "*[i]t is heartening to note* that the project turns out to be quite beneficial even if all calculations are based on market prices" (preface, TECS 1983, emphasis added). In the early 1980s, diverting Narmada river water for the drought-prone areas of Gujarat seemed a common-sensical development project, and stood in a long line of earlier water projects in India. As we shall see later, the Government of Gujarat and the SSP planners were not prepared for the scale of the opposition to the project later to come.

Gujarat had struggled for many years for a share of the Narmada River's water. Many of the persons who were part of the planning of the Sardar Sarovar Project in the 1980s and 1990s had been involved since the beginning of the interstate disputes over the water. Sanat Mehta, for example, who was Finance Minister of Gujarat in the Congress Government from1980 to 1985, and the first Chairman of the SSNNL from 1988 to 1990 and later from 1992 to 1994, had actively campaigned for development of the Narmada water since the 1950s, and described the project in 2006 as "the mission of his life right from the young age" (interview 2006). On becoming a member of the Upper House of the Legislative Assembly of Bombay

State in 1958[100], the first question he raised in the Assembly was when the Narmada Project would be sanctioned (interview 2006). When Mr Khosla, who headed the Khosla committee[101] came to Baroda in 1965, Mehta asked him the same question:

> "I said, you are presiding over the meeting, can you tell me when the project will become reality? And what was his remark, you know? He said: you are a young man, why are you so frustrated? Then I replied: I am young in age, but old for Narmada." (interview, Sanat Mehta 2006)

Another "old-timer" for the Narmada was C.C.Patel, the Chairman of the Nigam from April 1990 to November 1992. He had been an expert advisor during the surveying of the Narmada Valley for suitable dam sites in the early 1960s[102] (Dalal 1991). The hegemonic development perspectives of the 1950s and 1960s had influential carriers in the planning and later defense of the SSP in the 1980s and 1990s, and these development visions were not limited to the small circle of SSP planners. For example, one of the nestors of water management in Gujarat and the leader of the large NGO the Development Support Centre, Anil Shah, told me that he saw the SSP as "part of the larger process of development in India which started after Independence and is slowly transforming the country" and that he expected the project to have great impacts on the economy and poverty if managed properly (interview 3.3.2006).

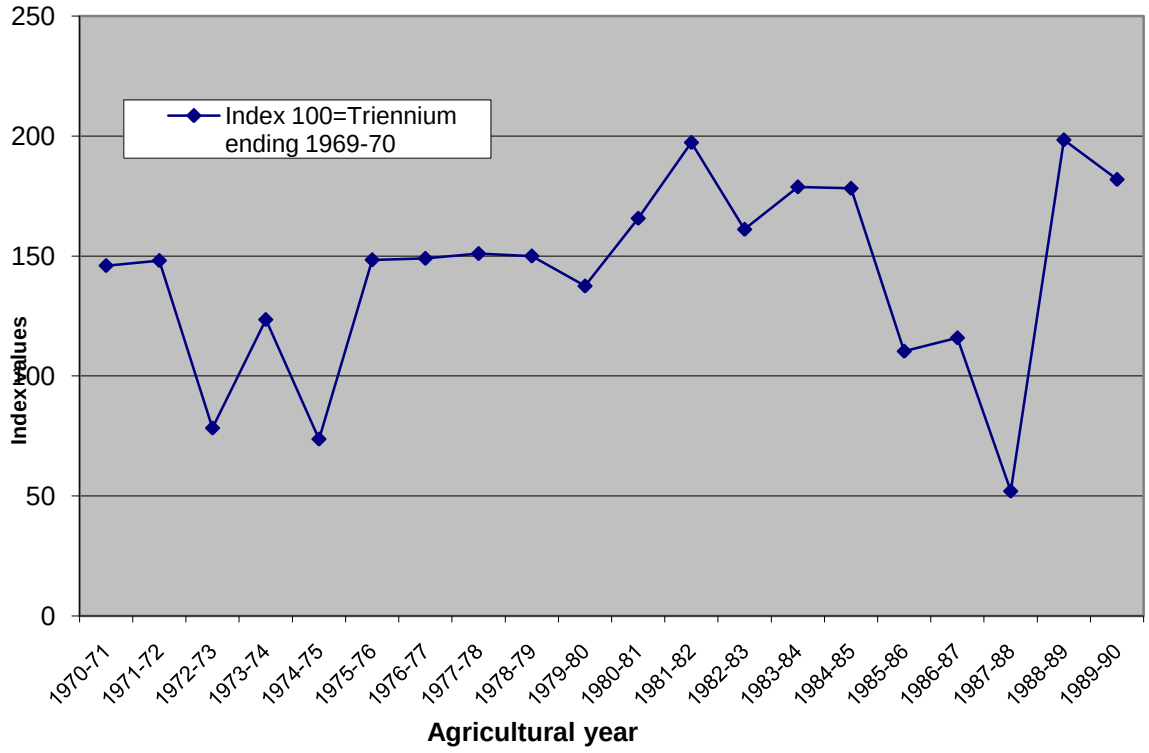
Main aims of the Sardar Sarovar Project

Agriculture in most parts of Gujarat was (and still is, given the delays and limited coverage of the SSP), as described in Chapter 3, a gamble on the monsoon, and productivity fluctuated greatly and had negative impacts on the economy at large. At the same time, the Narmada River was "flowing waste" to the Arabian Sea, only six percent of its water being utilised (Narmada Planning Group 1989). Alagh et al. (1995) show the destabilising effects of drought on agricultural production in a table comparing agricultural production in index numbers

[100] Gujarat and Maharashtra became separate states in 1960, and both were Bombay State before that.
[101] The Khosla committee was established in 1964 to solve the interstate dispute over the Narmada river water (see Chapter 4).
[102] He had suggested in 1962, that with a slight shift of the dam upstream from the site first proposed, the dam's height could be increased from 320 feet to 500 feet (Dalal 1991).

relative to the average agricultural production in 1967-70[103]. The fluctuations are displayed in Figure 3 below.

Figure 3. Fluctuations in agricultural production, Gujarat, 1970-1990



The main aim of the SSP development plan was to stabilize the economy of the state through assured irrigation (Narmada Planning Group 1989). The SSP will "put the Gujarat economy on a new equilibrium," said D.T.Lakdawala, former Deputy Chairman of the Planning Commission, an equilibrium where the prerequisites for a high agricultural and industrial growth will be assured" (Lakdawala 1995:8). However, economic growth was not the only goal, but to maximise the *social* returns to water. The chosen irrigation strategy was therefore one of extensive irrigation with a limited amount of water over as many acres as possible, "less than would be needed to get the maximum yield from that acre" (Narmada Planning Group 1989:99). The World Bank never questioned this principle, and writes in the project completion report that: "Because the appraisal team took for granted the concept of water

[103] Figure derived from table in Annex 3.1 "Index number of Agricultural Production in Gujarat Base: Triennium Ending 1969-70=100" (Alagh, Pathak et al. 1995).

spreading which prevailed at that time for social reasons, it did not consider the more intensive irrigation options which were known to yield higher rates of return" (World Bank 1994:6). The chosen strategy "gave higher priority to the project's equity and social aspects than to economic considerations", and "was accepted by the Bank as consistent with the goal of reducing poverty" (World Bank 1994:6).

The expectations to the project, as expressed in *Planning for prosperity*, are high: "The pace of low growth and intense fluctuations in the agrarian economy will be over after the completion of the Narmada Project," announced the NPG (Narmada Planning Group 1989:10). "Virtual elimination of poverty" would result from the rise in agricultural wage levels following irrigation development, and the increased production would "absorb a large number of the 1.5 million unemployed and under-employed" in Gujarat (Narmada Planning Group 1989:10-11). With assured irrigation, the planners expected a Green Revolution to take place in Gujarat, the creation of "a vibrant forward looking agriculture through irrigation-HYV-fertilizer based new technology" (Pathak 1995a:91) which the Gujarati farmers were prepared for given their many demonstrations of an "entrepreneurial mindset" (Narmada Planning Group 1989)[104]. The NPG estimates that in the decade from 1981 to 2001 the annual growth in gross output of agriculture would be 7.5% in the Narmada command area, as compared to 2.2% in Gujarat state in the decade from 1970 to 1980 (Narmada Planning Group 1989:7).

There is also a nation-building element to the management of natural resources and transfer of resources from areas of plenty to areas of scarcity. In several papers, C.C. Patel[105] argues that a hydraulic reconfiguration of the Indian landscape through the linking of rivers and transfer of water from surplus to deficit watersheds is important for national unity (Patel 1991b; 1995b). The larger River Linking programme which has become a matter of controversy in India in the 21st century was already part of the vision of the early SSP planners[106], the Master

[104] For example: "The history of agricultural development in Gujarat underscores outstanding examples of the enterprising attitude of cultivators in the State in the past" (Narmada Planning Group 1989:82).
[105]Engineer by profession, Chairman of the SSNNL 1990-92, and involved in the Narmada projects from the 1960s.
[106] "If we have to come out from droughts, we must build all the dams, big and small, and connect the river systems within the country by a common grid which will integrate even the international rivers. This alone could be a guarantee for food and water for all and such a grid alone can provide unbreakable bonds of unity of all the

Plan of 1983 explicitly sees the SSP as part of a national water grid (Narmada Planning Group 1983)[107]. External political considerations were also important for the design of the SSP. The decision to extend the canal network to Kutch was done after a suggestion by former Chief Secretary of Gujarat, Lalit Dalal, in 1965. At this time, there was growing tension and even a brief war between India and Pakistan over the Kashmir issue, and Dalal saw the potential of irrigation in Kutch for sustaining a larger agricultural population which would be the "most practical and economical way of guarding our border with Pakistan", a model based on the Israeli strategy of establishing agricultural kibbutz as reserve soldiers[108] (Dalal 1991:1).

Innovative features of the SSP

Canal irrigation projects in India are notorious for low efficiency, high rates of water loss, and accompanying problems of waterlogging and salinisation. This was general knowledge in India when the NPG started working. The SSP planners attempted to avoid these problems by learning from mistakes and shortcomings in previous large canal projects in India, and introducing a number of technological and managerial innovations. Indian irrigation efficiencies ranged from 30 to 40% on average, but with "good operation of systems" even unlined or partly lined systems could achieve 40 to 50% efficiency. "In lined systems, efficiencies upto 60 % are certainly considered achievable," wrote NPG advisor D.T.Buch (1994:5). Former Deputy Chairman of the Planning Commission of India, D.T. Lakdawala, commended the NPG for its planning framework, stating that it was the "most discussed and best studied multi-river valley project" in India (Lakdawala 1995:1):

> "Extreme care has been devoted to the study of past experience and avoid the errors. And yet, it has been credited with all the defects, observed and alleged, in earlier similar schemes. (...) Painstaking reseach, however, has been undertaken to see that none of these defects creeps into the SSP." (Lakdawala 1995:2)

States in the Country by way of interdependence of one another. Perhaps there is no other measure which is more effective towards achieving national unity than such a national water grid" (Patel 1991b:80).

[107] The idea for a river linking scheme dates back to the colonial irrigation pioneer Sir Arthur Cotton, and irrigation ministers in Independent India kept the idea alive through the 1960s and the 1970s with discussions of a "national water grid" (D'Souza 2003).

[108] "In my mind flashed the way in which Israel had been meeting the onslaughts of Syria and P.L.O. on its front from time to time: it had established agricultural kibbutz manned by reserve soldiers with full equipment and sophisticated weapons to keep a watch on the activities of its unfriendly neighbours. It was their job to withstand the first attack of the enemy till reinforcements from the Israel Army rushed to their rescue." (Dalal 1991:1)

The project is “a break with the traditional planning of water development in India”, argues Alagh (1991a:11). He specifically mentions three innovative features of the project: the first is the use of modern computer technology to support a “densely populated Asiatic peasant based agriculture”, including computer-controlled canal system and real time monitoring of surface and groundwater aquifers; the second is the regionalisation of the command area into 13 regions based on agro-ecological characteristics; and the third is the realistic estimation of costs and benefits through identification of project components down to the field level and the use of data on “actual achievements of Gujarat farmers” (Alagh 1991a:11). A fourth innovation in water management is the adoption of the new model of participatory irrigation managament.

The innovations were applauded in the World Bank completion report which was prepared after the cancellation of the loan in 1993: “the project set excellent engineering, construction, and management standards by introducing many innovative features” (World Bank 1994:v) .

Technological innovations

The “intensive use of modern technology” included several measures to control water use, reduce water loss and prevent water logging. The generally low efficiency in water utilization in Indian canal irrigation is due partly to lack of control with the amount of water used by each farmer and partly due to water losses through seepage and evaporation during transmission. The Narmada Planning Group planned for a semi-automatic, computerized monitoring system for water use, permitting remote-monitoring of the volumes of water allocated to the various parts of the canal system. The Master Plan for the project describes this only briefly, as “a reliable communication and automatic control system will be installed for canal operation” and “water distribution will be rationed and delivery will be controlled” (Narmada Planning Group 1989:20). The details of this system were operationalised and designed through the 1980s and 1990s, among other things based on a study tour to the USA. The three-day USA study tour was organised by the US Bureau of Reclamation in April 1990

and the aim was to see the technical possibilities of modern canal irrigation[109]. Sanat Mehta described it to me as a "dream", but a realistic dream.

> "What was the dream, when we planned? The dream was that semiautomatic, computerised system. It is possible. And then this is what I saw in America: The fellow who was operating, he was sitting in his control room and showing us that I can decrease or increase the water while it is flowing to a certain place, if there is a message that there is a deficit." (interview, Sanat Mehta, 4.3. 2006)

The computerised monitoring and semi-automatic canal system is presented as a key ingredient for SSP success. Sluices and gates will be automatically regulated and computer-monitored to ensure volumetric control of water delivery with the least response time (Alagh and Buch 1995). The root cause for the poor performance of previous canal irrigation systems "may be the lack of a scientific approach to their operation and management," writes SSNNL engineer Joshi in an article describing the system (Joshi 2001:109). The SSP conveyance system is so large that it requires simultaneous operation of all the control structures, as "even a slight mismatch" between the amount of water available in the conveyance system and the outtake of water at critical points in the system "can endanger the system" (Joshi 2001:117)[110]. The remote-monitored system will have its Main Control Centre in Gandhinagar, and receive information from 15 Divisional Operation Centres (DOCs), which in turn receives information from 1400 regulating points, or RTUs:

> "The RTU will receive the data sensed by various sensors (data such as water level, gate position, etc.), communicate this to the DOC, receive the command signals from the DOC and pass it on to the control cabinet so as to actuate the gate-hoist motor for raising or lowering the gate." (Joshi 2001:119)

The implementation of this system has taken a very long time. A global tender for the computerisation of the project was not issued until 2006. Alagh was confident that this would help speed up the implementation of the project and prove the critics wrong: "The SSP Canals

[109] They visited the Arizona Project Office and the Denver Office of Engineering and Research Laboratories, and met the technical expertise to discuss their interests as stated in the tour program: "Canal automation, construction of concrete lined canals, construction of underground power plants and general discussions related to large irrigation and hydro power facilities." (US Department of the Interior, Bureau of Reclamation. 1990. *"3-Day Visitor Program for Mr Sanat Mehta, Chairman, Mr P.A.Raj, Vice Chairman, and Mr. S.M. Koshi, Member in charge of Resettlement, Rehabilitation and Environment, SSNNL, India"*, document from Sanat Mehta's archive)

[110] Joshi mentions the example of the Saurashtra Branch Canal which at one place conveys water through a lift, pumping approximately 10,000 cusecs of water to a height of about 70 meters. If this pumping system fails (by the way, the only part of the conveyance system which relies on lifting water), the rest of the conveyance system will have to accommodate this enormous discharge of water.

are exposing the critics who first said the canal was not possible, then that water would not flow in it and now that its original design will be impossible" (Alagh 2006:101). As the remote monitoring and control system was finally underway and India's top engineering companies were bidding for the job, "the dream is on the way to reality of assured controlled water at the time of need" (Alagh 2006:101).

To prevent water seepage from the canals, the entire canal network from Main Canal to Subminor Canal would be lined with reinforced concrete. Secondly, the conjunctive use of groundwater and canal water will prevent water logging in the command area. Water logging happens when excessive application of canal water increases the groundwater table to the root zone of the plants. The NPG has planned for the installation of computer-monitored piezometers all over the command area[111]. If farmers fail to use ground water in conjunction with canal water, and the ground-water level reaches critical levels, government-installed tubewells will start pumping out water and release it into the canal system (Narmada Planning Group 1989). The planners therefore repeatedly argue that water logging because of the Sardar Sarovar Project is an impossibility (for example in Alagh 1991a).

Whereas some publications claim that water logging is impossible with the current infrastructure design, the environmental assessment of the command area showed that the risk of water logging in the command area is 5 to 7%, and that these low figures "entirely depend on quality of water management" (Alagh, Pathak et al. 1995:123). Still, the planners are confident that this poses no problem: "High canal efficiency is extremely conductive to better management of water logging and salinity. Sound and scientific water management is, thus, sure to mitigate likely environmental damages" (Alagh, Pathak et al. 1995:124)

Regionalisation and integrated scientific planning

Econometric modelling was important in the planning of the SSP. The aim of the planning of the distribution system for the Narmada water was to optimize the social benefits from the

[111] A piezometer is a borehole designed to measure groundwater conditions. The planners explain the strategy: "Water quality measurements would be available for all these piezometers as well as for existing wells in advance and appropriate blending or irrigation strategies with saline groundwater doses followed by appropriate waterings of good canal water can always be planned. Most farmers of India irrigating in problematic command areas know this" (Government of Gujarat 1992:51).

Narmada water for the Gujarat economy as a whole. Because water is such a scarce commodity in Gujarat, its use had to be "so regulated and controlled that the marginal return to water in all the regions is the same and so also the marginal return in the various feasible combinations of crops is equal" (Lakdawala 1995:2). To this end, it was necessary to factor in both the geo-physical and the social absorption capacities of different regions of the proposed command area. The boundaries of the command of the major branches of the canal system were thus designed to follow the agro-ecological regionalization, taking into account the soils, drainage needs, and climate of each region (Narmada Planning Group 1989). The geophysical absorption capacities of the various regions determined the designed carrying capacities of the canals and thus the water allocation for various branches and distributaries of the canal system. Two zones, the Bara Tract of Bharuch and the Bhal area of Bhavnagar, are both coastal, low-lying zones with high risk of salinisation, and for these areas a special and limited irrigation policy is prescribed.

The planners also took into account the predicted social effects of water in each region, by modelling the farmers' likely behaviour after receiving irrigation water. The NPG commissioned a study of the likely migration patterns following increased irrigation from Pravin Visaria, one of the leading demographers of India (Alagh, interview, 2006). Data from his surveys and from a cost-of-cultivation data set available for all regions of India were used to develop econometric models of the farmers' likely cropping responses under irrigation, given the local rainfall, soil characteristics, available technology, and relative prices of crops. From these models they estimated employment generation as a consequence of irrigation, and gave an extra allocation of water to areas with high potential for employment generation by valuing wages generated with a shadow wage rate in the model. Visaria's studies had estimated were unemployment would remain a big problem, and more water was allocated to these areas. Alagh explains the approach in a paper from 2006:

> "Economists have for long worked on this problem and have developed 'acreage response models'. These essentially postulate that the acreage allocation of the farmer follows profit maximising behaviour and depends on rainfall and its distribution, irrigation, the agricultural technology available and relative prices. The use of these models for irrigation planning would mean that the farmer's behaviour is studied and statistically estimated through acreage allocation models for an area of the kind with due consideration of the agro-climatic characteristics of the region in the command." (Alagh 2006:92-3)

He argues that agro-ecological regional planning of the SSP model enables a "more scientific" utilisation of water resources by taking a holistic view of soil type, topography, water resources and irrigation facilities and relating these to output and employment, and that the SSP approach should be adopted in other canal irrigation projects in India (Alagh 2006).

For the first time in India, argues Alagh, "modern economic, econometric and social science techniques were used to design the engineering configuration of some of the important structures of the project" (Alagh 1991a:12). "We are proud of it," he said to me:

> "I am a student of Lawrence Klein, the Nobel Laureate of Economics[112]. And I think it is one of the finest pieces of work that has been done anywhere in terms of this kind of modelling. And we did it." (interview 13.3.2006)

The NPG developed plans for the optimal cropping pattern in each region of the command area, a modelling exercise aimed at maximising "the returns to water by choosing that crop combination which economises on water consumption" (Narmada Planning Group 1989:100). The references to the planned cropping pattern are many in the planning publications, as assurances of the benefits that will accrue from the project. However, the modelling of future cropping patterns is an entirely theoretical exercise through which possible crop sets for each region are decided based on 1) current crop choices given relative crop prices, rainfall, and irrigation, and 2) the assumption that the farmers do not take more than their allocated share of Narmada water. They did not consider the potential conflict between the individual interests of profit maximizing farmers and the social interests of the Gujarat state in removing regional disparities ensured by allocating more water to areas where water is likely to create more employment:

> "Crop plans were designed on three considerations. First, basic agronomic features would limit the possibilities of choices available in each region. Second, the farmers would make his choice on the basis of the available technologies and their development, the economic opportunities available to him through the development of markets and relative prices and the amount and timing of water available. Systems were developed to understand his responses to likely developments in each aspect. Third, the crop planning problem then was to take full cognizance of his responses, but to determine water application in each region taking into account the need to maximize the return to water, subject to the cost of the system, giving explicit consideration to social objectives like

[112] Lawrence Klein was awarded the Nobel Memorial Prize in Economic Science in 1980 for his work in developing computer modelling and econometrics for economic forecasting.

> removal of regional disparities in income and employment generation within the command." (Narmada Planning Group 1989:252)

This method of development planning has a big potential, argues Alagh:

> "With these kinds of calculations, if an explicit weight has to be given to generate more employment in some poverty-stricken region, this could be done in a quantifiable manner." (Alagh 2006:97)

The only drawback is that the proposed cropping pattern cannot be enforced. The planners recognize in *Planning for prosperity* that "the main problem is (...) how to influence the farmers' decision in favour of the preferred crop set" (Narmada Planning Group 1989:108). The chosen solution for the SSP lies in a combination of persuasion through extension services and a policy of strict rationing of water. If the farmer knows how much water he will get, he will not choose a crop which requires more, the NPG holds. The 'crop sanction' procedure of Andhra Pradesh, in which water is only given to sanctioned crops in a given area, is not adopted by Gujarat. Although the canal water will be strictly controlled, the conjunctive use with groundwater will make more water available further and introduce an element of flexibility in the crop choices (Narmada Planning Group 1989).

The NPG members express a strong belief in the ability of 'science' and a 'scientific approach' to optimise the SSP. The members of the NPG were academics, and argue repeatedly that their approach is laudably 'scientific'. One of the first activities of the NPG was to commission base-line studies of the 62 *taluka*s in the command area of the Sardar Sarovar canals. Study teams from various research institutes and colleges in Gujarat were asked to carry out a socio-economic benchmark study of an area of around 6 *taluka*s each. These socio-economic surveys profiled the agriculture and socio-economic conditions in different regions of the command area and formed the basis of the agricultural plans, water allocation and evaluations of the social benefits of the project (Narmada Planning Group 1989). A repeated claim from the SSP planners is that the SSP is the most studied and best planned project in India. Lists of preparatory studies are provided in many of the pro-SSP publications, to prove this point. Consultancies from India and abroad were contracted to carry out planning studies. Also for the resettlement and rehabilitation part, the planners claim that a "scientific approach" distinguishes the SSP from other development projects in India. A comprehensive development project like the SSP has to "be planned on the basis of scientific studies", writes sociology professor Vidyut Joshi under the heading "Rehabilitation Studies

and Scientific Planning" (1991:53). The SSP is the first project in India to conduct pre-rehabilitation studies, he writes, and having been in charge of these studies himself, is confident about the quality of these studies. But "the academic input has not stopped here. Three academic institutions have been given the task of monitoring the rehabilitation practices" (Joshi 1991:53).

Managerial innovations: Participatory Irrigation Management

As we have seen, prudent water management is critical for project success. The Narmada Planning Group was painfully aware of this if we are to judge by the numerous iterations of this point in the planning texts from the 1990s. NPG advisor D.T.Buch, for example, wrote in a paper on the managerial innovations of the SSP: "There is, thus, an *imperative need* of having a culture of management through farmers' organisations after ensuring a reasonable system infrastructure" (1994:5, emphasis added). The model of management of water through user groups was not envisioned in the first planning phase from 1980-83. According to the master plan *Planning for prosperity*, successful village-level management of Narmada water would be ensured by volumetric controls, rotational water supply "based on the existing models of Punjab and Haryana", and irrigation supplied to *chaks* of 8 to 20 hectares to ensure the smallest possible number of farmers ("not more than 4 or 5") serviced below each outlet. The management model to be adopted in the SSP, Participatory Irrigation Management, was still not known in the early 1980s. When this model became widely known, the SSP planners eagerly embraced it, as it solved one of their problems.

On the larger scale, above the Minor Canal outlet, the installation of computer-monitored volumetric delivery is intended to ensure that the Narmada water reaches the entire artery system of the SSP. Below the Minor outlet, scientific management will be accomplished through volumetric pricing and water distribution through *water users' cooperatives*. SSNNL engineer Joshi describes their role in the computerized conveyance system:

> "The water demand will be assimilated from the cooperative societies of the farmers known as village service areas (VSAs) at least 24 hours in advance. For collection of these demands and compilation, data-collection centres (DCCs) will be provided in the command area, which will also serve as nodal centres for all the dealings with the VSAs including billing of water charges. The SSP has planned for about 132 DCCs scattered throughout the command area. The DOC [divisional operation centre] will derive the

> gate schedule corresponding to the discharge requirements received from DCCs and the allocation policy." (Joshi 2001:120)

The transfer of irrigation management from bureaucracy to the users themselves was an idea which took hold in international development agencies and governments during the 1980s. In India, Gujarat was among the first states to take active interest in what was later to be known as Participatory Irrigation Management. Within Gujarat, Anil Shah, a former IAS officer and Secretary of Rural Development in the Government, and founder of the Gujarat chapter of the Aga Khan Rural Support Centre (AKRSP), was the pioneer. Shah and representatives from the Irrigation Department were invited in the late 1980s by Frances Korten of the Ford Foundation to the Philippines to see what had been achieved through Participatory Irrigation Management (PIM) there, and were greatly impressed (interview, Anil Shah, 2006). Since the late 1980s, PIM has become the favoured model of management of irrigation water across the world (Mollinga and Bolding 2004a).

The concrete plans for implementing participatory irrigation management in the SSP began to take shape in 1994. In early 1994, the SSNNL expected irrigation to commence in the first 50,000 hectares of the command area in Phase 1 of the project by June 1995, and they began to plan for the operational phase of the project (Narmada Planning Group 1994). The SSP planners seem to have been enthusiastic about the achievements of PIM in other irrigation projects. Papers and reports of such projects were circulated within the NPG and the SSNNL, and the planners discussed solutions to the challenges drawn up in the papers[113]. On the cover page of a copy of an article on "The Ozar Experiment", a project in Maharashtra (Upadhye 1994), Sanat Mehta has written "This is a wonderful experiment we must write a letter to compliment Shri Bapu Upadhye". Inside the copy, he has written remarks in the margins where there are issues relevant for the SSP, and conferred these to the Technical Specialists of the SSNNL.

[113] These articles on Participatory Irrigation Management were found in the archive of Sanat Mehta: 1) Vaidyanathan, A. 1994. *Transferring irrigation management to farmers*. In Economic and Political Weekly, November 19, 1994. 2) Upadhye, V. 1994. *Farmers' participation in water management. The Ozar experiment*. Nashik: Samaj Parivartan Kendra, and 3) Gamboa, R.S. 1992. *Institutional development program of the national irrigation administration.* Manila: Irrigators Assistance Division, Institutional Development Department, National Irrigation Administration, Philippines.

An action plan for Participatory Irrigation Management was developed by the SSNNL in 1994 (SSNNL 1994a). The plan refers to experiments elsewhere which have proved that irrigation efficiency increases if farmers participate in the water management, but that this requires a serious effort to motivate farmers for this task. The Command Area Development Wing of the Nigam had already appointed some motivators who had approached farmers in 73 villages. The Nigam refers to a project on "People's Participation in Water Management" run by the Gandhi Labour Institute (GLI)[114] through informal dialogue in farmers' camps, and suggest that this approach should be adopted by the SSNNL also. "The informal dialogue with farmers can be initiated [more] easily by a NGO than by Government officers," they write (SSNNL 1994a:2), and therefore propose that the Nigam involves NGOs already working in the command area for this task. The use of NGOs will improve the chances of success as well as be cheaper, as the Nigam proposes to pay less to the NGOs for this work than it would cost to carry it out through the use of their own staff (SSNNL 1994a). The Baroda Office of the Nigam had already approached four NGOs[115] for help in forming water cooperatives in 10,000 hectares of the first 50,000 irrigated hectares of the command area on an experimental basis. A project was set up to develop a uniform pattern of NGO involvement under the leadership of Gandhi Labour Institute, and sociologist Vidyut Joshi of the GLI was the Project Director.

WALMI-Anand[116] was central in the formation of a PIM model for Gujarat, and the SSNNL was part of several of the activities. A Workshop on the "State Synthesis Report (Draft) on Farmers' Organisations and Organisational and Procedural Changes", a report prepared by a Delhi-based consultancy (ISPAN), was held at WALMI-Anand on August 25th, 1994. Participants were from the Narmada and Water Resources Department in the Government of Gujarat, from the SSNNL and from NGOs. The workshop was inaugurated by then Chairman of the SSNNL, Sanat Mehta, who said that irrigation is a multi-disciplinary field and that water delivery can only succeed if the system is managed by the farmers. Water management is one of two major challenges of the SSP, he said (the other being rehabilitation of the

[114] A research institute in Ahmedabad.
[115] Arch-Vahini in Mangrol, Bharuch District, Vikas Centre for Development in Jambusar, Bharuch district, Mangal Bharti at Bahadarpura and Shramik Vikas Sansthan in Baroda.
[116] "Water and Land Management Institute", a State government owned multi-disciplinary training institute in irrigated agriculture. http://guj-nwrws.gujarat.gov.in/english/walmi.htm

displaced people): "In SSP, if water management by farmers fail, the entire project may fail" (WALMI 1994:2).

A development planner's perspective

The Narmada Planning Group conceived of the Sardar Sarovar Project as a "development project rather than an irrigation project only" (Mehta 1991:4). We have seen the hopes expressed for a relatively quick once-and-for-all solution to the risky business of agriculture in Gujarat. But the planners were not content with designing the technological features of a water-conveyance system. They knew that water availability alone would not ensure its socially optimal utilization. The Narmada Planning Group was a rare think-tank, said Professor S.S. Mehta[117], of a sort that unfortunately does not exist anymore. "The Narmada Project is not a simple irrigation project," he explained to me, "it is a multi-dimensional development project.(…) We are transferring surplus water resources from surplus areas to scarce areas because planning means to move resources from plenty to scarce areas". Whereas "a simple irrigation engineer will not think beyond irrigation and can't be blamed for that", a development planner must adopt a broader perspective (S.S.Mehta, interview 2004).

The SSP canals were therefore to be accompanied by other programmes such as land levelling and land consolidation, improved agricultural extension services and marketing facilities, and improved public-health facilities in the face of increased risk for water-borne diseases. The introduction to *Planning for prosperity* states that "the results will be dramatic" of the "basic programme of land development" which will be implemented "through a command area development strategy, a land consolidation and a consolidation of holdings programme and the adoption of shorter duration crops" (Narmada Planning Group 1989:3). The Indian land reform programmes of the 1950s envisaged land consolidation through popularisation of cooperative holdings and cooperative village management as the only way to make small and medium farm units economically viable (Shariff 1987). This has not been a big success in India. The "Bombay Prevention of Fragmentation and Land Consolidation Act" of 1948 provides for compulsory land consolidation. The *Planning for prosperity* mentions that this

[117] Professor at School of Planning CEPT, former Professor at Gandhi Labour Institute, Director of Perspective Planning in the Government of Gujarat in early 1980s, part-time member of Narmada Planning Group 1979-1985.

has hitherto not been feasible, before it outlines the many benefits of achieving land consolidation in the command area in terms of better utilization of motorized equipment and improved economic basis for further investments in the farm.

The spatial redistribution of water in the Sardar Sarovar Project had another limitation: the topographical constraints to gravity flow. The command area of the SSP lies entirely on the Western side, also called right side, of the Narmada Main Canal. Sanat Mehta described the problem to me in 2006, "What about the right side? There will be diversity: one side will be rich, the other side will be poor" (interview 2006). The Operations Research Group, a sub-group of the NPG, was asked to look into the problem, and wrote a report suggesting that the agro-processing industries, which would flourish with the increased agricultural production, should be established on the right side of the canal.

The planners cast their net wide when imagining the rural transformations possible thanks to the SSP, including everything from rural roads and electrification to land consolidation under the development programme of the SSP. These interventions, however, are beyond the formal responsibilities of the SSNNL. Although claimed to be vital for project success, they are not part of the SSP today. In the course of implementation, the planning of agro-processing industries on the right side of the Main Canal and the land consolidation scheme in the command area have vanished from the Sardar Sarovar Project. The enthusiasm for the dramatic impacts of land consolidation in the Master Plan of 1983 is not repeated in a Narmada Planning Group document from 1995 which lists the points of the Command Area Development plan. Under "Land Consolidation" they now write: "This is not envisaged on a major scale. Where farmers volunteer to consolidate, GOG [Government of Gujarat] will provide help" (Narmada Planning Group 1995:153).

Water distribution as spatial injustice

"Planning means to move resources from plenty to scarce areas," said Professor S.S.Mehta. The statement is in its simplicity quite revealing of an essential feature of the SSP: The particular *spatial* perspective they adopt on the complex issue of development and poverty. The problem of access to water is framed as a question of spatial injustice, where 'space' is understood as a territorially defined unit containing more or less resources. The state of

Gujarat is the larger unit. Within the state, the distribution of water resources is grossly uneven across territories, with the southern part of the state receiving plenty of rainfall, and the central and northern parts suffering under little and erratic rainfall and semi-arid conditions. When asked about the issues of equitable resource access, the SSP planners always return to the issue of spatial redistribution, whether we look at the documents from the planning process or ask them today.

In the late 1980s, when opposition was mounting, the benefits of the project were called into doubt, and the critics argued that the canal system would for the most parts irrigate already wealthy *talukas*. Kalathil (1988), for example, argued in the EPW in 1988 that the 61 *taluka*s of the SSP command area were already prosperous and would benefit at the cost of the remaining 123 *taluka*s of Gujarat:

> "The SSP is supposed to supply water to 61 *taluka*s of Gujarat out of the 184 *taluka*s in the state. The beneficiaries are the already prosperous *taluka*s. Many of the 61 *taluka*s have already been the recipients of benefits from the bulk of minor as well as existing major irrigation schemes in the state. These developed *taluka*s are clamouring for more development at the cost of the little developed 123 *taluka*s." (Kalathil 1988:2570)

The NPG defended the project. In an internal memo from the NPG from the late 1980s, developing arguments about SSP from a social-justice perspective[118], V.M.Patel argued that considerations of social justice had "dictated the policy of thinly spreading waters to a large an area as possible", and lay behind the decision to extend the canal to the desert areas of Rajasthan (Patel undated). However, there are limitations:

> "It needs to be borne in mind that development of water resources, especially surface, depends on natural factors like topography of the area and social justice and equity aspects can be considered only within the topographic and engineering cost constraints." (Patel undated:2).

Alagh, similarly points to topography as the main constraint to equitable water distribution when asked about prospects for poverty alleviation through the SSP:

> "In the beginning I was excited, because I saw this as a great opportunity to bring about equity, but I found out that there are limits. You cannot make water run uphill. But within these limits, we tried to achieve equity. We try to prioritise areas where the water will generate more employment." (Y.K.Alagh, interview, 2004)

[118] The memo has comments for a discussion of a draft paper B.B. Patel was writing on social justice through the SSP. The paper was later published in *Sardar Sarovar Project. A Promise for Plenty* (Pathak 1991).

When I asked Sanat Mehta the same question (how will the SSP alleviate poverty when the poorest people are landless), he seemed not to understand it, and would only talk about the problem of the right side of the main canal, as can be seen in the interview transcript below where I repeat the question for the third time:

> "Guro: Back to my previous question, you were thinking about rehabilitation, I am not thinking about that. I am thinking of the water and the beneficiary area, to create development. When I read *Planning for prosperity*, they say the goal is poverty alleviation and employment generation. But that is happening through agriculture. And the poor people in the command area are not the farmers. The poor people are those without land, the labourers. How will this project help them?
>
> Sanat Mehta: You are thinking only in the command area? When I was the chairman, I asked ORG [Operation and Research Group] to prepare a document for [the situation] that the Narmada water will flow only on the left side of the canal, - what about the right side? There will be diversity: one side will be rich, the other side will be poor. So I got a report from them, and they gave lot many good suggestions. That when the water flows, suppose when the cotton production increases, and all those industries based on cotton should be on the right side. So there are number of concerns." (Sanat Mehta, interview, March 2006)

V.M.Patel's reminder of topographical and engineering-cost constraints was incorporated in the only NPG article directly devoted to the question of how the SSP will contribute to social justice and equity in Gujarat, "Social Justice Through Sardar Sarovar Project" by B.B. Patel published in the edited book *A Promise for plenty* (Patel 1991a)[119]. B.B.Patel starts by referring to the econometrician Angus Deacon and the early Indian economists C.N.Vakil and P.R.Brahmananda[120] for the importance of increased national food-grain production for the task of nation building. In the early sixties, India's growing inability to produce enough food for its people and dependency on US food aid led to "national insecurity", and was also "a source of national humiliation". The "importance of the Narmada Project (Sardar Sarovar) in Gujarat has to be viewed from this perspective", he argues (Patel 1991a).

This said, he maintains that the SSP's prospects for delivering social justice and equity can be judged based on certain criteria: The degree to which the benefits from the project will flow to

[119] The paper was written by B.B. Patel and printed in *Sardar Sarovar Project. A Promise for Plenty*, edited by Mahesh Pathak. An internal NPG note shows that the arguments to be presented in the paper were discussed in the NPG (Patel undated).

[120] Vakil and Brahmananda were influential economists in early Indian development planning, and together they authored the book "Planning for an Expanding Economy" (Bombay, 1956) in which they argued that the 'food bottle-neck' was the main operating constraint on India's growth (Chakravarty 1987).

backward and drought-prone regions of Gujarat; the coverage of socio-culturally and economically weaker sections of the population; the coverage of villages with problems of drinking water; and the creation of employment opportunities (Patel 1991a). The paper aims to show that the SSP will cover such areas and needs to a large extent. It argues that a majority of the *taluka*s in the command area are classified as "backward" by the Committee for the Development of Backward Areas in Gujarat. And those that are not classified as socio-economically backward are classified as drought-prone. "This analysis brings in focus that there are many pockets in the apparently developed districts which are either drought-prone or are socio-economically backward," writes B.B. Patel (1991a:89). The "socio-culturally weaker" sections of the population are the Scheduled Castes (SC) and Scheduled Tribes (ST). As large proportions of each district's SC/ST population live in command-area *talukas*, these groups will benefit from Narmada water, it is argued. The conclusion is symptomatic of the planners' rather simplistic claims about the issue of water access:

> "In eight out of twelve districts therefore, the majority of scheduled tribes would be expected to have access to Narmada waters." (Patel 1991a, p 91)

There is no mention of access to *land*, which is the only medium through which one can directly benefit from Narmada water. The paper does mention that the agricultural labourers are "at the bottom of socio-economic ladder" and to a great extent both economically and socially backward (Patel 1991a:91). However, Patel is not very convincing when he confidently claims that the water will help the landless because a large section, from 45% to 100%, of the agricultural labourers in the command area districts *live in* the *taluka*s covered by the SSP. Patel then leaves the question of landlessness and notes the fact that many marginal and small farmers, "although recorded as cultivators, in fact, derive sizable income for survival by working as wage labour" (1991a:91). The question of how landless people will benefit from the Narmada water is avoided by focussing on how the water will turn some of the marginal farmers into "whole time cultivators and thereby elevate their economic and social status" (1991a:91).

Consistently, the main argument of the planners is based on which percentage of the weak sections of the population live in command area *taluka*s. It is assumed that by merely living in the command area, Narmada water will reach and benefit these groups. By seeing poverty as a result of only a spatially unequal distribution of resources, the planners see it as a question of

either *lack of* resources or *failure to utilise* existing resources within a given space. In the case of water scarcity and drought, the problem is conceived as a lack of water in the drought-prone regions, and the existence of poverty in drought-prone regions is seen as a result of lack of water. Whereas the *physical* constraints to delivering water to all the needy people are specifically acknowledged, a conspicuous silence surrounds the social and political constraints to the same. Poverty and unemployment in the planners' perspective are only man-made phenomena to the extent that they are due to human neglect of technological options for rectifying nature's distribution of resources.

The planners' blind spots

The SSP master plan *Planning for prosperity* reveals a selective vision of poverty in rural India. The planners avoid dealing with the structural inequalities in villages. Landlessness and unequal land ownership are ignored. While the section on employment and poverty opens with the statement that the two main groups living from agriculture are "cultivators" and "agricultural labourers", the ensuing focus is entirely on the cultivators and the difference between "irrigators" and "non-irrigators". Access to *water* is seen as the main determinant of poverty level, whereas access to *land* is ignored. Data presented in *Planning for prosperity* shows that poverty is much more severe among the agricultural labour households than among the cultivators (see Table 2). The table shows that 64% of the agricultural labour households, compared to 31% of non-irrigating cultivators and 24% of irrigating cultivators, live below the national poverty line (defined as the monthly expenditure of 86 Rs or less in 1981).

Table 2. Percentage distribution of estimated population by per capita monthly expenditure classes and household types (1982).[121].

Monthly per capita expenditure class	Cultivator households		Agricultural labour households
	Irrigators	Non-irrigators	
0-36	Nil	Nil	0.95
36-68	6.45	12.84	32.33
68-86	17.24	17.85	30.43
86-110	20.70	25.31	22.38
110-150	30.39	26.81	11.40
150-250	21.48	15.44	2.41
250 and above	3.74	1.75	0.10
All classes	100.00	100.00	100.00
Average per capita monthly expenditure	129.61	115.82	82.11

Copy of Table 6.12 in *Planning for prosperity*, NPG (1989)

However, the accompanying text does not mention agricultural labourers, but states that "the consumption level of irrigating cultivator household is about 12% higher than that of the non-irrigating cultivator household" (Narmada Planning Group 1989:187). *Planning for prosperity* does not mention the relationship between irrigation and size of landholding, but claims that most farmers have "medium-sized holdings":

> "Gujarat's agriculture is predominantly based on medium size holdings, i.e. holdings between 2 to 10 hectares. Holdings in this size-group accounted for nearly 49 % of holders and 60 % of land in 1976-77." (Narmada Planning Group 1989:35)

The official labelling of landholding categories employed by the Agricultural Census of India, though, may misrepresent rural realities[122]. The very large group of holdings labelled "medium" ("medium" and the oddity "semi-medium") ranges from two to ten hectares, or five to twenty-five acres which is the more commonly used unit in Gujarat. This may mask important local inequalities. Compared to rich world farmers cultivating thousands of acres,

[121] The data is from a survey commissioned from the Statistics Bureau in Gujarat for the NPG.
[122] Marginal <1 hectare, Small <1-2> hectares, Semi-medium<2-4> hectares, Medium <4-10> hectares, and Large >10hectares.

differentiation of holdings below twenty-five acres may seem insignificant, but in real Indian villages, as we shall see in Part 3, there are big differences between a five-acre holding and a twenty-five-acre holding.

The attacks on the promised benefits of the project increased in the late 1980s, when large parts of the resistance movement began to oppose the very development model behind large dams. One of the major criticisms against the SSP is that the project will only benefit large farmers who are already wealthy. In the Indian polarisation debate (Rudolph and Rudolph 1998), left-wing critics of agricultural modernisation argued that this process led to a polarisation process in which large farmers were able to consolidate their economic position further by taking advantage of the new technologies and new market opportunities, whereas small farmers were marginalised into pauperized and proletarianised conditions.

The SSNNL's replies to this have been versions of "There are no or few large farmers in Gujarat", which sounds rather unconvincing to anyone who is familiar with rural Gujarat. One of the many information booklets about the SSP, dismisses the argument that the project will only benefit rich farmers as "an emotive myth, a misinformation propagated by anti dam lobby to arouse opposition to the dam", and a table presents the benefiting farmers as 28% marginal (<1ha) and 24.4% small farmers (1-2 ha) (SSNNL undated:58) without mentioning that water will multiply the productivity of *land*, and thereby benefit larger farmers to a larger extent. In another publication (Patel 1991b), the SSNNL takes the argument to its full absurdity by claiming that there are no affluent farmers in Gujarat. In a paragraph entitled "Prevention of powerful Groups from Prospering at the Cost of the Poor", chairman of the Nigam C.C. Patel writes:

> "There are hardly any affluent farmers by the Western standard or even by the standard of the average developing country. (Since there is a ceiling on land holding fixed by Law in Gujarat)." (Patel 1991b:91)

It is highly unlikely that a person like C.C.Patel is unaware of the many methods adopted by large farmers in Gujarat and the rest of India to circumvent land-ceiling laws. But as the quote shows, the planners compare Indian farmers with Western standards. Alagh agrees that 25 acres is a large holding in India, "but even in this country a six to eight hectare farmer will be poorer than almost anybody who has a regular job in the non-agricultural sector," he pointed out (interview March 2006), and placed himself in the polarisation debate:

> "They are not necessarily… This whole concept of the monstrous *kulak* class is a little overdone. You are talking basically about small peasants in a global context." (Alagh, interview, March 06)

The *kulak* concept is originally from a Marxist debate about the role of farmers in the class struggle, where the large Soviet kulak farmers were regarded as class enemies of small peasants and proletarians. The SSP planners relied on the analytical approach and results of a demographer from one side of the Indian polarisation debate when they argued that the SSP would reduce poverty in Gujarat: The demographer Pravin Visaria was contracted to analyse the impacts of irrigation on migration patterns in Gujarat, to find where the water would have the greatest employment effect. Visaria was one of the researchers who contradicted K.N.Raj's findings in the 1970s (Rudolph and Rudolph 1998). His reading of the statistical evidence of the changes following agricultural modernisation was that the change was dominated by family farms using *some* wage labour not capitalist agriculture based on wage labour. In the words of the Rudolphs, "Visaria saw bullock capitalists where Raj saw capitalist agriculture" (Rudolph and Rudolph 1998:349).

It is, however, unlikely that the SSP planners were unaware of the structural inequalities and poverty problems of rural society. They were researchers and university professors with an overview of the existing research and knowledge of rural Gujarati society. Many of them had published articles focusing specifically on rural development and backwardness since the 1970s[123]. But the arguments from existing research are selectively chosen to support the need for the canal water, and complicating political and social factors are conveniently ignored.

For example, V.M Patel refers to the *Resurvey of Matar taluka* from 1974 (Shah and Shah 1974) to support the claim that the underemployed sections of the labour force, the landless, will benefit from the SSP through migration to irrigated areas (Patel 1988). Matar is a poorer subdistrict of the relatively rich agricultural district Kheda in Central Gujarat. What is striking in the Matar Resurvey, and ignored by Patel, is the description of the condition of the agricultural labourers: their class has grown in numbers, landlessness among the agricultural labourers has increased, their wages earned have tended to decrease in real terms, and there has been a widening gap between the incomes of the agricultural labourers and others:

[123] For example Pathak (1974) and Pathak, Desai and Charan (1974).

> "Despite many adverse situations, there has been a slow but certain improvement in the absolute level of living as a result of the growth of the economy during the past three and half decades; the fact however is that in their upward economic journey they trail far behind the cultivating class, even compared to the small farmers, who are closest to agricultural labourers in several respects." (Shah and Shah 1974:161)

The NPG had commissioned detailed socio-economic benchmark studies of the entire command area of the SSP. These studies had arrived at more complex conclusions about the relationship between irrigation and poverty than that irrigation reduces poverty[124]. For example, the benchmark study of six *taluka*s in Surendranagar district in North Gujarat found that land distribution is highly skewed and that 87% of the land is controlled by "large" and "very large" farmers, and that this level of inequality has increased over time in the most developed *taluka*s (CEPT 1981). The report uses the terms "large" and "very large" about landholdings above ten and twenty-five acres, which is more in line with the local conceptions of landholding size. The study team further points out:

> "It is to be noted that the land inequality in the comparatively more irrigated *taluka*s like Halvad and Dhrangadhra has increased while it has decreased in the least irrigated Lakhtar. This observation brings out the relationship between land distribution and the level of irrigation indicating the process of irrigated land transfer from the poor to the rich." (CEPT 1981:193)

Rather than noting this complicating insight, *Planning for prosperity* reports that the data from the benchmark surveys show that "irrigation is one of the main factors for explaining variations in level of consumer expenditure in cultivating households" (Narmada Planning Group 1989:43)[125].

In my interviews with SSP planners, they brought up the tension between planning and politics when explaining the current status of the project. As illustrated by a few interview excerpts reproduced below, they see electoral politics and corruption as factors external to the planning process, and they do not consider local politics of access to water central or pertinent questions for their planning activities. When I raised the issue of the poor quality of the canals

[124] S.S.Mehta describes the planning and data base of the SSP in an article and says that the socio-economic benchmark studies "established the need for the project because of the absence of any other alternatives in the area" (Mehta 1991:7)

[125] "The low level of consumption expenditure in the state can be attributed to the low level of irrigation intensity and small size of land holdings. The bench mark surveys sponsored by the Narmada Planning Group in the command *taluka*s and a study on consumption expenditure conducted through the State Bureau of Economics and Statistics corroborate that irrigation is one of the major factors for explaining variations in level of consumer expenditure in cultivating households." (Narmada Planning Group 1989:43).

in Jambusar (conditions which will be further examined in Part 3) in an interview with Y.K. Alagh, he said that the SSNNL were supposed to set up "a design group" and "an evaluation group" which could have taken care of such problems. Part of the problem is the soil there, he said, and partly it is corruption. Such interferences in the implementation of the problem are not seen by him as integral to a development project such as the SSP, but as a regrettable annoyance from outside the domain of planning. He was very negative to the promises of Narmada water to areas outside the planned command area:

> "The Chief Minister fellows keep on declaring one million acre-feet here and there. And the other crackpot who came up with this idea of Kalpasar[126]! It is environmentally impossible, there are all kinds of other problems, the Government of India will never agree. (…) But they get all these grandiose ideas. The Chief Minister is from North Gujarat. He organised this function at the river Saraswati [as a political showpiece]. Once upon a time, a man like Sanat Mehta could get up and say there is not enough water. (…) I could tell them that there is not enough water; the models tell us that the existing water is going this way. They don't have that kind of system now. The engineers are saying send water to this and that place. Their jobs depend on it." (Y.K.Alagh, interview, 2006)

Alagh here describes the political use of water as a vote-grabber, how the promises of water work as a manifestation of the power of the rulers. However, he is optimistic about the rationality and capacity of the people, that they know their rights to water, and will object if others take more than their share:

> "Because I think this is a society which in spite of all its difficulties will develop answers through consensus, and through public debates which may sometimes be very intense, very, occasionally even very cantankerous, maybe even violent. And that is because water has already been allocated. And everybody knows, they can check up from Sardar Sarovar Nigam what is the water they are getting. Nobody will take less, and more there is not to give." (Alagh, interview, 2006)

The other SSP planners I interviewed were less optimistic about the prospects for success at this point. NPG member and professor of economics S.S. Mehta complained about the flawed implementation of the project and the promises of water to areas outside the plan:

> "S.S.Mehta: Every now and then they are tinkering with the project, adding things which were not supposed to be there. The water which is flowing in Sabarmati was never supposed to be given. The pipelines going to various parts of Gujarat was not there in the plan. They are forgetting that the water is limited.

[126] A planned project to build a dam across the Gulf of Khambhat with a freshwater lake inside it and a high-speed train connection between Ahmedabad and Mumbai across the dam.

Guro: Is this done by the politicians or by the Nigam bureaucrats?

S.S.Mehta: By the politicians. But the bureaucrats don't mind. And the chairman of the Nigam is always a politician. Politicians of all hue and cry think they can do anything with the project. My feeling is they are messing it up.

Guro: Is there any public debate about this?

S.S.Mehta: Not at all. These are popular moves, so nobody opposes it. The rational use of water has been given up. The feeling is that if Saurashtra is wanting water, let's give it. If Kutch wants, let's give. This is negating the benefits of the project. We have planned for some other benefits. Then if you divert water for other purposes, what will happen to the benefits? (…) The lives of politicians are very short; the plan's life is very long."

Sanat Mehta, former finance minister and chairman of the Nigam (and thus a politician himself), was equally disappointed with the way the SSP was turning out:

"Sanat Mehta: And see what is the plight: Take Saurashtra, Surendranagar district, which is to get the highest benefit in the form of irrigation. There command area development has to be done in 22,376 km canal. And out of that only 219 km have been constructed. And the outstanding reply that in Kutch [*noise*] kilometres of canals, branches, sub-branches have to be constructed. Do you know what is the progress? [*pregnant pause*]... That is why I am telling it is a broken dream.

Guro: But what is the reason for this delay?

Sanat Mehta: The reason is that this project has become a political weapon. So the present Chief Minister, when he realised that the canals will not be ready in his time...and he wants to create the impression all over the country that waters of Narmada has reached the people… he converted it into a pipeline scheme. Drinking water. Now nobody can speak against the drinking water. Because the area needs the drinking water also. But actually drinking water was to follow after the canal construction.

Guro: But there was a scheme for drinking water from early 80s also?

Sanat Mehta: No. It was a scheme, but it was decided… I give you an example, drinking water...: When I was the chairman, the city of Baroda asked for drinking water from Narmada. Because my main canal was ready. And the reservoir of the city was on the bank of the main canal. So they made a demand, that our reservoir should be filled with the Narmada water. And I said you cannot get. Why? Because when the drinking water plan was made out, it was divided into three phases. Who should get first? The priority was Ahmedabad and beyond, North and Saurashtra both. Not Baroda. So I said no. [Giving water to Baroda] would have given me lot of political weight. Because I belong to Baroda. I was criticised at that time. That I, being a man of Baroda, refused to give Narmada water to the city."

Sanat Mehta talked about the plans for conjunctive use of groundwater and canal water, how a consulting party of experts from Wallingford, England, had come and designed the system for them. Everything is planned, he emphasised:

"Guro: But this has not started working yet.

Sanat Mehta: No no, they don't know about it perhaps.

Guro: The SSNNL???

Sanat Mehta: It is planned. Everything is planned. At what places these borewells will be there, that is also there.

Guro: When you said they don't know about it, what did you mean?

Sanat Mehta: Because this has taken a very long time. That is why one of the comments on the Narmada project, Sardar Sarovar Project, is: "Deeply investigated and well planned, but not well implemented."

Guro: But what is the reason?

Sanat Mehta: Reason! Reason is commitment.

Guro: Commitment? But the government seems very committed to this project?

Sanat Mehta: For votes.

Guro: For votes? Can you elaborate? Can you explain some more?

Sanat Mehta: If somebody said that I am against Narmada, they will not get the vote. If only now, look at the present stage: According to the plan, when the dam reaches 110 meters, water can flow by gravity up to Kutch. Then why the hell does the government say that we want a higher height? And now, this Chief Minister, I have got his cutting, what silly he says, 'First we are working vertically in this Narmada, now we are working horizontally'. What does it mean? It means that he wanted to complete the dam first, and later on the canals. He does not know that if you want a better utilization of water, you have to build vertical and horizontal simultaneously. Suppose if I had not constructed the main canal, which was very costly, if I had behaved like him, I would have constructed the dam. Because the people were only asking me what is the height of the dam."

In the opinion of the SSP planners, everything is planned, and scientifically so. Based on the best available data base and economic modelling techniques, and state-of-the-art technology in irrigation canals, dam construction, and drainage, they had planned for socially optimal utilization of nine million acre-feet of Narmada River water in Gujarat. The only factor not factored in was the complexities of human agency, in particular, politicians' use of water for votes, and the local politics of access and project implementation.

Changing zeitgeist – shift in battlefield

Although the SSP was criticised from the inception of its planning in the early 1980s, the planners did not anticipate the scale and strength of the resistance movement towards the end of the decade. Until 1988, the demands of the critics had first and foremost been for a just and reliable resettlement and rehabilitation policy. These were demands that most of the expert planners supported. The work of NGOs like Arch-Vahini, SETU, and Oxfam bore fruits and in 1987, the Government of Gujarat announced a Resettlement and Rehabilitation package which was unprecedentedly generous in India. However, this changed with the formation of the Narmada Bachao Andolan in 1988. The demand was now the complete cancellation of the project and withdrawal of World Bank funding. The NPG had not prepared a communications strategy to convince the public opinion of the need for the SSP. The surprise expressed by C.C.Patel (chairman of the SSNNL from 1990-1992) is typical of the views and sentiments in Gujarat regarding the SSP:

> "Frankly, however, I must admit that I never expected this project to be the centerpiece of stiff opposition from human rights activists and environmentalists that it has become." (Patel 1995c:71)

The field on which the battle was fought had also shifted with the alliance of the NBA with an international movement campaigning against the development policies of the World Bank, in particular its funding of large dams, as explained in Chapter 4. This was no longer an Indian struggle, but a global one, and the public opinion that had to be convinced was not only Indian, but international. This must have caused the planners big problems. Sanat Mehta's archive for instance contained filed anti-SSP documents: a transcript from a debate in the Swedish Parliament in 1990 about the SSP in Swedish and with an English translation attached, as well as copies of letters from Friends of the Earth Japan to the Indian Embassy in Japan from 1992, and from Rainforest Information Centre in Australia to the Australian Executive Director in the World Bank in 1990, a letter which had been faxed from the World Bank to the NPG. The Australian organisation writes: "The decision taken by the World Bank on July 2nd, to continue funding for the Sardar Sarovar Project (SSP) has (…) greatly angered NGOs and concerned citizens both within India and elsewhere." In the margins, the handwriting of an NPG member reads: "Not true. Some very happy".

The SSP - A "victim of time"?

Then Chairman of the SSNNL, C.C.Patel, wrote a paper titled "The Sardar Sarovar Project. A Victim of Time" in 1995 in which he outlines the many unexpected "hurdles", as he calls them, that came in the way of the SSP (Patel 1995c). The Government of Gujarat had hoped that the Tribunal was the last hurdle, but in this they were seriously mistaken. Patel describes the Indian Forest Conservation Act of 1980 as a "major hurdle" which was later overcome. The Tribunal had decided to allot forest land for resettlement of the displaced persons, and this was now illegal. The Environment Protection Act of 1986 was also a hurdle. According to Patel, considerable time was lost in securing the environmental approval of the SSP because there were no clear guidelines given for how to prepare a realistic environmental impact assessment (Patel 1995c). But the main "hurdle" of the project was clearly the changing zeitgeist of the 1980s, with the increased awareness about the environment and human rights of indigenous people and the growth of a globally interconnected social movement gathering around these issues. "Unfortunately, the implementation of the Sardar Sarovar Project has coincided with this period of great enthusiasm and emotion for the environment," writes C.C.Patel (1995c:79), and further:

> "[T]he times during which other large projects have been implemented are totally different from those of today. The laws of the land have changed. There is a much greater awareness of the environment and human rights. While these environmental sensitivities must be appreciated, it seems that the pendulum is at its extreme swing." (Patel 1995c:87)

Seeing the problems mounting in front of the SSP, several of the old champions for a Narmada Development Project have toyed with questions of "if only". If only they had begun the development of the Narmada River before the split of the old Province of Bombay into Gujarat and Maharashtra, speculated Lalit Dalal, a long-time government servant of Gujarat[127],

> "we would have followed the Ukai model and included in Gujarat the Maharashtra villages going under submergence in the Bifurcation Act of 1960 and, in consequence, Maharashtra would have had no locus standi. Deprived of Maharashtra support Madhya Pradesh (M.P.) would not have created problems for Gujarat, which it later on did and thereby delayed the execution of the Project by over 20 years." (Dalal 1991:1)

[127] Collector of Broach 1948-49 and 1951-52, and later Revenue Secretary and Chief Secretary of Gujarat.

If only they had not involved the World Bank, complained Professor S.S. Mehta, former director of Perspective Planning of the Government of Gujarat and part-time member of the NPG from 1979 to 1985, the project would have been completed long before the Narmada Bachao Andolan came on the scene. Gujarat was rich in 1980, and the World Bank involvement was in his opinion unnecessary and delayed the project for 5 years (interview S.S. Mehta 2004).

The planners in defence

The Narmada conflict has gone through several stages, and peak periods in the conflict can also be seen from the pattern of publications from the Narmada Planning Group and the SSNNL (See Appendix 6 for list of main events in the conflict).

Before 1989, there are few pro-dam publications intended for a larger audience. Although critical articles appeared in Indian journals like *Mainstream* and *Economic and Political Weekly*, there are few articles from pro-dam actors[128]. I see this non-participation in public debate as a sign that the Government of Gujarat and the SSP planners were quite confident that they would have the support of the public opinion for the project, and did not conceive of the opposition as a serious threat. This changed with the establishment of the Narmada Bachao Andolan in August 1988. In 1989, a partly updated version of the master plan for the Sardar Sarovar Project, developed and written in 1981-3, was published by the NPG with the title *Planning for prosperity.* The plan was published with clear reference to accusations of intransparency[129]. Whereas the years 1981-83 were busy years for the planning of the SSP, the years 1991-3 were critical years for defending the project against mounting opposition. Chairman of the SSNNL, C.C.Patel, writes that the opposition "reached such proportions at one point that the management was put on the defensive" (Patel 1995c:71). The year 1991 started with the NBA-organised march to Ferkuva at the Madhya Pradesh-Gujarat border and

[128] Water expert B.D. Dhawan criticized in May 1989 the dam proponents and planners of the Narmada projects for not participating in the mounting public debate about dams in the 1980s. He says they have "shied away from sending to news agencies their own version of controversial points, not to speak of making no effort at all to make specific responses to critical write-ups appearing in the press day after day" (Dhawan 1989:1096).

[129] Y.K.Alagh says that the publication of the Master Plan was done because of these criticisms: "Baba Amte one of its critics has kept up the fiction that the Project is a secret. I had sent him details and published references and to nail this lie the Narmada Planning Group has published the Plan in a 586 Page printed book Narmada Planning Group, : Sardar Sarovar Development Plan, Gandhinagar, NPG, 1989" (Alagh 1991a:10fn).

a three-week standoff and hunger strike which ended when the World Bank announced it would initiate an Independent Review of the project. As described in Chapter 4, this was the first time in the history of the Bank that it asked for an independent review of one of the projects it was funding. The Bank announced the review in January 1991. The review team members were announced in June the same year, and their work commenced in September. The report was published in June 1992.

The 1990s pro-Narmada publications came in three waves, all related to phases in the anti-dam struggle. The first wave was in 1991, a year of peak tension. Early in 1991 the NPG published a book with several articles written by Narmada Planning Group members: *"Sardar Sarovar Project. A Promise for Plenty"* (Pathak 1991). In March 1991, the Government of Gujarat published the collection *"All about Narmada"* in the introduction to which the Chief Minister of Gujarat writes that the height of the dam will not be reduced an inch, that construction work will not be stopped, and that a review of the project will not be accepted under any circumstances – all with clear references to the demands of the opponents (Government of Gujarat 1991). And in August 1991, several papers were published by the Vikas Bharati Institute for Policy Studies, Research, and Futurology in Ahmedabad in defence of the project (Alagh 1991a; Shah 1991; Sheth 1991).

The report of the World Bank Independent Review (IR) in 1992 was devastating for the planners, and caused a second peak in the number of publications. The Government of Gujarat established a high-level committee led by Y.K. Alagh to go through the IR Report and counter the charges against the project. The report of this high-level group was reproduced in diverse forms, in 1992 and later, among other things as an SSNNL-booklet with the title *"No Cancelling Tomorrow"* (SSNNL 1992).

After the Indian cancellation of the World Bank loan agreement, the NBA demanded a complete Indian review of the SSP. Encouraged by the conclusions of the Independent Review, the NBA campaign focused on the flaws of the project planning, arguing among other things that the SSP lacked a proper environmental impact assessment. In response to this the NPG published a thick two-part book called "Narmada and Environment. An Assessment". Part 1 is a synthesis and overview of major environment impacts in the SSP command area and part 2 has the terms and references of various environmental impact

assessment studies carried out by and for the NPG (Alagh, Pathak et al. 1995). It is clear that the planners are trying to counter the charges of having ignored environmental consequences of the SSP. A collection of papers from two seminars held at the Agro-Economic Research Centre at Vallabh Vidyanagar in March 1991 and August 1992 was published in 1995 in the book *"Development Imperatives and Environmental Concerns"* (Pathak 1995c); Alagh and colleagues from the Sardar Patel Institute of Economic and Social Research published the book *"Economic Dimensions of the Sardar Sarovar Project"*, which was a new cost-benefit analysis of the project comparing the SSP with water delivery through desalinisation; and former Finance Minister and Chairman of SSNNL, Sanat Mehta, who was now the head of his own NGO "Gujarat Foundation for Development Alternatives", re-printed Alagh's foreword to "Development Imperatives and…", a critique of the Independent Review Report, under the title *"Morse Mission a Mission of Omissions"* with a new introduction by Sanat Mehta which refers to the demands of the opponents for a fresh review of the entire project (Alagh 1995).

In Gujarat, the planners and supporters of the project organised a counter-campaign. Several public seminars and lectures about the SSP were organised in 1990, 1991 and 1992. On 7-8th March 1991, a seminar on "Major issues pertaining to the Sardar Sarovar Project" was organised by the Post-Graduate Department of Economics and the Agro-Economic Research Centre of the Sardar Patel University at Vallabh Vidyanagar in Gujarat. There were 81 participants from various research institutes, universities, from the Government and from Arch-Vahini in Gujarat at the seminar. Out of 81 participants, 60 were academics in University positions or from Gujarati NGOs. The consensus in this group was that the SSP was "viable in earthy *(sic)* fundamental sense" and "cannot be judged solely in terms of cost benefit ratios" (Pathak 1995b:xxxxvii)

"No Cancelling Tomorrow" - Defending 'Development'

The challenges to the project from the growing opposition in the late 1980s forced the SSP planners to come up with convincing arguments about the benefits of the project - benefits which the planners had thought were self-explanatory from the beginning. What was at stake for the planners was the "development" of India, and thus a better future for its citizens.

“The activists, using a romanticised image of the tribal, are not just fighting the Narmada dams,” Alagh writes in his rebuttal of the IR Report, “They are fighting “development”” (SSNNL 1992). He continues:

> "Is this the purpose for which the IRM [Independent Review Mission] was appointed - to oppose modernisation, fertilisers, irrigation, industrialisation, development? Is the World Bank being called upon to "step back" while its charter is rewritten by neo-Luddites?" (SSNNL 1992:11-12)

The resistance to this kind of development is seen as utterly inappropriate for a poor country like India, a fanciful idea that the “urban elite” has adopted from the West forgetting that the West followed the same development model before they begun to care for human rights and environment:

> “During the hey days of Industrial and Technological revolutions, the mills of economic development of western world ground fast and fine, not caring either for human rights or for ecological consequences. With accumulation of wealth and affluence, finer sentiments of human rights and environment are now surfacing. And what is good for G-7 has to be good for the rest of the World! So our urbanite elite have also adopted human and environmental issues as the State of the Art evaluation angle.” (www.sardarsarovardam.org accessed 4.9.2009)

Modernisation, fertilisers, irrigation, industrialisation, and development – this is the *future*, what the world moves forward to, and it should not be stopped by “luddites” who denounce any change and improvement in machinery and industry. We recognise in the defence of SSP the emphasis on tomorrow that characterises the “high modernist” ideology (Scott 1998). The titles of the publications reveal the futuristic perspective: “No Cancelling Tomorrow”, “A Promise for Plenty”, and “Narmada River Project. For a Better Tomorrow.”

The ideas and values guiding the SSP planners are those of the modernisation theories and development economists. Then Vice-Chairman of the SSNNL, V.B.Buch, opened his prologue to an SSP information booklet from 2000 with reference to the end of the 2nd World War which marked the end of the colonial era: the “ambitious programme of economic development” after the 2nd World War was “a crucial task for the planners and leaders” of post-colonial countries. They had to “channelise the unharnessed natural resources – land, water, minerals, forests, sea wealth and so on and the idle manpower so as to transform them into productive wealth for the people” (SSNNL 2000:10) “The core issue of development in a country is to manage its natural resources,” he continued, “and as Development Economists

often say, a country is poor, not because it does not have resources, but because it does not have either will or ability to manage its resources" (SSNNL 2000:14)[130]. His reference to Development Economics indicates the source of the planners' conceptions of development. The outlining of the Sardar Sarovar Project in the many plan publications can be described as a strategy for a big push for rural take-off.

The environmental challenge

The challenge from the environmental movement was one of the biggest hurdles for the SSP, as acknowledged by C.C.Patel. Difficulties in the environmental components of the SSP were one of the two reasons for the commissioning of an Independent Review by the World Bank. The other was difficulties in Resettlement and Rehabilitation. The critics argued that the dam would negatively affect the environment in the submergence area and downstream in the canal area, and that the canals would create environmental problems in the command area. The reservoir would submerge pristine forests and destroy the habitat of wildlife; the aquatic life in the river Narmada would be destroyed downstream of the dam; and the command area would suffer from salinisation and water logging. The Independent Review arrived at many of the same conclusions, and the SSP planners were insulted by claims in the Review that the planning process had not included serious environmental impact assessments. It is unfair to judge a project in India by the environmental norms and criteria of developed countries, argued C.C.Patel (1995c), and Alagh maintained that they had applied the data, methods and perspectives that were available in the early planning phase of 1981-1983 (Alagh, Pathak et al. 1995). One cannot expect a developing country to produce data of the same quality as industrialised countries, the NPG argued. The Independent Review Report never reflected on the justifiable time required "for such detailed studies in a developing country where in the basic environmental ground data generation itself takes a few years" (Alagh, Pathak et al. 1995:v).

The Independent Review argued that the planners have not assessed the impacts on down stream environment in the Narmada River. The planners argue that such studies have been done, and refer to a study by the Department of Botany of the MS University in Baroda in

[130] This prologue is also published at the official SSP website under the heading "Need for the Sardar Sarovar Project" http://www.sardarsarovardam.org

1983, and studies done by the Central Inland Fisheries Research Institute (Government of Gujarat 1992). The impact on fish in the Narmada River downstream of the dam is one point of contention. The critics argued that populations of freshwater fish like *hilsa* will be adversely affected by the reduced flow in the river. The SSP planners argued that this will not have economic consequences because the Narmada River "is not the major source of fresh water fish seed" (Government of Gujarat 1992). Any reduced fishery in the Narmada River will be more than offset by the creation of new opportunities for fish farming in the reservoir and in the command area of the canals:

> "These culture fisheries will be based on artificial propagation of the commercial species in hatcheries and not based on seeds available in the river stretch." (Government of Gujarat 1992:47)

The Independent Review stated that the downstream environmental effects would take decades to manifest themselves. The planners argued that "hence, it cannot be said that it is too late to initiate remedial measures on the basis of the available data and studies undergoing" (Government of Gujarat 1992:48). Whereas the precautionary principle applied by the Independent Review meant that such future environmental effects would be entirely negative and should be avoided, the planners saw them as necessary side-effects which would be taken care of and ameliorated once they occur in the future.

Overall, the SSP planners emphasised the importance of modernisation and industrialisation for development, and argued that one had to balance the need to preserve the environment and create development. For this, they found support in the Brundtland Report, and argued that the SSP was the perfect example of "sustainable development":

> "The Sardar Sarovar Project stands this test [of sustainable development] and the analysis shows that while it massively contributes towards fulfilment of the needs of water of the present generation as well as future generations for irrigation, for drinking and other domestic uses, for industries and for power, it strengthens the ability of the future generations to meet their own needs by preventing soil degradation, salination and desertification by improving and spreading green trees and forestry cover, by recharging groundwater resource base etc., that is, by balancing development with environmental protection, preservation and sustainability." (Shah 1991:2)

The environmental critique is interpreted by the SSP planners as "militant anti-growth eco-fundamentalism" (Shah 1991), and even a form of eco-imperialism imposed from already developed countries. "Vital nation-building projects have been delayed in the name of the

environment," wrote C.C.Patel (1995c:79), revealing the understanding of "development" as nation building. The planners argue that the project is vital for *improving* the environment, rectifying the errors of nature: "The Review had failed to appreciate that efforts were made not only trying to compensate resources lost from one part of the State but were trying to create entirely new resources, where no such resource exist today" (Alagh, Pathak et al. 1995:xviii).

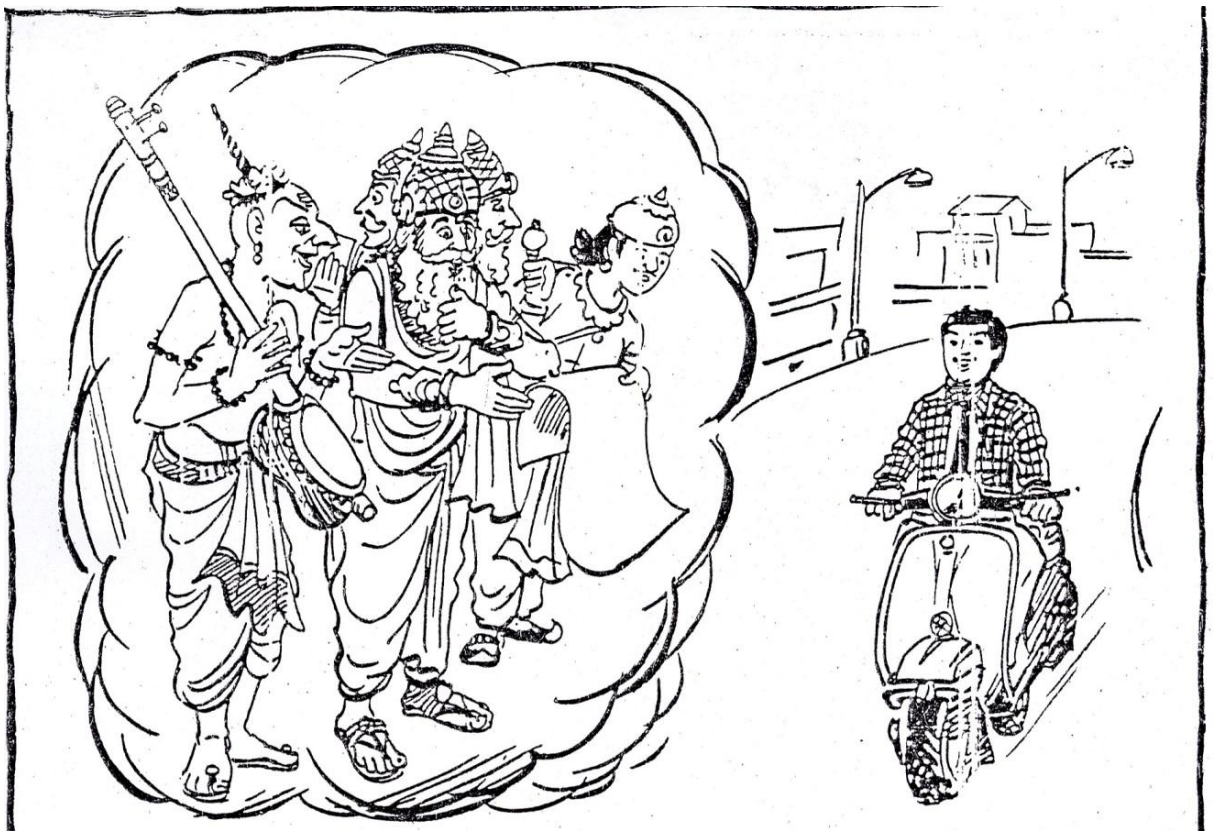
The human rights challenge – displacement and rehabilitation

Even more central than the environmental critique, was the critique of displacement of the people living in the Narmada Valley, many of whom were already marginalised *adivasi* communities[131]. During the stand-off at Ferkuva following the Jan Vikas Sangharsh *yatra* in January 1991, the Government of Gujarat published an "Advertiser's Supplement" in the widely read Indian journal *Economic and Political Weekly* with articles defending the SSP (EPW Advertiser's Supplement 1991). In this was also an advertisement from the SSNNL about rehabilitation of *adivasis* (See Picture 1).

The advertisement covers a whole page and has a drawing of a cloud of gods looking down on a happy, short-haired man in chequered shirt and tie, riding a scooter in a street with street lights. "My my, what went wrong?" ask the gods, "Look he is riding a scooter! And I have specifically written in his destiny that he will not drive a vehicle, not even cycle". The text answers the gods: a lifeline has crossed and changed the destiny of 22 year old Mohan, who used to be a landless labourer. He now has 5 acres of fertile land and can afford to drive a scooter. The lifeline is the Sardar Sarovar Project, frequently referred to in government publications as "the lifeline of Gujarat". This advertisement gives in a concise way the essence of the ideals of the SSP: the valuation of a modern life with scooters, ties and electricity over a traditional life. The advertisement does not say explicitly that Mohan is an *adivasi*, but this is implicit in the reference to PAPs, or Project Affected Persons. The Narmada Bachao Andolan had effectively constructed a public image of the displaced person as an *adivasi* by 1991.

[131] According to Narmada Control Authority numbers from 1985, around half the displaced persons from the SSP were Scheduled Tribes (Dhawan 1989).

Picture 1. Advertisement from the SSNNL in EPW (Jan 5-12, 1991): Adivasis defying fatalism thanks to the SSP.



"My my ! Why ? What went wrong ?
You mean what went right?"
No. Look he is riding a scooter ! And I have specifically written in his destiny that he will not drive a vehicle, not even cycle.
Well, it seems that a life-line has crossed his line of fortune.
Oh ! Am I surprised ! How come Mohan Naran, a 22-year-old oustee ehanged his destiny ? He is a landless labourer.
He was ! Now he is a proud owner of five acres of fertile plot.
But that is not just possible.
Well, you better rewrite destiny of project affected persons families.
Why ? Their life-style have also been changed like Mohan Naran ?
I would not be surprised ! They are being resettled under the most liberal rehabilitation policy of the Gujarat Government for the PAPs of the SSP
It means the life line of Gujarat is already changing life-style of PAPs ?
Yes. And you will be happy to lead that all fortune tellers or prophets of doom have been proved wrong.
Indeed. Mohan Naran inllustrates the potential of SSP. Already 1737 out of 3322 PAP families of Gujarat have found out this. Similarly 184 out of 202 PAP families of Maharashtra, who opted for resettling in Gujarat have bettered their life-style. Now 66 PAPs of MP have been resettled at a place near Gutal village, a just 30 kms from Barod. See for yourself and be satisfied No tall talk this.

Sardar Sarovar Yojna : A National Project

Sardar Sarovar Narmada Nigam

Block No: 12, First floor, Sardar Bhavan, New Sachivalaya, Gandhinagar.

CANON

The advertisement clearly illustrates the growing gap between the dam proponents' vision of 'development' and a new global awareness about indigenous peoples. By 1991, the violation of indigenous peoples' human rights was at the top of the global development agenda. Cultural rights and the protection of traditional livelihoods were important topics, and representatives of indigenous peoples travelled the world participating in international forums pleading against the destructions caused by modernisation and mainstream development. This new awareness celebrated cultural difference, and indigenous representatives were conscious about dressing in traditional costumes when campaigning. The artist Sting and Amazonian Indian chief Raoni with the pierced lip started campaigning for the rainforest and against dams in Brazil in 1989, and became important symbols of a new fight for justice for an entire generation. 1993 was the UN Year for Indigenous people. That the SSNNL chose to depict a modern adivasi wearing shirt and tie and riding a scooter shows that they were out of tune with the shift in global opinion and the redefinition of development and progress.

Although many of the SSP planners recognised the hardship that displacement would cause for the people of submerged Narmada Valley villages, they saw a temporary trauma of displacement as a necessary sacrifice for the greater common good. In the same Advertiser's Supplement to EPW, the dam builders[132] write that the PAPs of Sardar Sarovar have to "take a broader view of the Madhya Pradesh state itself and co-operate in speedy rehabilitation. By doing that, they will be improving their own lot and of course, with a little sacrifice by moving their habitats, they will serve many times more the people of the State" (EPW Advertiser's Supplement 1991:AS-17)

The SSP planners argue that the preservation of traditional *adivasi* livelihoods is only in the interest of mainstream caste Hindus "for our research museum and tourism interest" (Joshi 1991:63). The planners argue that given a generous R&R compensation, the *adivasi*s want to move and start a better life in the plains[133]. The goal of the planners is the "assimilation of PAFs[134] into the mainstream of the Society" (SSNNL 2000). Again we can see a particular

[132] Probably the SSNNL, as it was the Government of Gujarat and the Nigam which were under attack at this time.
[133] As described in Chapter 4, the Government of Gujarat and the SSP planners are not the only ones to say that there was a willingness to move among the Narmada Valley *adivasi*s. The NGOs Arch-Vahini and Oxfam also corroborate this version.
[134] Project Affected Families

idea of development as modernisation being expressed, and most clearly in the words of Gujarati sociologist Vidyut Joshi. India has modernised enormously after Independence, he says, without opposing the impact of "so-called 'western' culture". "On the contrary," he continues, "we have welcomed this change in the interest of progress, development or modernisation. This being so, why should any one oppose when tribal culture changes?" After all, he concludes, "a culture based on lower level of technology and quality of material life is bound to give way to a culture with superior technology and higher quality of material life. This is what we call 'development'" (Joshi 1991:63).

The SSP planners consulted academic expertise in their attempts at countering the campaign that presented the Government of Gujarat as insensitive to *adivasis* and argued that the SSP violated human rights. A six-point draft text for an advertisement was found in Sanat Mehta's archive with the following notes handwritten in the margin:

> "According to discussion with respected Professor to prepare a little advertisement on Human Rights in the Financial Times. Shri Vidyut Joshi has typed details and sent to the Professor for proof reading. The same advertisement is to be seen by Shri L.G.Varghese as the Professor has instructed."[135]

The text argues that indigenous people of the Narmada valley are not a separate nation as some indigenous peoples in the West are, and that they have never been put into reserves in India, and furthermore that tribals have been informed about the project and that the SSP has the most liberal rehabilitation policy in the third world. It ends with two sentences in capital letters: "WE ARE A DEMOCRATIC COUNTRY. HUMAN RIGHTS ARE ENSHRINED IN OUR CONSTITUTION."

Explaining planning processes

The Sardar Sarovar Project is by many labelled as a disaster, also by some of the planners and former government servants. Sanat Mehta told me: "I have the title of your thesis: "The Sardar Sarovar Project – A Broken Dream" (interview 2006).

[135] Handwritten on copy of the draft text circulated within the SSNNL. Translated from Gujarati by Manhar Patel.

Examples abound of large public physical planning projects that run into huge cost overruns, implementation delays, unforeseen technical problems, unintended negative secondary effects, and/or major gaps between stated objectives and actual results. Studies have shown that large civil construction projects consistently tend to be far more expensive than forecasted (Hall 1980; Flyvbjerg 2007)[136]. Large-scale canal irrigation projects also tend to be far more expensive than planned (WCD 2000). A central question is *why* government agencies repeatedly carry on with projects that are seen by many to be obvious failures, a waste of public money with negligent or even destructive consequences for human well-being. There are many attempts at explanations of this.

Interests or ideas?

One main line of difference in the proposed explanations is the degree to which decisions on "failed" projects are attributed to strategic calculation, vested interests, and hidden agendas. Human geographer and planner Bent Flyvbjerg goes a long way in reducing the explanation to this. He has studied mega-projects in different parts of the world, and argues that the difference between forecasts and actual costs, revenues and viability are too consistent and too one-sided to be explained primarily by the difficulty of predicting the future. Although his study has been of the transport sector, he has compared his results with cost and benefit data from other project types like power plants, dams, aerospace systems, and weapons systems, and he concludes that transport infrastructure "appears to be not a unique case of cost overrun but, instead, one example among many of a more general phenomenon, namely cost overrun in infrastructure policy and planning" (Flyvbjerg 2007:36). In case after case, he has seen that planners tend to think in a deterministic way, based on what he calls the "EGAP"-principle: "Everything Goes According to Plan", although experience should tell them that everything never does go according to plan. The reason for the lopsidedness in favour of public mega-projects, he argues, is a calculated action of "strategically misrepresenting" the costs and benefits in favour of the self-interests of numerous actors in the planning process who will benefit from the realisation of the project. "A project brings immediate benefit to many people," says Flyvbjerg in an interview in *Critical Planner* in 2004, benefits to "engineers and

[136] Hall (1980) found that large civil projects on average were 50% more expensive than estimated, whereas Flyvbjerg's more recent data for the transport infrastructure sector found cost overruns of 45% for rail projects, 34% for bridges and tunnels, and 20% for roads (Flyvbjerg 2007).

architects who develop the projects, planners who plan them, land owners, land developers, construction companies, lawyers, politicians who cut the ribbon" (Ehrenfeucht 2004:55). This, as we have seen in Chapter 5, has also been one of the most dominant explanations for the SSP.

However, I will argue that explanations of development projects and decision-making which focus only on vested interests and hidden agendas miss important aspects of such processes. One reason for this is that such explanations must assume a simple decision-making process with rational and calculating actors with enough power to enforce their will on, or even brainwash, their fellow citizens. As Hall shows in his classic work on "Great Planning Disasters", this assumption is not confirmed by case studies of bureaucratic or government decision-making (Hall 1980). In an attempt to develop a "pathology of the planning process" of such "Planning Disasters", Hall reviewed a large set of theories on decision-making in public planning (Hall 1980). He identifies three main groups of actors in a decision-making process, community, politicians and bureaucracy, and shows that they have different goals and different ways of working towards them[137]. Decision-making in public planning is not a process in which rational actors, with a single set of goals, a single set of options and a single set of consequences of alternatives calculate the costs versus the benefits of each alternative, and then choose the best one. Decision-making results from conflict, compromise, and confusion among individuals and institutions, and does not result in a single, clear and coherent answer on how to achieve one ultimate goal. In fact, the goal of "development" is not only one, singular goal, but, as we have seen comprises a variety of ends. In Chapter 2, I showed the complex set of intentions behind British colonial rulers' canal construction in India. We have seen that the SSP was a project that served several aims: nation building, poverty reduction, economic growth, and defence against Pakistan are among the explicitly stated aims of the project[138].

[137] Hall's analysis is of decision-making processes in democracies. Presumably, politicians would have different rationality in for example a communist one-party system and community groups would work differently in a dictatorship.

[138] Due to time constraints, I was not able to pursue the question of the variety of aims, interests, and visions among the various proponents of the SSP in detail. I am sure this is an issue worth further investigation, as suggested to me by Mahesh Rangarajan. In particular, the looking at aims of the planners versus the aims of the various *political* proponents of the project is an interesting issue. In this dissertation, I limit myself to the views of the planners and bureaucrats, although here too, there are blurred boundaries, as for instance the chairman of

There are also certain bureaucratic characteristics that lead to organisational inertia, systematic distortion of searches for alternative courses of action, and a pressure for quick solutions, - so-called "bureaucratic pathologies". Bureaucracies or organisations with a single or limited purpose have been shown to be particularly prone to the development of internal solidarity and ideology, argues Hall, "their members come to believe in their own objectives, so that divergence is increasingly seen as deviancy" (1980:210). Part of this complex rationality is certainly an amount of vested interest in securing ones own existence; as Hall points out, "[f]ew will have any interest in redefining the problems they are supposed to be attacking, in such a way as to open up the question of the justification of their own existence" (Hall 1980:243). However, self-interest can not be the only explanation for so-called planning disasters. For example, it fails to explain why the ideas for certain kinds of projects came up in the first place and why some things and not others are defined as problems at a certain point in time.

Hall emphasises the role of changing values in society for the creation of "planning disasters". The planning of physical projects has to deal with uncertainty about future conditions. Hall identifies three main spheres of uncertainty (Hall 1980). The first is uncertainty about what he calls the "relevant planning environment", i.e. the future demand for the deliverables of the project, or about future costs and benefits. The second is uncertainty about decisions in related decision areas, for example new environmental legislation or other events or processes which affect the demand for or utility of the project in question. The third uncertainty is about future value judgements. The hegemonic values in society change, and may both influence the direction of changes in the sphere of the relevant planning environment or the sphere of related decision area and the norms and criteria according to which a project is perceived as a success or failure by the public opinion (Hall 1980). Within a new zeitgeist, projects which made perfect sense at the planning stage during a different age may seem terribly misguided and destructive. In some sense, Hall argues, "shifts in values provide the final explanation of everything else" (1980:10). The material analysed in this chapter has shown how the fundamental shift in values and norms regarding the environment and rights of indigenous peoples created unforeseen problems for the SSP. From being an expression of common

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the SSNNL is a politician. Sanat Mehta is therefore an interesting person who transcends the boundary between electoral politics and bureaucracy.

sense, the project was now forcefully targeted as the greatest planned human and environmental disaster in India, and the planners had to defend their ideas of development.

Of course, a Marxist analysis will argue that hegemonic values in society can not be separated from the material basis of the same society. The ruling values will, according to Marxism, always represent the interests of the dominant class or classes in society, and provide one of the means through which dominant classes justify policies supporting their privileged position. However, as Ferguson points out, empirically

> "there is no easy congruence between the "objective interests" of the various parties involved and the stream of events which emerge." (Ferguson 1994:14)

It is impossible, he says, to understand actual events as a simple effect of identified interests (Ferguson 1994). Tania Li, in an analysis of rural development projects in Indonesia, makes the same argument, that if we only use the lens of vested interests to understand development interventions, a lot of what we want to explain remains obscure or unintelligible. Ferguson sees vested interests as only parts of a structural "anti-politics machine", "the visible part of a much larger mechanism through which structures are actually produced, reproduced, and transformed", interests are not "the logic that defines the train of events" (Ferguson 1994:276). Li takes as a starting point for her analysis of development projects in Indonesia that "the will to improve can be taken at its word" (Li 2007:9).

Rendering development technical

The problem with many development projects is not so much the intention, Li argues, but the practice of developmental governmentality which she in Focauldian terms defines as the intervention of trustees in the relationship between "men and things" with the aim of improving the well-being of populations. In the process of government, development practitioners, whether they represent the state or non-government institutions, identify problems and propose interventions to solve them. Common to most development interventions, argues Li, is the process of rendering these problems *technical*. They are seen as intelligible fields with identifiable boundaries which can be solved by a technical practice. Development experts "are trained to frame problems in technical terms", argues Li. They derive their expertise precisely from "their capacity to diagnose problems in ways that match the kinds of solution that fall within their repertoire" (Li 2007:7). A key feature of this

process, as was also shown by Ferguson in his argument about development as an "anti-politics machine" (Ferguson 1994), is that the problem is *rendered non-political*: Political-economic questions are excluded from the domain of development because they are not questions to which the development experts have any solutions. For example, says Li, development experts "focus more on the capacities of the poor than on the practices through which one social group impoverishes another" (Li 2007:7). We saw this tendency clearly in the SSP planners' readings of existing research literature on rural inequalities.

Indian technocratic planning

The SSP can be seen as an example of the particular approach to development planning adopted in Nehruvian India, as illustrated in Partha Chatterjee's analysis of the implications of the establishment of the Planning Commission in India (Chatterjee 2001). Chatterjee argues that a development ideology was "a constituent part of the self-definition of the post-colonial state" (Chatterjee 2001:277). As mentioned in Chapter 7, Chatterjee argues that the aims and means of development in Independent India were not seen by the ruling elite as political questions, but as universal truths (Chatterjee 1986). The Indian nationalist movement had developed a powerful economic critique of the British colonial rule, arguing with force that the British were draining India of its economic resources. The twin slogans of *swaraj* (self-rule) and *swadeshi* (self-reliance) were the rallying cries around which the nationalist movement gathered, with the argument that the British had to quit India in order for India to develop.

However, the leaders of the Congress nationalist movement did not agree on which model of *swadeshi* to follow. Gandhi was deeply sceptical of industrialisation and modernisation arguing that it was industrialisation itself, rather than the inability to industrialise which was the root cause of Indian poverty. Until the 1940s, the Congress had espoused this anti-industrial rhetoric for mass mobilisation. But in the new national state, this "archaic ideological baggage had to be jettisoned" (Chatterjee 2001:274). As mentioned earlier, Nehru disagreed profoundly with Gandhi on industrialisation, and regarded Gandhi's position as unscientific and utopian. His position was that India had to catch up with the industrialisation process that had started more than a century earlier in the West. The Gandhians in the nationalist movement had suggested in the 1930s that the Congress took responsibility for the

regulation and restriction of the growth of modern industries in India. This was the direct cause for the establishment in 1937 of a National Planning Committee through which the leftist in the Congress hoped to end the "nagging ideological debate" on industrialisation (Chatterjee 2001:273). After Independence this Committee re-emerged as the Planning Commission.

This, argues Chatterjee, is an interesting example of a modality of political power which constitutes itself as an institution outside the political process itself. Development planning was constituted as a domain of experts whose activity was to technically evaluate alternative policies and determine choices on scientific grounds. Nehru himself, writing in 1944-5, found the experiences of the Planning Committee as "particularly soothing and gratifying" and a pleasant contrast to the "squabbles and conflicts of politics" (quoted in Chatterjee 2001:274). Chatterjee sums up the Indian government's approach to development policy as bureaucratic function outside the normal processes of representative politics. Planning was "the domain of the rational determination and pursuit" of universal goals, "a bureaucratic function, to be operated at a level above the particular interests of civil society, and institutionalized as such as a domain of policy-making outside the normal processes of representative politics and of execution through a developmental administration" (Chatterjee 2001:279).

The rational determination and pursuit of universal goals require a self-deception, argues Chatterjee, the self-deception that it is possible to fully know everything about your objects of planning:

> "It must *know* the physical resources whose allocation is to be planned, it must *know* the economic agents who act upon these resources, *know* their needs, capacities, and propensities, *know* what constitutes the signals according to which they act, *know* how they respond to those signals." (Chatterjee 2001:281)

Such omniscience is impossible, and the technological approach to the pursuance of development ignores that the state is also "a site in which the subjects of power in society interact, ally and contend with one another in the political process" (2001:282). While Indian development planning was constituted as a field elevated above the particular interests in

society, the planning authorities themselves "are objects for a configuration of power in which others are subjects" (2001:282)[139].

While technocratic expert planners attempt to secure adequate information and produce a "general result in which everybody would be better off", they leave behind

> "an unestimated residue, which works imperceptibly and often perversely to upset the implementation of plans. This residue, as the irreducible, negative and ever-present 'beyond' of planning, is what we may call, in its most general sense, politics." (Chatterjee 2001:282).

The Sardar Sarovar Project is an illuminating example of the relationship between this particular development ideology and the workings of 'politics'. Like Nehru attempted to elevate the noble act of development planning from the interference of political squabbles, Alagh insisted that the SSP planning should be redeemed from interference from party politics. The Narmada Planning Group was a technocratic institution that surveyed every nook and cranny of the objects of its development plan, but conveniently ignored the social processes which produce poverty at the local level. And the implementation of the Sardar Sarovar Project Plan has been hindered by one political factor after the other, from the international politics of the environmental and human rights movement, to the electoral politics of Gujarat.

Role of science

As discussed above, Flyvbjerg observed that planners tend to express belief in an "Everything Goes According to Plan"-principle. As the analysis of the SSP planning process shows, the SSP planners are excellent examples of this attitude. Whereas Flyvbjerg suggested that the persistence of this belief should be explained in terms of vested interests, there are other explanations too. For the particular case of water management, Chapman (2002) suggests that

[139] By the term 'technocratic', I refer to these underlying aims of arriving at optimal solutions through the use of experts, scientists and engineers who possess expert knowledge and the ability to devise solutions to problems by using it uninfluenced by particularistic, selfish interests. I use the term "technocratic" as a characterisation of the planning approach of the SSP, and do not see it as more derogatory than "bureaucratic". Although undoubtedly it is to some extent reductionist, as are all labels. The term is also used in a positive or neutral way by others, for example by Bardhan (1998:73) who argues that there is a need to insulate economic policymaking from politics and that the Planning Commission is a "semi-insulated technocratic institution" whose influence unfortunately is rapidly declining; and Sanat Mehta who said in a seminar that the success of the SSP depend on the collective performance of "technocrats, administrators and democrat, i.e. politicians" (WALMI 1994:2).

the intellectual climate of each era is an explanatory factor, and with the intellectual climate, the contemporary developments in science and technology. Much of the late 19th and early 20th century was dominated by an *engineering* approach, that is, of the technological and scientific developments that enabled practical men (and a few women) to device new practical solutions to previous problems. I described in Chapter 2 how British colonial hydraulic engineering is the source of inspiration and technological expertise for the dam-building of the 20th century. British canal construction was based on a scientific approach of deterministic command and control in government interventions (Gilmartin 1998). The British irrigation engineers conceived of the environment as a mathematically modelled system, Gilmartin writes. This modelling "conveyed to the concept of the 'environment' an increasingly 'scientific' definition as a bounded and knowable system" (Gilmartin 1998:212). The mathematic models were tools for understanding and controlling the complex geo-hydrological system, in order to improve human control over the reliability and productivity of agriculture and thus increase the well-being of the population. However, Gilmartin emphasises the link between technology and rule: the mathematical models and hydrological engineering were also tools which enhanced the control of the colonial powers over the colonised populations (Gilmartin 1998).

For a planner of physical infrastructure, uncertainties should be eliminated to the maximum possible degree, and many planners seem reluctant to admit that unintended consequences and unforeseen problems may dramatically alter the impacts of their schemes. The SSP planners extended the engineering approach into the social sphere. (As we shall see in Part 3, the implementing engineers of the SSNNL today call this task *social engineering*, and complain that it is beyond their capacities.) Time series data of socio-economic aspects of rural production systems were by 1980 available for analysis and econometric modelling, methods which were at the frontier of social planning at this time, and part of a mathemitisation of economics which, as argued by (McCloskey 1983), gives the analyses a gloss of scientific certainty. This provided the SSP planners with an instrument for designing the optimal water conveyance and distribution system. Their approach is clearly, as I have shown in this chapter, rendering the development process technical and non-political, to use Li's vocabulary. There is a visible pride in this achievement in much of the writings of the planners, as in these words by Y.K. Alagh:

> "This is the first project in India in which modern, economic, econometric and social science techniques were used to design the engineering configuration of some of the important structures of the Project and conversely, very detailed technical information was used to work out economic choices and outcomes." (Alagh 1991a:12)

This pride leads us to another factor worth mentioning, the factor of academic and professional curiosity, pride, and prestige. Not only are development experts, from whatever profession or field of expertise, prone to define problems so they fit the solutions within their repertoire, they are also likely to be particularly intrigued by the repertoire of solutions offered by their field of expertise, and to want to refine and develop it further, whether it is to extend econometric modelling into the field of human behaviour or solve a complicated technical problem in canal irrigation. Whether the motivations for problem solving are driven by altruism or egoism is impossible to decide.

Summary

This chapter has shown how the NPG was established as an expert group outside or above the conflicts between political parties in the Legislative Assembly of Gujarat, with direct access to and communication with both the Chief Minister and the leader of the opposition, and it described its 'scientific' planning approach, with the plethora of studies identifying and documenting every possible aspect of the object of development: the natural, human and economic aspects of the command area of the canals, data on which could now be analysed with help of the most sophisticated econometric models. The account of the planning process has also shown how the planners were receptive of new trends and techniques that fitted into the needs of their project. In the early years of planning, by incorporating the promising new computer technology in the water management, and in the early 1990s by enthusiastically embracing the new local-level Participatory Irrigation Management model.

While it seems justified to agree with Lakdawala of the Planning Commission that the SSP was the "most discussed and best studied multi-river valley project in India", the perspective of the planners had certain important blind spots. While the planners repeatedly acknowledge the physical constraints of delivering water to all the needy people, a conspicuous silence surrounds the political and social constraints to the same. Most importantly, they never mention unequal land ownership as a constraint to poverty reduction and neither do they focus on the landless labourers, but rather emphasise how irrigation will increase the productivity of

even small landholdings. Although some of the studies commissioned by the NPG as well as other research on rural society and development had emphasised that there are structural processes which hinder benefits of agricultural modernisation and growth from trickling down to the poorest, these issues are neglected by the planners. They did not actively engage in the polarisation debate which had been running in the pages of academic journals for several years, but relied on the analytical approach and arguments of one side in the debate which held that irrigation and agricultural modernisation was surely reducing poverty.

Both Y.K. Alagh and Sanat Mehta used the term "dream" when describing the SSP: the dream of dependable irrigation water to every command-area farmer at the time of need, ensured by a semi-automatic, computerized delivery system. It is from their description of the technological innovations and detailed planning of the project I have borrowed the first half of the title of this dissertation. I see these dreams as genuine expressions of an approach to development that dominated the intellectual climate and the development agenda in the decades after Indian Independence. The visions of the planners can – as Tania Li argues for development in general – be taken at its face value, their will to improve is genuine. However, the contents of the concepts of "development" and "improvement" are not timeless, and the SSP illustrates well how changing hegemonic norms and values have impacts on our judgments of development projects.

In Gujarat of the early 1980s, when the Narmada Planning Group started working, the damming and diverting of the Narmada River seemed a commonsensical development project. All political parties were in favour of it, indeed shifting Governments had been arguing the case of Gujarat in the inter-state disputes for more than twenty years, and the broad public opinion and the media was largely in favour. Critical voices in the early years of planning mainly worried about the lack of attention on and information to the displaced, and the lack of a proper resettlement and rehabilitation scheme. However, the SSP planners did not expect the opposition to really threaten the project, and did not participate in public debates around dams before the unexpected strength of the Narmada Bachao Andolan became apparent around 1990. In the 1990s, the planners were forced to defend the project on the terms of the critics, and their texts reveal how the concept of "development" had been redefined: the older hegemonic development concerns of nation-building, modernisation, economic growth, and national food self-sufficiency were challenged by the concerns of the

critics of mainstream development: the rights of indigenous peoples, the environment, local communities, and the poor.

Part Three.
Implementation and the politics beyond planning

Chatterjee (2001) claims that the implementation of plans is bound to imperceptibly and perversely be upset by politics – the "negative and ever-present 'beyond' of planning". We have seen how the SSP planners firmly believe in the excellence of their planning exercise. The optimal allocation of water was carefully designed using the most sophisticated econometric models and the best data available. The aim was to get the maximum social returns to the water for Gujarat as a whole, within the recognizable limits set by available technology and the physical landscape and topography. We have further seen how, within the technical domain of planning, there is little evidence of an awareness of social and political constraints to project implementation. Part 3 of the dissertation will turn to the implementation process of the Sardar Sarovar Project through an exploration of the arrival of SSP canals, Narmada water and SSP management policies in the beneficiary area of the project.

India has on paper and in law prohibited untouchability and caste-based discrimination, redistributed land, imposed strict pollution controls, and provided social safety nets for the poor, to mention only a few examples. In reality, scheduled castes are frequently prevented from sharing the village well, large landowners cultivate land above the land-ceiling laws, untreated effluents flow unchecked into water courses, and the social safety nets fail to prevent widespread poverty and destitution. Many observers conclude that the problem of Indian development lies not in the lack of good plans and policies, but in the failure to implement them, and India is therefore frequently called a failed developmental state (Herring 1999). Myrdal famously called India a 'soft state' in his 1968 work "Asian Drama"; that is, a state insufficiently autonomous from the particularistic and powerful interests in society, leading to several characteristic features: general lack of social discipline, deficiencies in law observance and enforcement, lack of rule obedience in public bureaucracies, collusion of public officials with powerful persons or groups that resist public controls and policy implementation, and widespread corruption (Myrdal 1968).

Explanations of implementation failure

From the analyses of policy and plan implementation in India, we can discern three main factors in the explanation of its failure: 1) corruption, 2) the (lack of) capacity of the bureaucracy to efficiently implement policies, and 3) the state's embeddedness in society and

the power held by dominant social groups over the state's policies. While Indian bureaucracy in general is said to be corrupt, the *irrigation* bureaucracies are notoriously known for systematic and ingrained corruption, more specifically for the extortion of bribes from farmers in the allocation of water and from contractors for allocating contracts for construction and repair work. Indeed, it is only in the case of canal irrigation that a "corruption *system"* has been meticulously researched and documented: in Robert Wade's field research in a South Indian canal irrigation system through the 1970s (Wade 1982; 1985). His research showed that the corrupt behaviour of field-level and high-level officials is linked in a system where the bribes collected from farmers and contractors is channelled up through the bureaucracy as it is used to buy transfers to more profitable postings in other parts of the Irrigation Department. Wade's argument is that this administrative corruption is in turn linked to political corruption in a democratic system where votes can or must be bought from the electorate and the candidate has to raise the money for this on his/her own. In the first article, Wade shows how this system leads to poor-quality construction of canals, neglect of repair and maintenance, and unpredictable and unfair allocation of water among the water users (Wade 1982).

Wade specifies that the model of systematic corruption is not a complete description, and that he does *not* imply that all officials are actively engaged in it. However, his evidence is powerful, and many use his study to support claims about the widespread systemic corruption in the Indian state. The claim that irrigation officials are notoriously corrupt has in fact reached a status of truth, to the extent that no evidence is needed for claiming it, even in academic literature (for example in Wood 2007). But there are researchers who question the pervasiveness of corruption in Indian bureaucracy. They point out that although the media is ripe with stories of bribes and corruption, little additional documentation has emerged of systematic corruption in the Indian bureaucracies since Wade's seminal contribution (Banik 2001; Mollinga and Bolding 2004b). Contradicting popular perception, Mollinga and Bolding (2004b) argue that they find a considerable level of commitment to 'good performance' in irrigation bureaucracies, a potential that should be tapped for improved public service provision. They have, furthermore, not found evidence of systematic corruption of the kind described by Wade (Mollinga 2003; Mollinga and Bolding 2004b). Mollinga's study confirms that contractors have to pay an illicit commission to get a public contract, but does not find

that corruption in the form of bribes from farmers to irrigation department officials is an important factor in water distribution (Mollinga 2003).

Banik (2001) similarly argues that Wade's systemic corruption model presupposes connivance of nearly the entire agency involved, and he finds it simply unlikely and quite at odds with his experience from interacting with personnel on state pollution control boards and district administrations that such lack of integrity exists among all state employees. These authors find the corruption thesis too simplistic and in need of further research and analysis. This leads to the second explanatory factor: bureaucratic (in)capacity and (in)efficiency.

Harriss-White (2004) argues that corruption is only the tip of the iceberg when it comes to the drain on state financial resources in India, the way most people encounter and discuss the local state. But the more important reasons for state failure are tax evasion, fraud and an inefficient bureaucracy[140]. On tax evasion, she writes:

> "But tax evasion is the much more important state and social failure. The evasion of tax is not only a matter of accumulative greed, it is also the most obvious sign of a distinctive conception of accountability and morality that focuses on close kin and immediate locality, and excludes the generation and redistribution of resources through the State to society as a whole." (Harriss-White 2004:100)

Part of the reasons for bureaucratic inefficiency is that the bureaucracy is burdened with too many tasks and built-in disincentives to innovation and performance. Frequent personnel transfers are among the disincentives to bureaucratic performance, as they reduce the efficiency of governance and demoralise public servants who never know how long they will last in their current position (Banik 2001; Harriss-White 2004). Transfers are unpredictable and as much motivated by private or political considerations as they are based on transparent criteria of performance, and therefore reduce rather than enhance performance in policy implementation (Banik 2001). Herring (1999) argues that identifiable "bureaucratic pathologies" hamper the implementation of state policies: rigidity from routinisation, hierarchical norms that induce conservatism and risk avoidance and extreme arrogance.

The third explanatory factor is the lack of state autonomy from the various social forces and dominant classes in society. The literature on this political economy of India is vast and old (a

[140] The loss to public finances from tax evasion is estimated to be about 20 times higher than corrupt leakages (Harriss-White 2004).

few of the more recent famous examples are Bardhan 1998; Rudolph and Rudolph 1998; Harriss-White 2004; Frankel 2005). What these political-economy perspectives have in common is an understanding of economy and society as an arena where "accumulating classes are able to exploit others and to 'induce other classes to accept as their interests the requirements for continued capital accumulation'" (Harriss-White 2004:1). Bardhan (1998) argued that the Indian state is controlled by three dominant propertied classes: the industrial bourgeoisie, the rich farmers (defined as those owning more than 10 acres of land), and the professionals (civil, military, and white-collar). Pressures from these and other demand groups have "seriously interfered with the accumulation and management of functions of the public economy" (1998:39). This loose and heterogeneous dominant-class coalition has been busy with "anarchical grabbing of public resources" and has thus fostered a patron-client regime which "tends to choke off efficient management and utilization of capital in the public sector" (1998:70-71). India's policies and the fate of their implementation is a result of the fights and bargains between these three dominant classes. Bardhan argues that the main problem in policy implementation in India is "to insulate economic management from political processes of distributive demands, rent-seeking and patronage disbursement", an insulation which is difficult to maintain in "a polyglot and heterogeneous and fragmented society like India" (1998:72). One of many examples of the diminished insulation of the state from political processes of particularistic demands, is the "rapid decline of what used to be a semi-insulated technocratic institution like the Planning Commission over the last two decades [i.e. since the mid-sixties]," according to Bardhan (1998:73).

Other scholars emphasise the influence of the *intermediate* classes on Indian politics, rather than the rich elite. Harriss-White (2004) revives an older theoretical contribution by Kalecki and Jha[141] on the intermediate classes, and identifies these as small landowners, rich and middle peasants, merchants of rural and semi-rural townships, small-scale manufacturers and retailers. These usually depend on family labour, and the struggle between capital and labour is therefore not a determining factor on interest formation. The influence of the intermediate classes works through their numerical strength, and although more dispersed than the public sector and big business, they have large influence in the rural areas and small towns, as

[141] Kalecki, M. 1972. *Essays on the Economic Growth of the Socialist and the Mixed Economy*, Unwin, London. Jha, P.S. 1980. *The Political Economy of Stagnation*. Oxford University Press, Delhi

"masters of the countryside" or as masters of "the India of the 88 percent"[142]. Lloyd and Susanne Rudolph (1998)[143] similarly emphasised the importance of numerical strength, and argued that a class of "bullock capitalists" had come to dominate the Indian state. Bullock capitalists are small and medium-sized farmers (holding from 2.5 to 12 acres) who, as suggested in the name, do not practice capital-intensive agriculture.

As described in Chapter 2, Scott (1998) seeks deeper, more systemic reasons for the failure in implementation in typical statist, "high-modernist" schemes like dam and canal projects. The "openly predatory practices" and the "familiar bureaucratic pathologies" of modern developmentalist states are fostered by a self-confident ideology of the supremacy of a scientific, technocratic expertise in mastering nature and society. Typically, such modernist schemes of both technical and social engineering fail because "local knowledge, practice, and context are considered irrelevant or at best an annoyance to be circumvented" (Scott 1998:201). Furthermore, they fail because they are met with resistance from civil society, that is, from local individuals and communities.

> "We must keep in mind not only the capacity of state simplifications to transform the world but also the capacity of the society to modify, subvert, block and even overturn the categories imposed upon it." (Scott 1998:49)

This topic is dealt with in more detail in Scott's earlier work, "Weapons of the weak", which describes how such resistance, subversion, and modification need not be collective action of a conscious, open, strategic kind. Rather, the relatively powerless groups practice types of so-called 'everyday resistance', like foot-dragging, petty theft, false compliance and feigned ignorance. These are typically the weapons of the "peasantry" says Scott, and the effects may in the end be to "make an utter shambles of the policies dreamed up by their would-be superiors in the capital" (Scott 1985:xvii).

[142] Harriss-White argues that to understand how India works, we must understand the India were most people live, not the globalized, metropolitan cities: 88% of the Indian population lived in villages or small towns in 1991.
[143] First published in 1987.

9. Village stratification, water, and poverty

This chapter will present the two case villages of this dissertation: Krushigam in the SSP command area and Motugam outside the command area but bordering the Narmada Main Canal. Using data from household surveys of the two villages, it will look at the composition of the population in the villages, internal stratification, access to and ownership of productive resources (mainly land and irrigation), and poverty. As the main aim of the SSP has been to alleviate rural poverty and create employment, the entry point to the chapter is the question of how and to what extent irrigation reduces poverty. Krushigam and Motugam are very differently endowed with resources, also water resources, and a comparison of the two is therefore useful for a discussion of the relationship between resource endowment and poverty.

Does irrigation trickle down?

The poverty-reducing effect of irrigation is a much-debated topic. To a large extent, the topic is part of the broader debate about the benefits of the Green Revolution and agricultural modernisation in general. In brief, there are two main positions in the debate, the first arguing that irrigation will reduce poverty through a "trickle-down" process by doubling or tripling the productivity of one unit of land. This will increase the income of cultivators, and hence stimulate rural economies, reduce food prices, and increase employment opportunities for the rural poor. Examples of these arguments can be found in Datt and Ravallion (1998) and Mellor (2000). Several studies from Green-Revolution areas in India show that poverty levels have decreased over time or are lower in these areas than in areas with traditional, unirrigated agriculture, i.e. that there are smaller proportions of the local population below the poverty line (for example Khurana 1992; Bhalla 1995).

As detailed in Part 2 of the dissertation, the proponents of the Sardar Sarovar Project hold that the main aim of the project is to address the problems of rural poverty and unemployment in Gujarat. Canal irrigation from the SSP is expected to

> "help directly in raising the consumption standards of the poor people at least in the command. Large number of small and marginal cultivators would increase their income levels because of irrigation and increase of productivity. Almost all the agricultural labourers in the command area are below the poverty line at present. Large scale

> employment opportunities generated on the farms of their villages would help directly attacking the poverty in the command.*"* (Narmada Planning Group 1989:550)

Because a more productive agriculture needs more labourers, irrigation development will

> "push up the wage rates in agriculture which in turn affects the wage rates in other sectors. The Narmada project not only would offer employment opportunities but also set higher wage levels resulting in virtually elimination of poverty." (Narmada Planning Group 1989:11)

Against these more optimistic views on irrigation and agricultural modernisation, the more pessimistic school concludes that agricultural modernisation creates polarisation and increased inequalities. The larger landowners, with more capital and better access to credit and mechanized inputs, are able to take better advantage of the new opportunities for increased productivity whereas the small landowners will lag behind and frequently be pushed out of agriculture through indebtedness. Freebairn (1995) reviewed more than 300 studies of the Green Revolution from several countries, and found that about 80% of the studies concluded with increased interfarm and interregional inequalities as a consequence of the new technology. Several Indian studies arrive at the same conclusions. Beck (1995), for example, in a study of the impacts of the introduction of irrigation facilities in a West Bengal village, found that although all groups, except the absolute poorest, experienced absolute gain in living standards, the gains of the richer households were by far greater than those of the poorer, leading to increased inequalities. Patel (1982) found that irrigation concentrated incomes in the hands of the richer farmers and increased their power over the labourers and the poor farmers in the village and in the larger political landscape of South Gujarat. Bardhan analysed NSSO data on agricultural productivity growth and the poverty of agricultural labourers and found that other things being equal, "the probability of an agricultural labor household sliding below the poverty line seems to be higher if the household is located in a district where agricultural production has grown at a faster rate" (Bardhan 1984:195).

Those who are pessimistic about the poverty-reducing effects of irrigation emphasise the need for a deeper structural transformation of relations of power, presupposing a redistribution of the ownership of productive resources and in particular land (Lipton and Longhurst 1989). In between the poles of irrigation pessimists and irrigation optimists are voices who emphasise the possibility that new resources may alter pre-existing power structures, and reduce the dominance of local elites in unpredictable ways by opening up new production possibilities

for the poorer groups, for example Gidwani's study of the impacts of canal irrigation in a sub-district of Kheda district in Gujarat (Gidwani 2000; 2002).

What is the relationship between irrigation and poverty in Gujarat? Shah and Singh (2004) have recently analysed the relationship between poverty levels (as measured by percentage of population below the poverty line) and irrigation at the *taluka*-level of Gujarat (excluding predominantly urban *talukas*). The study does not distinguish between types of irrigation, whether water comes from canals, tubewells, check dams, or farm ponds, but measures irrigation through land use intensity which is largely determined by any kind of irrigation access in a dry climate. The regression analysis found that a ten percent increase in farm output facilitated by irrigation will reduce the proportion of households below the poverty line with one percent[144] (Shah and Singh 2004). Based on this, they estimate that the Sardar Sarovar Project, when completed and if its assumptions hold, will reduce the rural poverty level of Gujarat by 6.75 percent from the 1997 level of 43 percent, all other things being equal, and suggest that the "Narmada project may well be the biggest poverty reducer in Gujarat" (Shah and Singh 2003). However, they point out that as groundwater irrigation is more dispersed geographically than canal irrigation, the largest impacts of the SSP on productivity and poverty reduction may come through the recharge of groundwater rather than direct benefits from the canal water.

The average poverty incidence of the ten *talukas* with the *lowest* irrigation density was 55 percent, while the average poverty incidence in the ten *talukas* with the *highest* irrigation density was 31 percent. The state average is 43 percent of the population below the poverty line in rural *talukas*. In the ten most irrigated *taluka*s, the lowest poverty level is 13%. The key result of the study, they say, is that "whatever helps to raise the value of (...) average gross farm output/rural person in a *taluka* (...) helps to reduce the proportion of households BPL in that *taluka*" (Shah and Singh 2004:174). There are also other interventions that reduce poverty, and the authors include electrification, industrialisation, urbanisation, and investment in primary education in the model. However, the authors argue that the only variable "around which practical poverty reduction strategies can be built" is irrigation and increased farm

[144] The variable "Farm Income per Rural Person" is a function of land-man ratio, land use intensity and rainfall.

productivity. Because there are also other paths to reduced poverty, Shah and Singh conclude that:

> "[a]ll evidence from rural Gujarat seems to suggest that access to irrigation is a *sufficient* condition for poverty reduction though not a *necessary* one." (Shah and Singh 2004:171)

Leaving aside the other poverty-reducing interventions, I think the data from Gujarat on irrigation and poverty, and hence the conclusion regarding the sufficiency of irrigation, merits further consideration. Firstly, although the covariation between irrigation density and BPL-ratio is clear, no *taluka* has less than 13% of its population below the Indian poverty line at average per capita income of USD 0.69 per day (PPP adjusted) [145]. When more than 13% of the population remain absolutely poor, it seems clear that the benefits of irrigation do not trickle down to all sections of the rural population. Secondly, there are anomalies in the evidence: some highly irrigated *talukas* have very high BPL-ratios, in the range of 25% to 45% of the population, and especially so in the canal-irrigated South Gujarat. Shah and Singh suggest that this last phenomenon is due to "imported poverty", because the sugarcane economies in South Gujarat attract migrant labourers who gradually settle in irrigated districts:

> "This makes irrigated areas appear poorer than they would in the absence of such inflows, but a more inclusive analysis shows that some of the poverty found in irrigated areas is imported from surrounding dry areas." (Shah and Singh 2004:176)

However, to me the idea of "imported poverty" suggests that the poverty-reducing effects of irrigation do not trickle down to all the poor, and should further strengthen the conclusion that irrigation is *not* sufficient. Whether the labourers are the original labouring inhabitants of these regions or migrants from other areas, does not matter: Those who occupy the position as agricultural labourers in irrigated regions still live below the poverty line. It is well-known

[145] The Indian poverty line is a food-poverty line, based on the estimated command of minimum calorific requirements for sustaining life and health. Households meeting *any one* of the following criteria are *dis*qualified from BPL status: a) per capita income more than Rs 254 at 1997 prices (equivalent to 0.69$ per day with PPP adjustment); b) owning more than 2 acres of land, or classified as large farmers by the Drought Prone Area Programme or Desert Development Programme; c) having a *pukka* house (solid house of brick or equivalent material, unless constructed under the *Indira Awas Yojana*); d) any member of the household earning more than Rs 20,000/year or Rs 1700/month; e) ownership of either television, refrigerator, fan, motorcycle, scooter or an auto-rickshaw; and f) ownership of a tractor, power tiller, or thresher (Shah and Singh 2004). Notwithstanding the reliability problems of BPL statistics, the Indian poverty line is a very conservative poverty line, and can hardly be said to exaggerate the problems of poverty in India.

and well-documented that poor labourers migrate to irrigated areas to find employment in lean seasons. However, research has also shown that this does not necessarily mean that the agricultural economy in the irrigated regions has absorbed and provided secure livelihoods for all the local poor. Another process which is not accounted for in the study is the process that poor people may migrate out not only of poor, rain-fed villages, but also of irrigated, modernising areas, if the new economic dynamics of a more capital-intensive agriculture makes some livelihoods uneconomical.

Interestingly, two of the *talukas* which stand out as anomalies in Shah and Singh's study, Gandevi and Bardoli in Surat district, are the sites for Jan Breman's detailed field research on rural poverty and labour relations, research carried out over more than fifty years. His and other studies have shown that migrant labourers displace the local labour in the fields because migrants are more docile and insecure and therefore preferred by farmers (Patel 1982; Breman 2003; 2007). Breman concludes that rather than creating a process of agricultural economic growth which trickles down through the economy and benefits all groups to a smaller or larger extent, the agricultural transformation leads to a dual process of wealth creation at the top paralleled by pauperization at the bottom (Breman 2003). Breman finds no sign of trickle down to those "who own no other commodity than their labour power" (Breman 2003:46). This suggests a need for disaggregating not only the geographical distribution of poverty, but also the levels of poverty, and a need for a focus on the social processes and relations that structure and reproduce poverty at the village level.

Next, I will present the two villages where I did field research on the SSP. I will give a brief overview of complex local rural societies, with a focus on village social stratification, the general level of poverty, land distribution, village irrigation endowments, and irrigation distribution. Through a comparison of the two very different villages, I will address two issues: 1) the labour relations in agriculture as seen from the labourers and as seen from the farmers, and 2) to what extent can we relate the conditions of the poor in these villages to the supply of irrigation water?

Krushigam

Krushigam is a village of around 2000 inhabitants, located five kilometres from the Gulf of Khambhat in Jambusar *taluka*, Bharuch district. The *panchayat* village covers the main village and two hamlets. The distance to Jambusar town, the *taluka* headquarters, is around 16 kilometres, or about an hour's journey with the erratic supply of public transport available in this region, where state buses and licenced jeeps run at an unpredictable schedule. Krushigam is a poor village, with little commercial activity, not much more than a small shop at the central square selling staples like lightbulbs, matches, toothpaste, bisquits and the smallest bottles of soft-drinks. There are two primary schools in the panchayat village, one in Krushigam and another in the hamlet of Navagam. A new secondary and higher secondary school is located on the main road to Jambusar; about fifteen minutes drive from Krushigam. Power cuts are frequent, and even though quite a few houses in the richer neighbourhoods had installed private water taps connected to the village water tower which gets water in a pipeline from Jambusar, it was anybody's guess when these taps would actually carry water. The water supply depends on the simultaneous absence of power cuts in Krushigam and Jambusar (so water can be pumped all the way from the source), and this was a rare situation. The village ration shop was closed because the owner had sold goods on the black market, and poor villagers must now go to one of the neighbouring villages to get subsidised goods under the Public Distribution System. A travelling salesman passing through Krushigam with a bicycle-load of saris and plastic jewellery told me there was no point in stopping in Krushigam, as most people are too poor to buy anything.

The hamlets of Rangpura and Navagam are both located around 3 kilometres from Krushigam. Rangpura is a hamlet of 25 households of Koli Patel farmers 3-4 kilometres from Krushigam. Navagam is a resettlement colony of around 70 households of Narmada oustees from Jhabua district in Madhya Pradesh near the Gujarat border. They had come to Krushigam around 1994 because their original village was partially submerged by the Sardar Sarovar reservoir. Now, they were medium-sized farmers in Krushigam. All households owned 5 acres of land and two bullocks given by the Government of Gujarat as compensation for displacement. More than half of the households had taken an additional five to fifteen

acres for sharecropping[146]. They live in simple brick houses provided by the SSNNL. In Jhabua, they had seasonally migrated to South Gujarat as labourers in road construction during the summer season, and this continued from their new home in Jambusar. Like most of Krushigam's farmers, they were waiting for regular provision of Narmada water through a complete canal network.

Agriculture is by far the dominant economic activity in the area around Krushigam, but Bharuch is not among the agriculturally prosperous districts of Gujarat. In 2003, Bharuch district came out as the fifth most backward district in Gujarat, after the tribal districts Dangs, Dohad, Panchmahals and Valsad[147] (Planning Commission 2003). In a ranking exercise done in the early 1970s, Jambusar was ranked as the agriculturally "most backward" *taluka* of Gujarat (Pathak, Desai et al. 1974), and no major transformation had happened since then. In general, the villagers said they felt they lived in a backward and politically neglected region. The more informed farmers complained that the local MLA, who came from the neighbouring village, was a "useless fellow" who had failed to get into any influential committees or networks in Gandhinagar. The vast majority of Krushigam's inhabitants depend directly on agriculture for a living, 36% of households have their farm as the major source of income and 40% depend mostly on agricultural labour[148] (see Table 3).

Table 3. Main income source of household, Krushigam, % (n)

Own farm	36
Agricultural labour	40
Unskilled job (cleaner in railway, sweeper, peon, guard, etc)	7
Minor private business (small shopkeeper, transport of goods with Tempo, etc)	7
Skilled job (teacher, contractor, supervisor in juvenile prison, etc)	6
Cattle/milk	5
Total	101 (104)

(Source: household survey 2004)

[146] Distribution of operational holdings of Navagam were as follows: 43% of 5 acres, 21 % of 10 acres, and 36% between 11 and 19 acres (source: household survey).

[147] As this was a national ranking, it also showed that Bharuch was the 37th most backward of India's 447 districts. The index was based on SC/ST population, agricultural wages and agricultural productivity per agricultural worker (Planning Commission 2003).

[148] Farmers both big and small would call themselves "khedut" which means "farmer" in Gujarati, and agricultural labourers would call themselves "ket majoor" (land labourer) or only "majoor" (labourer).

Many landowning household can not support a family only from farming, and combine this with other income sources. Most small and medium farmers, cultivating below 10 acres, supplement their income with the sale of buffalo milk to the cooperative dairy, incomes from this generally is around 100-200 rupees per month. Some own a flourmill that they rent out to others, or work as agricultural labour, or from family members with jobs in a town. A few of the wealthier Rajput families also benefited from remittances from family members in Britain or the USA.

Because of the proximity to the sea, the groundwater in the area is largely saline and unsuitable for irrigation. Only four farmers in Krushigam had found sweet water when test drilling and used borewells. For the rest of the farmers, agriculture was the proverbial "gamble on the monsoon" until Narmada water became available from the Baroda Branch Canal in November 2002. The soils of the region are of the water-retentive "black cotton" type, and with a normal amount of rain, this supported the cultivation of cotton sold to the cotton gin in Kavi, and pulses (*tuwer*) and coarse cereals (the millets *jowar* and *bajri*) for consumption. Although the area is rain fed, the farmers have adopted the technologies of the Green Revolution: they use hybrid high-yielding seeds, fertilizer, and pesticides. Hybrid seeds are used for both the pea *tuwer* and for cotton, and many use genetically modified Bt-cotton seeds, although only the richest can afford the patented Monsanto-Bt. Most farmers use what they call *desi*-Bt-seeds at half the prize[149].

Krushigam's neighbourhoods are strictly structured by caste. The dominant caste is an upper Rajput caste with the surnames Sindha and Rana. Among them were the largest landowners and the most "entrepreneurial" farmers, i.e. the first to adopt new seeds and new agricultural technologies. They lived in the adjoining neighbourhoods Mota Vato and Nano Vato. The Brahmins lived in Brahmpur, lower Rajputs of OBC status lived in Jaria Faliu and Baria Faliu, the Harijan caste of Vankars lived in Vankarvas, the Bhangi Harijans (now only counting an elderly couple) in Bhangivas, poor Muslims in Diwanvas, and the agricultural

[149] At the time of field research, *desi*-Bt cost 800 rs/acre against Monsanto Bt at 1600 Rs per acre. The *desi*-Bt-technology was developed by Gujarat's own seed company Navbharat Seed. How they aquired the technology is unclear, but it is most likely an an offspring of Monsanto's patented seed which has spread illegally in Gujarat (Herring 2005).

labouring caste of Rathods lived in Old Halpativas or in the outskirts of the village in Navi Nagri.

Table 4. Caste-wise composition of population in Krushigam, % (n)

Sindha-Rana (high Rajput)	12
Koli Patel[150] (OBC Rajput)	29
Vankar (SC)	9
Bhilala (ST)	14
Rathod (ST)	24
Other upper castes (Brahmin and Muslim Motesian Garasia)	6
Other middle castes (Rabari and Tailor)	3
Other lower castes (Bhangi-Harijan and Muslim Diwan)	5
Total	102 (104)

(Source: household survey 2004, missing: 1)

Although Krushigam was generally known to be poor, this was not a homogeneous village of roughly equal smallholder peasants. The distribution of landownership was highly skewed, and several of the big landowners lived comfortable lives with modern amenities. The richest farmers were found within the dominant caste of Sindha-Ranas, and also a few Brahmins had large holdings. Households' landownership and operational holdings[151] are shown in Table 5. It shows that half of the small and marginal holdings and one third of the "semi-medium" size holdings are not cultivated by their owners. They have either been given to others for sharecropping or lost as a mortgage to a loan.

[150] The *sarpanch* grouped all the various sub-castes of Baria *falia*, Jaria *falia*, and Rangpura into the caste of Koli Patel. The people of these neighbourhoods gave different names for their castes: Gohil, Padiyar, Chauhan-Rajput, Darbar, Parmar Patel, Rajput, Rajput-Patiyar, Thakore, Makwana. There is an internal caste hierarchy also within this group of OBC rajputs, but to the other villagers of Krushigam they were seen as more or less the same caste with the same status.

[151] As official land statistics were not available in Krushigam, the distribution of holdings is based on my own survey. The operational holding is calculated as land owned plus land cultivated through sharecropping or as mortgage on loan given, minus land given to others for sharecropping or as mortgage for loan taken. The self-reported ownership of land is likely to underreport the size of the holding, as the respondents had a tendency to present themselves as poorer than they were. This is particularly true among the larger landholders, especially those owning more than the maximum holding allowed in the land-ceiling laws. However, it is safe to assume that the underreporting is done systematically in proportion to the actual holding (an owner of 12 acres may say 10, while an owner of 100 may say 80), and the pattern of land distribution will therefore give a meaningful picture of village inequality.

Table 5. Landownership and operational holdings, Krushigam, % (n).

	Landless	Marginal (<2.5 acres)	Small (2.5-4.9 acres)	Semi-middle (5-9.9 acres)	Middle (10-24.9 acres)	Big (>=25 acres)	Total
Owned holdings	36	13	12	21	14	5	101 (104)
Operational holdings	46	6	6	14	23	6	101 (104)

The categories are the official categories of the Agricultural Census of India. (Source: household survey 2004, missing:1)

Land ownership is to a large extent determined by caste. Average landholding size of the Sindha-Ranas is 24 acres, against 8 acres among the Koli Patels and Vankars, and 10 among the Bhilalas[152].

The rich farmers own tractors and threshers, but most farmers use bullocks. Larger farmers own more of the needed productive resources than do smaller farmers: Two thirds of medium or large farmers (operational holding above five acres) in Krushigam village and Rangpura own bullocks, against one third of small or marginal farmers. In Navagam, all households have two bullocks as this was part of the compensation package from the Government of Gujarat. Farmers without bullocks rent bullocks from others when needed, often in exchange for their own labour.

Motugam

Motugam is a large village of around 5000 inhabitants who live in Motugam village itself or one of three small hamlets, Pita Falia One, Pita Falia Two and Indira Colony. It is located a couple of kilometres off the Interstate Highway between Ahmedabad and Indore, in Godhra *taluka*, Panchmahals district. The Narmada Main Canal runs along the fields of Motugam farmers and crosses the Kundh River north of the village. Motugam is very different from Krushigam. Its economy is visibly stronger and more diversified, and it has numerous public and private services: A Primary Health Centre, a Police sub-station, a bank, one boys' primary school and one girls' primary school, a high-school, several STD/ISD phone booths, and a

[152] Source: household survey

few specialised shops selling cloth, herbal medicines, or jewellery. These services cater to the population of a larger region, as does the prominent Pranami Temple in the middle of the village. Public infrastructure works pretty well in Motugam, there are streetlights, *pukka* roads in the central village, and individual water taps to all houses (except in Harijanvas whose inhabitants had not afforded to pay the relatively small sum of 300 Rs required to secure a connection). Private wealth is of urban standards, there are cars parked in every street of the central village, and several enormous houses. Agriculture is not the only source of this wealth, the geology of Motugam supports numerous stone quarries, the owners of which make large profits. Because of the proximity to the Highway and the service economy for the transport business in the nearest market on the Highway, Motugam draws migrants from other parts of Gujarat, and there is a market for renting out houses or rooms in the village.

Motugam is furthermore an important village in the marriage circles (*gols)* of the Leva Patel caste of central Gujarat. It is one of the so-called "*chogam*" (six villages) at the top of the hierarchy of villages constituting one marriage circle, and can therefore demand higher dowries. The Leva Patels of the *chogam* are also known to be more conservative and obey caste and religious rules more strictly. Nowadays, the six villages at the top are expanded to fifteen villages, the so-called "*pandargam",* to expand the pool of suitable spouses. The social status and influence of Motugam makes it a politically important village. Political notabilities of Gujarat have visited the village on numerous occasions, such as school openings, temple jubilees, and Republic Day functions.

There are many different kinds of livelihoods in Motugam, and a relatively low share of the population that make a living from their own farm; around 30% of the population are employed in non-agricultural sectors. Around 20% make a living as landowning cultivators; whereas around 40% depend on labouring, divided in equal share between quarry labour and farm labour (see Table 6). Many families depend on both farm labour and quarry labour, choosing whatever employment option is available in the season. It is important to note that, as in Krushigam, many households have several income sources, combining agriculture with the sale of milk, or income from non-agricultural jobs or, if they are small farmers, labouring.

Table 6. Main source of income, households, Motugam and hamlets, %, (n)

	Motugam main village	Indira Colony[153]	Pita Falia One[154]	Pita Falia Two	Total, panchayat village
Own farm	26		23	12	22
Unskilled job/minor business[155]	18	59	15	19	21
Quarry labour	9	18	46	58	19
Farm labour	20	18	15	8	18
Skilled job/business[156]	18			4	13
Cattle/milk	3	6			3
Other	4				3
Sweeping/rag picking	3				2
Total	100 (137)	100 (17)	100 (13)	100 (26) (missing:1)	100 (n=193)

(Source: household survey, 2005)

Both quarries and farms provide insecure employment for the labourers, but farm labour is the least dependable, with seasonal variations and less formal security of employment. I will return to labour conditions in agriculture later.

We see that quarry labour sustains a majority of the inhabitants of the two hamlets "Pita Falia One" and "Pita Falia Two". Here, even households that own land get most of their income from labouring in quarries. Some landowning households have either given all their land for sharecropping to others or given it away as a mortgage for a loan that they have been unable to repay. This is mainly done by small or marginal landowners who then work as labourers instead. Table 7 shows that the number of de facto landless households increases and marginal

[153] Note the small sample size of Indira Colony which gives unreliable statistics for categories with few respondents. One respondent is 6 % of the sample. For Indira Colony, it is safe to draw the conclusion that around half the population has its main income from unskilled jobs, in this case labouring in road construction or the nearby papermill.

[154] See also footnote above. The small sample size inflates the proportions of answers of low frequency. 15% of Pita Falia One's population is only 2 households. For Pita Falia One, a reliable conclusion is that around half the population get most of their income from quarries.

[155] Unskilled job/minor business includes activites like construction work, peons, guards, small shopkeepers and teastall-owners.

[156] Skilled job/business includes activities like white-collar professions, ownership of quarries or big garages, or teaching.

holdings decrease, when we take into account such land transfers. A large majority of the operational holdings[157] in Motugam are small and marginal, as shown in Table 7.

Table 7. Land ownership and operational holdings, Motugam, % (n)

	Landless	Marginal (<2.5 acres)	Small (2.5-4.9 acres)	Semi-middle (5-9.9 acres)	Middle (10-24.9 acres)	Big (>=25 acres)	Total
Owned holding	43	35	6	7	6	3	100 (193) (missing:3)
Operational holding	53	29	5	6	6	2	101 (192) (missing: 4)

(Source: Household survey 2005)

Landholdings in the hamlets are smaller than in Motugam main village; most of the farmers in the hamlets own less than five acres. Small and marginal landowners are generally not able to survive only on farming their holding. In the Pita Falia One survey, all sample households owned 2 acres or less. As the following table shows, the mean size is around 1.3 acres in the two hamlets, against 5.5 in Motugam, and there is much larger inequality in holding size in Motugam than the hamlets[158].

People in Motugam belong to a variety of castes (see Table 8 below), and all these castes are present in Motugam main village. The hamlet of Indira Colony houses mostly Scheduled Castes and Scheduled Tribes eligible for the housing subsidy given under the *Indira Awas Yojna* which was used to construct Indira Colony. The other two hamlets are dominated by Barias[159]. My first guides in Motugam, all upper-caste, educated farmers and professionals,

[157] The operational holding is calculated as land owned plus land cultivated through sharecropping or as mortgage on loan given, minus land given to others for sharecropping or as mortgage for loan taken.

[158] Standard deviations in the hamlets are 0.6 and 2.1 against a standard deviation of 8.9 in Motugam main village.

[159] The caste data here is derived from the household survey carried out by me and my field assistants (interpreters and husband). We asked the respondents about caste and recorded their answers. In the Baria category, I have included the recorded castes Baria, Parmar, Khant, Solanki, Derola, Chauhan and Kshatriya, if supplementing information, surnames, and residence suggested that they belonged to the Baria caste. The pattern of surnames and castes supported this classification, as people of Solanki caste had the surnames Derola, Baria, Parmar and Solanki, and the Baria caste surnames were Khant, Parmar, Solanki and Baria. One person said he was of Baria caste, but had gotten himself recorded as "Parmar" to avail of reservation benefits, because Parmar is a well known SC surname. Some respondents explained that they were of Parmar caste and that this is "Baria Kshatriya" or "Baria darbar". The Barias claim Kshatriya origin, as do many other castes in a process of sanskritizaton and "caste climbing".

claimed that caste was irrelevant here. Neighbourhoods do not follow caste segregations, and all castes mix, they claimed. However, it soon became clear that "all" had a rather narrow definition. Castes were only mixed in the central village. In a circle around the centre were the neighbourhoods of the lower castes. OBC Barias live in Baria falia on the east side and *bahar falia* ("outside neighbourhood") on the west side of the village. To the south one finds Tirgarvas, Rohitvas, and Harijanvas, all inhabited by different Scheduled Castes: Tirgars, Chamars, and Bhangi-Harijans. Rabaris also live clustered in the outer parts of the village.

Table 8. Main castes of Motugam, % (n)

Brahmin	2
Patel	17
Vaniya	2
Thakor	8
Baria	45
SC/ST	10
Bhangi-Harijan	4
Other middle castes	6
Other lower castes	7
Total	101 (193)

(Source: household survey 2005)

The size of landholdings is highly skewed: the vast majority of farmers are small and marginal whereas a few farmers own large holdings. The farming castes are Patel, Thakor, and Baria, and the largest landowners are found among Patels and Thakors as can be seen from Table 9 below[160]. Tractors and other mechanised equipment are not commonly owned by Motugam cultivators, and the survey shows that most tractors are owned by Patel farmers. The largest group of cultivators, the Barias, generally do not have enough land to support the investment in tractors. Instead we see that around two thirds of all farmers have bullocks that they use for draught animals. Other farmers can rent the use of bullocks in exchange for their labour power.

[160] I regard the household survey to give reliable information on the relative distribution of landholdings among the different castes, even though I know it is likely that respondents, especially among the larger landowners, underestimated their holdings to me. See Chapter 6 on Methodology for a discussion of reliability and validity of the household survey.

Table 9. Mean size of landholding, cultivating castes, Motugam, acres[161]

Patel (n=32)		Thakor (n=15)		Baria (n=85)	
mean	*standard deviation*	mean	*standard deviation*	mean	*standard deviation*
8	*12*	6	*7*	1	*2*

(Source: household survey 2005)

Compared to Krushigam, Motugam is relatively well endowed with irrigation sources. According to panchayat statistics, there are 86 private irrigation wells in Motugam. Because of the geohydrological conditions of the area, all are open, dug wells, not deep tubewells. Most of the pumps are driven by electric power, the rest run on diesel. They are owned either by single farmers or shared between brothers. In the panchayat statistics, 31 wells were registered as dry, but it is not clear when this register was made. My household survey found 24 well owners in a 25% sample of all households, and only one dry well. It is likely that some of the wells recorded as "*not working"* by the panchayat had come into use again with the replenished groundwater level after Narmada. I was told by several farmers that this had happened.

Ownership of wells is related to caste and farm size. Whereas nearly half the Patel and Thakor landowners own a well, only 10 percent of Baria landowners have one (see Table 10).

Table 10. Well ownership among cultivating castes, Motugam, % (n)

	Cultivating castes			
	Patel (n=29)	Thakor (n=11)	Baria (n=59)	Total
Yes	45 (13)	46 (5)	10 (6)	24 (24)

Chi-square 15.749, p=0.000. (Source: household survey 2005)

Ownership of wells is related to the size of the holding. Very few marginal farmers own a well (5%), and the percentage of well owners increases with the landholding size (see Table

[161] The difference between Patel and Baria is statistically significant (p=0.05). Thakor landownership is more varied, and the difference between Thakor and Baria is not significant. Of the 15 sample households, 7 are landless or marginal farmers and 8 own between 5 and 20 acres.

11). Only 5% of marginal landowners have a well, whereas around 60% of medium and large landowners have private well(s).

Table 11. Well ownership according to landholding size, Motugam, % (n)

	Landholding				Total
	Marginal (<2.5 acres)	Small (2.5-4.9 acres)	Middle (5-9.9 acres)	Large (>10 acres)	
No well	96 (65)	67 (8)	43 (6)	40 (6)	78 (85)
Well	4 (3)	3 (4)	57 (8)	60 (9)	22 (24)
Total	100 (68)	100 (12)	100 (14)	100 (15)	100 (109)

Chi-square 35.834, p=0.000. (Source: household survey, 2005)

As described in Chapter 3, well digging requires a large investment and gives uncertain returns, and therefore necessitates a certain amount of capital to be able to handle the risk and access credit (Hardiman 1998). Ownership of a well today may therefore reflect past as much as present landholding size, because many, if not most, landholdings in Gujarat have been fragmented as ownership has been passed on to new generations.

The wells of Motugam farmers are concentrated in the fields of farmers from Motugam main village. The hamlets of Pita Falia Two and Pita Falia One have far fewer wells, only one well-owner in each village was registered in the sample survey of these villages, and in both cases the wells were owned by the leaders of the hamlets (referred to as the *sarpanch*es of Pita Falia Two and Pita Falia One respectively). Estimates based on the survey were confirmed by the *sarpanch* of Pita Falia One: There are four privately owned wells here, which are rented out to others when the owner is finished watering. In addition, four farmers have installed private pumps in the Kundh River. Farmers in Pita Falia Two have installed several private lift-irrigation pumps in Mahi River, an option not open to Pita Falia One farmers because of the location of fields.

Most landowners in the village do not have their own wells, and must rely on others' wells or canal or river for irrigation. Even some well-owners must sometimes and for some plots of land (which are usually spread out in the village fields) rely on other sources of irrigation. For electric engines, the supply of electric power is a limiting factor on irrigation capacity, as

electricity was only available 8 hours per day. The prices for water from the wells in Motugam vary with the power of the pump, and range from 30 to 75 Rs/hour. Taking water on credit is usually allowed, one can pay at the time of harvest. Sanctions are strong on those defaulting, if they do not pay, they will not get water next year.

As described earlier, most landowners, irrespective of caste, do not have their own, private water source, but have to rely on access to someone else's well, or on a commonly managed source. Access to sufficient water is a common challenge for farmers. Naturally, it is more difficult for farmers without wells, but even among well owners supply may be insufficient due to the location of some of their plots or the water level in the well: 13% of well owners reported to have received insufficient irrigation water the previous year against 40% of farmers without well[162].

The survey confirmed the rather obvious, that farmers with irrigation could grow more crops per year and grow more cash crops than could those depending on rain-fed farming. Motugam's location between two rivers, the Kundh and the Mahi, gave opportunities for lift irrigation from the rivers, but most importantly, there were several wells that could irrigate the land. Therefore, the cropping pattern was found to be quite varied. Important crops were cotton, tobacco, castor seed, wheat, corn, paddy, and mustard seeds; in addition farmers cultivated chillies, groundnut and staple food crops like the millets *jowar* and *bajri*. Many marginal farmers without irrigation only grew a single food crop for household consumption, whereas options for cash crops and double and triple cropping grew with access to irrigation water.

Agriculture and poverty in Krushigam and Motugam

Irrigation makes a clear difference to agricultural productivity. This is illustrated by the difference in crop production between Motugam and Krushigam before Narmada water was widely available in Krushigam. The agricultural production of Motugam was more diverse and more dispersed though the year, as many farmers had enough water for three growing seasons per year. Crops were sown between late June and February and harvested between September and May. Periods of peak labour need were therefore more spread through the

[162] Source: household survey, significant.

year. More than 40% of farmers with access to irrigation grow three crops per year, and 37% grow two crops per year. In Krushigam, irrigation had only been available for two years in 2004, and was not yet widespread. Around half of Krushigam cultivators used Narmada water in 2004, and most of these used it for an additional crop of winter wheat in parts of their land[163].

As discussed in the beginning of the chapter, one hypothesis holds that increased agricultural productivity reduces the level of poverty in a region. We can take Krushigam and Motugam as starting points for a discussion of this hypothesis. Both villages have similar proportions of the population below the poverty line, around 60% (see Table 12). (Real BPL-levels are likely to be slightly higher in Krushigam than in Motugam, as most of the 11% of households without ration card most likely qualified for BPL-status)

Table 12. Below Poverty Line households, % (n), Krushigam and Motugam

	BPL	APL	No card[164]	Total
Krushigam	64	25	11	100 (102, missing:3)
Motugam	61	32	7	100 (191, missing: 5)

(Source: household survey 2004 (Krushigam) and 2005 (Motugam))

However, BPL status is a coarse measure of poverty, and is likely to include some households who do not qualify for the status. To get a more nuanced picture of poverty levels, we can look at two other indicators of poverty: child mortality and food insecurity. According to these indicators, poverty is more severe in Krushigam than in Motugam. In Krushigam, the child mortality among agricultural labourers is significantly higher than among farmers: half of labouring families has lost one or more children before the age of five, against a quarter of

[163] There were signs of diversification in 2006, when a few farmers had started growing aubergines, and four farmers were in the process of applying for subsidized drip irrigation systems. All of these, needless to say, were large landowners.

[164] Households without ration card were generally poor households. They gave different reasons for not having a card, one had even mortgaged it for a loan, others had lost it. In Krushigam, 7 of the 11 sample households without ration card were landless, and one was a marginal landowner; three were medium or large farmers. In Motugam, 9 of the 14 sample households without card were landless, 4 were marginal landowners, and one was a semi-medium landowner.

farming families[165]. Child mortality among labourers of Motugam is also higher than among farmers, but the difference is not as large as in Krushigam and not statistically significant (see Table 13).

Table 13. Households where the respondent had lost one or more children below the age of 5, % (n) [166]

		Main income in household			
		Farming	**Labouring[167]**	**Other**	**Total**
Krushigam	Lost no children	76	51	56	62
	Lost one or more	24	49	44	38
	Total	100 (34)	100 (39)	100 (18)	100 (91)
Motugam	Lost no children	76	60	63	65
	Lost one or more	24	40	37	35
	Total	100 (41)	100 (58)	100 (71)	100 (170)

(Source: household survey, 2004 (Krushigam) and 2005 (Motugam))

In Krushigam, there were also more labouring families that had lost more than one child below five years: 25% of the labouring families had lost from two to eight children. The corresponding figures for farmers in Krushigam and both farmers and labourers in Motugam are 12%. Reasons for death were generally reported to be "disease": the child fell sick and died because they had no money for a doctor.

Another aspect of poverty is food insecurity. In the survey I asked whether all members of the household got two proper meals every day of the year. This is a commonly used indicator of food insecurity in Gujarat[168]. The responses revealed that food insecurity is more severe

[165] There is no significant difference between the number of children born to farmers and labourers.

[166] Some households were joint families with several married couples. In these cases, I recorded the child mortality experienced by the respondent, who was always an adult member of the household. If the respondent was unmarried or had never had children, the question was irrelevant, and these respondents were excluded from the sample.

[167] For Motugam, "labouring" includes both quarry and farm labour as main income source. There was no significant difference between these two categories in child mortality.

[168] The question leaves it open to the respondent to define what they see as a "proper meal", and the statistic will therefore be open to subjectively varying definitions of sufficient food. The respondents did not hesitate when asked this question, but would quickly answer yes or no. I see this as a sign that they had a clear idea of whether getting enough food for all the whole year was a problem or not. They would also indicate during which periods of the year they had problems getting "two proper meals". It is important to note that self-defined "two proper

among labourers than farmers in both Krushigam and Motugam, but more severe in Krushigam than in Motugam. Table 14 presents the percentages of food insecure households in Krushigam and Motugam.

Table 14. Food security[169] Krushigam and Motugam, % (n)

	Main income source	Not two meals for all	Always two meals for all	Total
Krushigam	Farming	3	97	100 (37)
	Labouring	48	52	100 (42)
	Other	4	96	100 (25)
Motugam	Farming	0	100	100 (42)
	Labouring	24	76	100 (71)
	Other	9	91	100 (77)

Krushigam: significant, p=0.000, Motugam: significant, p=0.001 (Source: Household survey 2004 (Krushigam) and 2005 (Motugam))

Whereas half the labouring households in Krushigam report that there are times during the year when there is not enough food for all household members, only one quarter of the labourers in Motugam said the same. The worst season for the labourers of Krushigam was the lean agricultural seasons of summer and monsoon. The results indicate that the more diverse agricultural production and the opportunities for labour work in quarries relieve the labouring poor from the most severe poverty. This may also translate into lower child mortality rates in Motugam than in Krushigam. The presence of a primary health centre in Motugam is also likely to give the poor better access to health care and thus reduce child mortality.

In both Krushigam and Motugam, poorer people and small landowners talked about themselves as "small people" and referred to the larger landowners as "big people". They were clear about the divide between small people and big people, and argued that the big people were the decision-makers on village matters and in any conflicts, and also the main beneficiaries of any government programmes. A comment from a marginal farmer of Baria

meals" does not mean that the family is *not* undernourished or malnourished, as the diet of most labourers seemed very poor, usually only *roti* and chilis, and very little vegetables. However, the Rathods also got proteins from eating rabbits and snakes.

[169] Answers to the survey question "Do all members of your household get two proper meals every day of the year?"

caste in Motugam is typical of the sentiments expressed by those who saw themselves as small people:

> "The Narmada water will benefit only the people inside [i.e. in the central village], the Patels. They have big farms near the canal and are big people so they get water first. We are small, so we get last." (Baria farmer, marginal unirrigated landholding, interview 2005)

The interconnectedness between caste, wealth, and power is clear in his statement: People of Patel *caste* have *big farms* and are therefore *powerful* ("big people"). The same perceptions were found among the "small people" of Krushigam.

The landless poor

Poverty in Krushigam is most severe among the landless labouring caste of Rathods. There are around one hundred households of Rathods in Krushigam, making them the second largest caste in the village as they constitute around one quarter of the village population. Their traditional occupation has always been agricultural labour for the landed families of the village, often tied to specific families as bonded labourers. The position as farm servant, or *chakar*, was in earlier times hereditary in the Rathod family and the tie was secured through debt bondage. The Rathodia caste is considered a sub-caste of the Dubla community of South Gujarat (Singh and Lal 2003), but I never heard the Dubla name used in Krushigam[170]. The other labouring community in Krushigam was the Muslim Diwans, around sixteen households.

Agricultural labour in Krushigam is no longer bonded in the way that it was earlier. However, the labourers did not necessarily see this as a form of liberation. Rather, the permanent positions as *chakar*, or farm servant, were few, and were thought to provide better security of income than daily labour which was highly seasonal and poorly paid. In the farm-servant position, we see remnants of the debt-bondage system, because one common way of obtaining such a position is through a loan. For major life cycle events like a marriage or even a funeral, a large sum of money is needed, sums unavailable to labouring families. They then borrow the money from landowners and repay through 1 to 3 years of unpaid farm servant work. For

[170] This is a quite derogatory term as it literally means "weaklings" (Patel 1982).

those hired as a farm servant on a paid basis, the wage is 12,000 Rs per year as well as the provision of clothes, medicines, and other necessities through the year.

The population of Motugam is differently composed, with other kinds of historically rooted labour relations. The poorest caste in Motugam was the Bhangi-Harijans, but they were rarely asked to provide agricultural labour. Instead, they make a living from a combination of rag picking and cleaning the farmers' cattle pens, at the rate of 20 Rs per buffalo per month. In addition, they receive food from the families in the streets where they work. In the evenings, they walk up the street and call "*Kawano apu chhe!* - Please give food", and the housewives wrap up a portion of the dinner and hand it to the Harijan. The Harijans told me the food is good. However, this relationship increases the dependence and decreases the bargaining power of the Harijans. Open resistance to injustice is hardly likely if it entails biting the hand that feeds you, a phrase that can be used quite literally in many villages of Gujarat. The biggest labouring caste of Motugam was the Barias, a caste that had traditionally lived as small and marginal farmers. Barias claim Kshatriya status, like the landlord caste of Thakors, and I was repeatedly told by Baria labourers and small landowners in Motugam how they used to be of the same status as the Thakors, but that the Thakors had acquired Baria land by lending them money against mortgaged land. Other labouring castes in Motugam were Scheduled Caste Chamars and Tirgars, some in combination with cultivation of small or marginal holdings.

The landless can not rely only on agricultural labour for their income, but must supplement it with other activities. This was particularly important in Krushigam, where no other industries existed but agriculture and where agricultural employment was more concentrated in a few peak seasons because it was rain fed. In Motugam, the quarries provided alternative employment in agricultural lean seasons, and the agricultural production and labour needs were more dispersed through the year. In Krushigam, the Rathods earned some money from fishing and hunting snakes and rabbits in the early monsoon, and collecting and selling firewood in the late monsoon or early winter. Other income sources are the brewing of country liquor and collection of wild honey. In March 2006, the Rathod neighbourhood in Krushigam was deserted because almost all the Rathods had left for the season to harvest wheat in an irrigated area south of Jambusar or to pick cotton in Saurashtra. The whole family went along for this work, and Rathod children were taken out of school in this season.

Labour relations

…as seen from the labourers

A striking feature of the agricultural labour conditions in both Krushigam and Motugam was the unanimous condemnation of what the labourers saw as the exploitative practices of the landed castes. "They take so much work from us, and they get all the profit," complained the labourers. The agricultural wage level in both Krushigam and Motugam was a meagre daily wage of Rs 25, half the government minimum-wage rate of 50 Rs. This provided the labourers with barely enough money to feed themselves and their family. The amount of twenty-five Rupees was seen as something close to an insult by the labourers in both villages, but they were in no bargaining position to object. "How can we live on twenty-five Rupees??" was the rhetorical question I was asked in almost all interviews and talks with the labourers, and "*Pachis rupiya!!* - Twentyfive Rupees!!" would quickly come up as the reason for most of their troubles. Many also criticised the fact that the wage was the same pitiful 25 Rs even if yields or prices were very good, as exemplified in this statement from a Rathod couple:

> "We do all the farming work, and the farmer gets all the benefit. Even if the yield is better, they always pay twentyfive rupees. Four *lakh* income or twelve *lakh* income, labour charge is always the same." (interview, Krushigam, 2004)

One Chamar labourer and marginal farmer in Motugam believed that the Government-decided minimum wage was 40 Rs, and called the labour relations exploitation:

> "The rich exploit the poor. They earn five hundred rupees per "*maund*" [20 kg] and only give us twenty-five Rupees. Who can help us? The government has decided the wage of forty rupees per day, but nobody is giving us." (interview; Motugam, 2005)

I asked whether they could demand higher wages, but he denied the possibility:

> "How? If they want fifteen labourers, there are thirty who are ready to work. We have to go, how else will we eat? The government minimum wage is forty Rupees. We thought of going to strike, but then we only had food for two days, so we had to go to work."

Interestingly, the Krushigam labourers said that in other villages of the Jambusar area, even the nearest village, wages were higher. In neighbouring Begam, the daily wage was 40 Rs,

and in Kavi a little further away, farmers pay 50 Rs per day[171]. The labourers of Krushigam blamed their fellow villagers for being particularly insensitive to their condition, unlike the farmers of Begam or Kavi. However, there are other reasons for the higher wage level in the other villages. One is the shortage of local labour, for example in Begam with only around 20 Rathod households, many of whom have some land on their own. Another reason for higher pay is the distance to the fields and the longer working days. When hired to work in other villages, the labourers in Krushigam are picked up in the morning by a vehicle and brought back in the evening.

If work is available at better wage rates in other villages, why do the Rathods and Diwans choose to work for the low-paying Krushigam farmers? To this, many Rathods answered that Krushigam is home, it is their native place and where they belong, so they "have to return to Krushigam". But the answer is also partly found in the precarious conditions of the poor, and the "Faustian bargain" entailed in life at the lowest income level: in pursuance of immediately needed security, the poor must enter and put up with relationships and structures that displace the possibilities of sustained improvement of livelihoods in a longer term (Wood 2003). Examples of such Faustian bargains abound in the lives of the Indian poor, from depriving your children of education because of labour migration to acquiring debilitating debts to pay seemingly irrational dowries to ensure informal security for the family through a good marriage. Apart from the fact that there is not continuous agricultural work available in *any* village of Jambusar throughout the year, the Rathods and Diwans depend on the farmers of Motugam for larger loans for major life cycle events like marriages and in the case of medical emergencies. With no other collateral than their labour power, formal credit is unavailable to them. The marriage of a Rathod daughter, for instance, costs around Rs 10,000. As explained to me by one Rathod man:

> "We can go to Kavi and Begam for daily work, but if we need five or ten thousand Rs for a wedding or for medical expenses, we must ask for a loan in Krushigam. This is where we have some relations of trust." (interview, Krushigam, 2006).

The labourers both in Krushigam and in Motugam also complained that increased mechanisation of agricultural operations over the last decade had reduced the availability of

[171] The wage rate of 40 Rs in Begam was confirmed by farmers in Begam. For Kavi wage rate I only have information from Krushigam labourers.

work for them. Larger farmers have mechanised both the harvesting and threshing operations thus reducing the need for labour.

…and from the farmers' perspectives

The perspectives of the farmers were quite different. Firstly, the farmers of both Motugam and Krushigam claimed in general to pay a more generous daily wage of at least 40 Rs. Secondly, they complained about the difficulty of finding sufficient and reliable labour in the time of need. In contrast to the labourers' stories of lack of work, the farmers said that there was plenty of work for those who wanted to work, and that in peak seasons, labour was in shortage. However, the labourers were regarded as highly unreliable, sometimes refusing to come to work when offered employment, and frequently not showing up for work even when they had promised to come. When asked about the compliance to Government minimum-wage standards, the farmers dismissed these regulations as incompatible with agricultural work, because the labourers never, in their view, work eight hours per day. A group of farmers in Krushigam described a typical workday to me to explain why they pay less than minimum wage. Labourers show up at the farmer's house around 7:30 in the morning, drink tea and reach the fields around 8-8:30. Here, they sit down and smoke a *bidi* before they start working around 9. At 10:30 they will rest, often for half an hour or more, and the pattern continues through the day, with frequent and long breaks. When labourers went home from the field around 4:30 or 5 PM, they had been away from home for nine or ten hours, but the farmers only regarded the six hours or so of efficient work as worthy of pay. In addition, I was told, the labourers steal vegetables during harvest, fodder for their goats, and firewood from the farm, and farmers could not afford a higher wage.

Agriculture is a notoriously unpredictable business, with high fluctuations in crop prices and high variability in weather conditions. "If agriculture were profitable," said one of the largest farmers in Krushigam sitting in his newly-constructed large bungalow, "everybody would have houses like mine". When asked about the costs of input, the large farmers of Krushigam were clear that the costs of pesticides by far exceeded the costs of labour and the costs of fuel for irrigation pumps was only slightly less than the cost of labour. The farmers' reports of paying a daily wage of at least Rs 40 for labourers were given during my household survey when I talked to farmers individually. However, a wage level of 20 or 25 rupees was also

confirmed by some farmers. In a group interview in Krushigam with 10 to 12 Sindha/Rana farmers, a picture which confirmed the labourers' reports of 25 Rs per day emerged, at least for three months per year, as seen in the summary of the information given in Table 15.

Table 15. Wage levels for main labour tasks of different seasons, Krushigam

Task for cotton	Months, Gujarati calendar	Wage
Weeding	*Ashadh-Shravan* (July-September)	10-40 rs per line, depending on length of line. On average 25 rs/day
Spraying pesticides	*Bhadarvo-Asho* (September-November)	30 rs/day
Harvesting cotton	*Karthik-Mha* (November-March)	2 rs/kg
Irrigation	*Asho-Magsar* (October-January)	50 rs/day + *bidis* and tea, because this work is around the clock, day and night.
Preparation of land	*Vaisakh* (May/June)	25 rs/day + food, tea and *bidis*, because this is heavy work.

(Source: group interview, Sindha/Rana farmers 2004)

In Motugam, individual interviews with some landowners confirmed the low wage. One small Patel farmer (owning 1 acre, sharecropping 2 more) said the poor are trapped in a vicious circle:

> "Because they don't have land, they don't have money, then they don't send children to school, the children become labourers and the chain goes on. They get a very low wage, 20 rupees, so how can they save?" (interview, Motugam, 2005)

A Patel widow in Motugam who had given the family's 6 acres of land for sharecropping, had similar concerns for the poor:

> "The big landlords exploit the poor landless. And they are afraid that they [the landless] will become their equals. Then who will work for them? The prices of commodities should go down, because they only earn 20 rupees, so how can they eat? Wages will not go up, so prices should go down. If they earned 40-50 rupees, they could save, but they only earn 20 rupees." (interview, Motugam, 2005)

The farmers in both villages complained about the highly fluctuating and unpredictable prices for their produce. This year, cotton was sold at 1800 Rs/quintal whereas last year it was sold at 2700 Rs/quintal. When yields are good, the prices drop, thereby reducing the benefits of a bumper crop. At the same time, all input costs are rising, they complained, - all except labour costs. Labour seems to be the only input costs over which the farmers exercise control. In this regime of highly unpredictable incomes they attempt to increase the chance of earning a profit

by squeezing labour costs. Some farmers seemed genuinely concerned about the poverty level of the labourers, but perceived themselves to be powerless to exceed the established wage rate of the village. Smaller farmers, Barias in Motugam and Vankars in Krushigam, said the wage rate was decided by the big farmers in the village, and they had to follow the same rate, as explained for example by one Vankar farmer and retired teacher in Krushigam:

> "The big farmers decide the wage. For cotton harvest it is 2 rs per kg. If we give 3 rs per kg, they will protest. If rich farmers change it to 2, 5 or 3 rupees, we have to follow." (interview, Krushigam, 2004)

Because the local labourers are regarded as highly unreliable, farmers often preferred to use migrant labourers which they regarded as more hard-working and reliable. In Krushigam, the resettled Bhilala Narmada-oustees in Navagam enjoyed this status, and were paid 40 rs per day. In Motugam, too, *tribal* labourers were preferred. Some of the biggest farmers of Motugam employed tribal Bhils from the neighbouring *taluka* Dahod as semi-permanent farm servants. The biggest landowner in the village employed 15 Bhil farm servants, and had built houses for them in his fields. He explained his choice:

> "The local labourers are lazy and don't work hard. Even if you pay, they don't work hard. The Bhils are hard working and do good job. I have used them since last eight-ten years. The farms are six kilometres away and the locals won't live there. We are eight or ten farmers who do this, employ Bhils and build houses for them in the farms. Other farmers have small land and it is not affordable to them." (interview, Motugam, 2005)

The wage for this is 12,000 Rs annually to the main earner in the Bhil household, and 30 Rs per day of work to the other family members. In addition, he provides grain, clothes and "other facilities" to the servants. However, this is not a permanent job for the Bhils: He changes them every three years, he informed me, because they become lazy with time.

Whose reality counts?

The wage level of agricultural labourers in Krushigam and Motugam is very low compared to labouring wages in other sectors of Gujarat, agricultural wages in other regions of Gujarat, and compared to all-India official statistics of agricultural wages. The usual daily wage of unskilled labour in for example road and house construction during the time of my field research was 50 rupees, and, as we have seen, agricultural labour was paid more in other areas of Gujarat. In the case of Jambusar, wage levels even varied between neighbouring villages. An analysis of agricultural wage trends for selected districts in all Indian states show

inconclusive results for Gujarat (Chavan and Bedamatta 2006). The Ministry of Food and Agriculture data on Agricultural Wages in India show that in the decade from 1990 to 2000, the district in India with the *lowest* agricultural wage level for men was found in Gujarat (Sankheda village of Baroda district) with an average real wage rate between 5 and 10 rupees per day (deflated against the price of grains to the level of 1986-87). At the same time, the Rural Labour Enquiry of the NSSO[172] for 2004 found that agricultural labourers in most states, including Gujarat, were paid *more* than the minimum wage. The inconsistencies are explained by the different data collection procedures of the two data sets, and the large reliability problems involved in arriving at estimates of average wage levels with the large seasonal and geographical variability of wage levels (Chavan and Bedamatta 2006). This should caution us against drawing strong conclusions about the causal relationships between agricultural productivity level and poverty level based on macro-analysis of large datasets.

The farmers describe lazy, unreliable labourers who refuse to work even if they need it and work is available and decently paid. The labourers describe callous employers, exploitative wage levels and lack of work in long periods of the year. The stories may seem incompatible. Breman, who documented similar attitudes in his research villages in South Gujarat, argues that the landowners' complaints about the labourers' low productivity and work-shy behaviour can hardly be denied (Breman 2007). The labourers do have an unpredictable tendency to stay at home and refuse to go to work, and most of them are not actively searching for work outside agriculture. As pointed out by Breman, there is a physical explanation to the labourers' seemingly counter-productive behaviour. Their harsh living conditions through several generations have gradually sapped the physical strength and weakened the mental resilience of the landless and permanent malnutrition makes them susceptible to all kinds of diseases (Breman 2007). To this, I may add my own observations of widespread alcoholism in the labourers' neighbourhoods. For example, it was not uncommon to meet drunken men and women even before noon in the Baria hamlet and Harijan neighbourhood of Motugam.

[172] National Sample Survey Organisation

However, the labourers' open resentment to being exploited by the farmers and the frequency with which I heard statements like "We do the work, and the farmer takes all the profits"[173] suggest that the labourers are engaged also in a kind of conscious but covert resistance against an unjust labour regime. The labourers' laziness, unreliability, and petty thieving from the crops and fields may easily be interpreted as hidden protests against an unjust social system, through the so-called "weapons of the weak" (Scott 1985). The farmers respond to this behaviour by paying less than minimum wage, and thus contributes to a process of pauperization which makes the labour regime a vicious circle of low wages and foot dragging (Breman 2007). "In this way, both parties hold each other in a vicious circle of ill-will," argues Breman, "but it is clear who has the worst of the arrangement" (Breman 2007:436). Breman concludes in terms of strategies and intentions: "The attitude of the village elite to the landless households appears to be based on a strategy intended to prolong the latter's marginality and hamper their advancement" (Breman 2007:421).

What difference does water make for poverty?

My own field research from Krushigam and Motugam can be supplemented with Breman's research from the canal-irrigated sugarcane economies of South Gujarat for a brief consideration of the effects of irrigation on the poverty of the agricultural labourers, which constitute the largest poor class in rural Gujarat. These three areas represent different agro-ecological landscapes: Krushigam was in 2004 still a largely rain-fed area (2004 was the first season in which many farmers had started irrigating), Motugam is fairly well-endowed with irrigation sources in semi-arid Central Gujarat, and Breman's research is from the sub-humid district of Surat with perennial canal irrigation from the Ukai-Kakrapar canal (Breman 2007).

Labour needs in agriculture in Breman's areas were fairly evenly spread out through the year, but most farmers had mechanized agricultural operations and there was therefore less need for labourers. Most agricultural operations in sugarcane cultivation were sub-contracted to sugar cooperatives employing migrant labourers. Farmers of other water-intensive crops, like *chiku* orchards, also prefer migrant labourers over the local labouring Halpati caste. Breman finds little improvement in the lives of the labouring poor in rural Surat district, and relates this to a

[173] The phrase in Gujarati was: "*Ame kam kariye ane badhu e le"*

readily available reserve army of labour which can travel from all parts of India to labour at what is barely a subsistence level (Breman 2007).

My comparison of the poverty levels of Krushigam and Motugam show that the presence of irrigation water and more productive agriculture has no discernible effect on the wage level for agricultural labour. However, a more diversified agricultural cycle in combination with employment in quarries in Motugam seemed to have reduced the severity of poverty for most labourers. Food insecurity and child mortality was less severe in Motugam than in Krushigam. It is also likely that the access to a primary health centre in Motugam village has contributed to less child mortality among the labouring poor.

These three villages, of course, do not constitute a probability sample of Gujarati villages, and I do not know whether they are representative of the agriculture and poverty in the agro-ecological regions of the state. However, the similarities between the labourer's conditions in the three very different economies, supported by different water endowments, suggest that the benefits of irrigation do not trickle easily down through the economy, particularly not to the bottom. On the other hand, higher production per unit of land will increase the income also of the owners of smaller holdings, and even though it is less than the increased income of larger landowners, it should lead to reduced poverty. As the Narmada water at the time of field research was new in Krushigam, and the canal network was not finished, it was too early for a detailed analysis of its impact on poverty levels. However, between 2004 and 2006, I have registered a few indications of the immediate impacts. I saw or heard nothing that indicated improved living conditions for the *labourers* due to Narmada water. In March 2006, the entire labourers' colony had travelled to other regions for work, taking the children out of school. Some of the richest farmers, on the other hand, were investing in drip irrigation and had bought new tractors, and some small farmers with Narmada water reported that their *rabi* yields were much larger than previously.

Summary

Despite the differences between Krushigam and Motugam, in population size, centrality of location, and endowment of resources, they are similar in terms of their caste heterogeneity and prevalence of poverty. However, the water endowments of Motugam, from wells, rivers

and even the Narmada Main Canal, made agriculture more diversified and productive than it was in Krushigam. This seems to have alleviated the most severe forms of poverty in Motugam, as agricultural labourers can find work throughout most of the year. Additionally and importantly, in Motugam, alternative income sources for labourers are available thanks to a more diversified economy than in Krushigam. However, despite these differences, the relations between labourers and farmers are strikingly similar in both villages, and the wage level in agriculture is equally low in both villages. Agriculture is an unpredictable business with highly fluctuating output prices and steadily rising input prices, and the farmers squeeze the labour costs. They regard the labourers as lazy and unreliable and many prefer to hire more hardworking tribal labourers if possible. The labour relations in Krushigam and Motugam seem to be similar to what Breman has described for South Gujarat, where the relationship is locked in a vicious circle of ill-will. These conditions suggest that the trickle-down effect from irrigation is curtailed and does not by itself reach the bottom to the poorest villagers, the landless labourers with nothing to sell but their labour power.

Furthermore, the chapter has demonstrated the need to be cautious about simplistic notions of either a village or farmers as one local "community". The population of Krushigam and Motugam is highly stratified, and all strata of the population are aware of their position in the village hierarchy. "Small people" cannot overrule decisions by "big people", and the relationship between labourers and cultivators is often strained and at times antagonistic. Gujarat's villages are not the relatively homogeneous villages of "medium-sized peasants" that they are presented as in the plans for the Sardar Sarovar Project, and this has bearings on the effects of the Narmada water in the villages, and also on the implementation of the planned model of participatory irrigation management.

10. The Troublesome Beneficiaries

In August 2002, Gujarati newspapers announced with great fanfare that Narmada water was finally flowing in the SSP canal network and could be used for irrigation by water-starved farmers in Gujarat. Upon arriving in Gujarat in March 2004, a year and a half later, I soon realised that this was a partial truth. Yes, water was flowing in the larger canals, but significant parts of the canal network were not even constructed, much less carrying water to the fields. The conditions in Krushigam, one of the villages I chose as a case, were typical: Water was flowing in the big Baroda Branch Canal, which ran through the village fields, but at the next levels, both Distributary and Minor canals were dry, while the Subminor canals were not even constructed. The farmers told me that they expected the Subminors to be complete before the upcoming monsoon, i.e. in the next 3-4 months. While waiting for this, some farmers were irrigating with Narmada water through diesel-driven pumps or siphons if the location of their land permitted it. I returned to Krushigam six months later to begin detailed field research on access to Narmada water, only to find the same situation: Still no Subminor canals, but the contractors for Subminor construction were about to start construction.

The government expects the Narmada water to initiate a great rural transformation in Gujarat, a process of agricultural productivity increase which will set in motion economic growth and thus alleviate poverty and unemployment. However, when I asked about the difference that Narmada water made in Krushigam and neighbouring villages in 2004 and early 2005, there were more stories about the damage done to fields and crops by floods of Narmada water due to breaches in the canal network, than stories about increased productivity and opportunities for new cultivars and double cropping. Yet, it was clear that those with the financial means and appropriate location already had access to Narmada water for irrigation, even without a canal network, through their own or rented pumps and pipes. Rather than participating in and facilitating the completion of a life-saving project intended to "quench the thirst of water-starved farmers" (according to government rhetoric), the farmers were obstructing the construction process and violating the management policies.

At this point it is useful to revisit the strand of arguments against large dam and canal-irrigation schemes which argues that an important effect of – and the "unspoken logic" (Scott

1998) behind – such projects were the consolidation of the power of central institutions and the diminished autonomy of cultivating communities. As described in Chapter 2, Wittfogel (1957), Worster (1985), and McCully (2001) all agree that government bureaucracies rule hydraulic societies at the expense of local communities and local self-reliance: large-scale canal irrigation concentrates power and expertise in the state and bureaucracy, making the cultivators and local communities the helpless followers of a process beyond their control and agency.

Through this chapter, I will show that the power balance between the bureaucracy and the local communities in canal irrigation systems are not necessarily one of state domination over a de-skilled peasantry. I will describe the reception of the Sardar Sarovar Project and the Narmada water in the project's command area through a case study of one command-area village in Bharuch District in Gujarat and brief visits to other command-area villages. In contrast to the narrative of disempowerment, the experiences in Krushigam and other parts of the command area gave me a picture of farmers' active resistance to, obstruction of, and disinterest in the government rules and regulations rather than a de-skilled, disempowered, subservient peasantry. But before we turn to the field realities, it is necessary to present the official policy of the SSP.

The official SSP irrigation policy

The Sardar Sarovar Project is a huge government undertaking. Only the physical construction of the project is an enormous task: It involves the construction of 66,000 kilometres of lined canals and an associated drainage system. The Subminor canals are the smallest lined canals in the network (see Figure 4). They take off from the Minor canals which each serve a Village Service Area of 200-500 hectares.

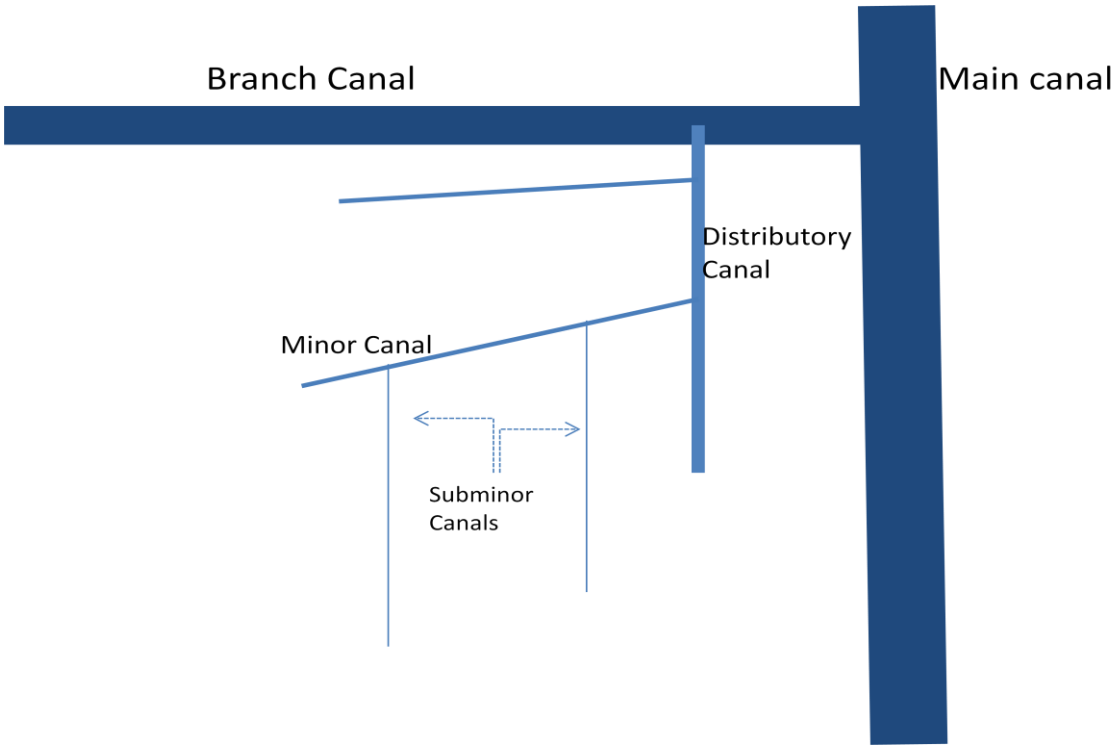


Figure 4. Sketch of canal network.

One VSA follows a drainage boundary and can therefore cut across several villages. The water management within each Village Service Area (VSA) will be the collective responsibility of the farmers organised in a Water Users' Association. With a command area of 1.8 million hectares, the SSNNL have to establish more than 5000 Village Service Areas and the same number of Water Users' Associations[174]. This too is an enormous challenge. Each VSA is divided into *chaks* of about 40 hectares, and these are again divided into sub-chaks of 5-8 hectares which will be served by Subminor canals. From the Subminors, each farmer has to dig earthen field channels to let the water into his field. In 2004, only construction of the Subminor canals remained in Phase 1 of the SSP command area, i.e. the part falling in central Gujarat, south of the Mahi aqueduct[175].

The Water Users' Associations (WUAs) have the formal responsibility for repair and maintenance of the Subminor canals. Each WUA will be run by a committee of 11 members

[174] I do not know the exact number of VSAs in the command area, but estimated this roughly by dividing 1.8 million on the size of the VSA, 200-400 ha. If average VSA size is 300, there are 6000 VSAs in the command area.
[175] See Map 5, page 118, or Map 6, page 314.

representing different parts of the VSA. The WUA committee has to report larger damages to the SSNNL. The Nigam emphasises the need for representation of tail-end farmers on the committee. In addition, on the committee of each WUA, there are also government members: one SSNNL section officer (who will be a qualified engineer), one Agricultural Department field officer (who will provide advice on cropping guidelines, fertilizer etc), and one member from the Cooperative Department. Each of these officials will be a member of three to five WUAs each. The WUA will further be sub-divided into committees: a water-distribution committee, an accounting committee, a construction committee, and a grievance committee. In this way, it is planned that experts and farmers will meet and exchange knowledge, and a democratic structure will be in place for solving conflicts through deliberations. The WUA will ensure that irrigation water is shared on rotation, and in principle the tail-enders should get water first (Chief Engineer Baroda Branch Canal, interview, 15.10.2004).

"The beauty of the WUA is that all the farmers are members and even the smallest farmers will be present at the meetings," said D.B.Vyas, Executive Engineer for Command Area Development in the entire SSP (interview, 03.03.2005). He argued that the main reason why a trickle-down mechanism may not function properly, and why government programs may not reach their intended beneficiaries, is lack of awareness (interview, 03.03.2005). The WUA is the government's way of trying to mitigate this. It is a mechanism to prevent elite capture of a public resource:

> "It is true; the situation [of exploitation by the local elites] may arise. The only thing is that with the cooperative society, and raised awareness among the members about their rights and entitlements, people can prevent this. And the SSNNL is part and parcel of the management. If we find that elites run the show, we can intervene. And at least 51% of the farmers should be enrolled as members and 25% should be from the tail ends. These mechanisms are installed to prevent the elite capture. The major part is through awareness and participation. A good example is the milk cooperatives in Gujarat. Before that, the local elites ruled the milk market. If you look at the evolution, initially the powerful persons have the rule, but slowly it changes. We organise village meetings and spearhead groups so the smallest farmer knows his rights. They all get a share certificate, a physical document certifying each person's right to water. This is how you build the capacity of the smallest man." (Vyas, interview, 27.3.06).

There is also a technical reason for delegating management responsibilities to water users' organisations. Volumetric pricing is an incentive for water conservation and a way of controlling water use and preventing overuse of water. But it is not feasible to measure water use at the level of the individual farmer in a canal system with millions of small landowners.

Water can only be measured and stopped at the level of distributory outlet, i.e. minor-canal head. Below this level, the SSNNL has no technical possibility for stopping water or measuring its use (Vyas, interview, 27.3.2005). The task of water distribution, measurement, and sanction of violations therefore has to be delegated to groups of farmers.

Collection of water charges is also the responsibility of the Water Users' Association. The exact fee was increased year-by-year, from around 150 rs per hectare per watering in 2003 to around 250 rs/ha/watering in 2006[176]. Seven percent of the collected fees are kept by the WUA for administration costs and the rest is paid to the Nigam.

For many years, the SSNNL tried to convince the newly established Water Users' Associations in the SSP command area of the benefits of taking charge of the construction of Subminor canals themselves. This was a reversal of previous policy advice from irrigation planners in Gujarat. The Perspective Plan for Gujarat for the decade from 1974 to 1984 (Government of Gujarat 1972) argues that the then prevalent practice of leaving field channel construction to the farmers is one main reason for the failure to utilise the full irrigation potential of canal schemes, as "it is generally observed that they [the farmers] find it difficult to unite, co-operate and execute this work themselves" (Government of Gujarat 1972:131). The plan recommends that field channel construction should be included in the project cost estimates and the construction should be the responsibility of the government. In the SSP master plan, *Planning for Prosperity*, it was planned that the government should provide field channels in the entire command area:

> "The field channels will be aligned and laid out on a scientific basis and to engineering standards by the CAD [Command Area Development Staff]." (Narmada Planning Group 1989:500)

By 1994, there is evidence of the changing position of the government engineers and planners with regards to this. Not only the construction of field channels to individual fields, but also the Subminor Canal construction is suggested left to the farmers. At first, this seems to have been seen as an option. Advisor to the NPG D.T Buch, for example, in a paper on water

[176] In March 2004, the Chairman of the WUA of Krushigam told me the charge was 214 rs/hectare per watering, and had been 157 rs/ha/watering the previous year. In October 2004, the Chief Engineer of Baroda Branch Canal said it was 245 rs/ha/watering, and in March 2006, the field engineer in Jambusar said it was 249 rs/ha/watering. In Vahelal, the NGO DSC said it was 284 rs/ha/watering in 2006.

management in the SSP, wrote: "Farmers' organisations will also have an option of doing minor networks themselves if they choose" (Buch 1994:9-10). However, the government not only gave the farmers the option, but actively tried to convince them to take charge of Subminor construction, a persuasion process that took several years and was largely futile. By delegating the Subminor construction to the intended beneficiaries of the project, they hoped to achieve a greater sense of ownership of the canal system among the farmers and higher quality in the construction (R. Orvi, Director of Command Area Development, interview 24.03.2004, and Chaudhry, Chief Engineer Chaudhry, Baroda Branch Canal, interview, 15.10.2004). Apparently, the planners and bureaucrats thought that the farmers would be much more interested in doing this construction work than they turned out to be. It is generally argued in the irrigation-management-transfer literature that by taking charge of canal construction, the farmers can bypass the corrupt nexus between contractors and irrigation-department officials, and thus ensure high-quality canals (personal communication, Professor Schenck-Sandbergen, May 2009). The suggestion, however, was not received well by most SSP beneficiaries, and farmers in most of the command area refused to take on the responsibility. In July/August 2003, the attempt to delegate the responsibility of all Subminor-canal construction to WUAs was abandoned, and the first tenders were issued (R. Orvi, Director of Command Area Development, interview 24.03.2004, and Chaudhry, Chief Engineer Chaudhry, Baroda Branch Canal, interview, 15.10.2004). But the process had already delayed the completion of the canal network by several years.

Interim policy

Rotational water delivery and full WUA management of the canal network is impossible in a stage were there are no Subminor canals and only erratic water supply in Distributaries and Minors. In the absence of a complete canal network, the Nigam had therefore, shortly after releasing water in the network for the first time, announced an interim irrigation policy which allowed farmers to pump water from the branch canals if they paid water charges for it. The interim policy is that "the beneficiaries can pump water for irrigation on their own until the entire distribution system and structure is complete". However, they are not allowed to take water without a prior application to the Nigam sent through the Water Users Association (See

Box 1). The Nigam also notes "that the water fee should be collected in advance from the irrigation cooperative societies"[177]. During the interim irrigation stage, before the completion of the canal network, volumetric pricing was not possible, and water rates were charged per hectare.

Box 1. SSNNL Interim Irrigation Policy

1. Water will only be supplied for the command area and not outside it.
2. In areas with minor canals complete, water will only be supplied through irrigation cooperative societies, and not on individual basis.
3. If canal work is not over, and there is no other option, the farmer will be allowed to pump his own water directly from the canal.
4. Farmers will be free to decide which crops to grow, but permission for water intensive crops will not be granted
5. Water will not be released for summer crop irrigation.
6. There shall be wide discussions regarding the availability of water quantity, cropping pattern and distribution of water at executive engineer level with the irrigation cooperative societies.
7. Farmers in the command area who want to take water, will first have to apply in a prescribed application form to the irrigation society and the form should contain survey number, area of land and details of the crops. After granting the permission, farmers will be eligible to take water and a passbook containing all the details provided by farmer will be given to him.
8. Clerks and irrigation officers will examine the passbook on their field visits. Clerks as well as cooperative societies will maintain details of water given and crops grown. They will maintain a proper register for this purpose.

The eight points of Resolution No: PIM/2002/8I, issued by SSNNL on 20th September 2002 (translated from Gujarati by Mahesh Langa)

We see that the Nigam aims at controlling the use of Narmada water by demanding that the farmers apply for water *before* they install pumps. Applications for water should go via the WUA. The Nigam wants to establish the norm that one cannot use water on an individual basis; it attempts to institutionalise the participatory management structure by insisting that all communication between farmer and the Nigam goes through the Water Users' Associations (called 'irrigation cooperative societies' in the circular).

However, I found no clear evidence of sanctions if these rules are violated (which they frequently are). Although the Chief Engineer of Baroda Branch Canal told me that during random checks in 2003, non-payment of the water rate was penalized with a double water fee,

[177] Resolution No: PIM/2002/81, SSNNL, Gandhinagar

and said that it would set the wrong precedence if water could be taken for free now, his subordinate engineers said that this was not practiced, but that there definitely *should have been* a double water rate for those who stole water. This latter view is the one that was confirmed through field research and interviews with field officers and farmers: there were no clear sanctions on rule violations. But this is running ahead of the story. How was the SSP functioning in the villages? What were the views of the beneficiaries of the Narmada water?

Sardar Sarovar Project in Krushigam, Jambusar

In Krushigam, I had planned to study access to water and the participatory irrigation management of the canals. What met me was an unfinished and to varying degrees dilapidated canal network, two WUAs existing mainly on paper, and two important conflict-ridden and related processes: the construction of the Subminor canals and the struggle of the farmers to get the existing canal network repaired and maintained.

WUAs, knowledge and participation

Krushigam has two registered Water Users' Associations: The "Krushigam Minor-1 Narmada Irrigation Cooperative Society Limited" and the "Krushigam Minor-2 Narmada Irrigation Society Ltd". Irrigation Society is *Piyat mandali* in Gujarati, and this is what the farmers called it. The chairman of *Piyat mandali* 1 was Rajendrasinh Sindha, and the Chairman of *Piyat mandali* 2 was Adityasinh Rana, both large landowners. The Secretary of both *Piyat mandali*s was Ramsinh Sindha, a relative of Rajendrasinh, and all the papers and maps belonging to the associations were kept in his house. Ramsinh was also the Secretary of the Watershed Committee[178] in Krushigam. Both *Piyat mandali*s had a registered board with 11 members, as prescribed in Nigam policy. The two WUAs of Krushigam were registered in 2001 and all landowners are registered as members of one or both, depending on which Minor

[178] The Government of Gujarat has initiated a state-wide Watershed Programme, operating under the State Land Development Corporation. Village-level watershed committees are to organise soil improvement and rainwater harvesting activities such as contour bunding of fields, digging of field ponds, construction of drainage channels, and distribution of kitchen garden kits, crop demonstration kits and saplings. In Krushigam, the main activities have been to construct drainage channels leading rainwater into the village pond. According to the chairman, this is not restoration of traditional rainwater harvesting systems that had come into disrepair, because at the time of his father and grandfather, he said, there was no awareness of the need to conserve rainwater. There is also a sewing class operating under the Watershed Programme, and the members are young women from the Sindha-Rana and Brahmin castes.

Canal their fields belong to. If their fields belong to several VSAs, farmers are member of all the related *Piyat mandali*s, even if they are in other villages.

The chairmen and the secretary of the *Piyat mandali*s knew well the most important formal rules for the management of Narmada irrigation water. However, the leaders of the associations argued that there was no point in holding meetings and organising any activities as there was neither regular water in the canals, nor a complete canal network. None of the farmers who pumped or siphoned water from the canals applied in advance through the *piyat mandalis*, nor did they keep a passbook of details of water use and charges paid as prescribed in the interim irrigation policy. Few if any paid the prescribed water charge[179].

Not all people who were registered as board members knew that they were on the board. Furthermore, most of the landowners in the village had at best a vague idea of being members of a *Piyat mandali*. None of the small and marginal farmers and a minority of so-called middle-sized farmers (holdings from 5 to 25 acres) reported to be members (see Table 16)[180]. Eighty percent of large farmers reported to be members, but this group is small in Krushigam, only around 20 farmers.

Table 16. Farmers' membership in Water Users' Association, Krushigam, % (n)

	Marginal (<2.5)	Small (2.5-4.9)	Semi-middle (5-9.9)	Middle (10-24.9)	Big (>=25)	Total
No	100 (13)	100 (12)	96 (21)	67 (10)	20 (1)	85 (57)
Yes	0 (0)	0 (0)	5 (1)	33 (5)	80 (4)	15 (10)
Total	100 (13)	100 (12)	100 (22)	100 (15)	100 (5)	100 (67)

(Source: Household survey, 2004)

Information about important village matters in Krushigam was spread through small talk and gossip as well as formal meetings of village associations or the Gram Sabha. Regarding the

[179] It was hard to find out whether anyone actually paid water charges. The survey answers varied wildly on this point, and I suspect that those who reported to have paid only said so because they did not wish to be seen breaking the rules. I have experienced several times that farmers initially claim to obey rules and only during the course of conversation admit that they break the rules.

[180] There is a possibility that female respondents may have answered 'no' even though the husband knows they are members. This is particularly likely for higher castes which pride themselves in keeping women off the land and uninvolved in agriculture. If this were the case, it would not alter the numbers significantly, as there were only 7 female respondents among the landed households, of these were 5 from lower or middle castes where women also practiced farming. All the female respondents reported not to be members of the WUA.

SSP progress, the most important channel of information was informal talks and exchanges between neighbours and friends. The residential pattern of the village is therefore important for the way information flows in the village. Most people would stay within their own neighbourhood in the evenings and chat only with their own caste people. As described earlier, caste determines the spatial residential pattern of Krushigam, and therefore also the information flows in the village.

The government officials from various offices had good relations with the Sindhas and Ranas, in particular with two elder brothers, Rajendrasinh and Sanjaysinh Sindha, who were among the largest land and property owners in the village. Mota Vato was mostly inhabited by relatives of Sanjaysinh and Rajendrasinh. The contractors of the Subminor work rented a house in a compound just outside Mota Vato from Rajendrasinh and Sanjaysinh. For Nigam officials visiting or passing by the village, a stop was natural at the veranda of Rajendra and Sanjay's new, large bungalow for tea and a chat. Both the Chairmen and the Secretary of the *Piyat mandali*s lived in Mota Vato. The Sindha brothers and their relatives were therefore well informed about the SSP.

The household survey confirmed the general impression I had that knowledge of the SSP and the procedures for water delivery was limited in the rest of the village. Only 11% of landowners reported that they had participated in an information meeting organised by the Nigam. Eighty percent of the landowners in Krushigam did not know that a water users' association was responsible for distributing Narmada water in the village[181].

One of the leaders in the neighbourhood Baria Falia, who had been the *Sarpanch* of Krushigam in the early 1990s[182], said:

> "Nobody knows what are the rules and regulations for the Narmada water. Officers come and talk to Amitbhai, Sanjaysinh… The village people don't know. Nobody in the village knows that this sort of Union is there, no other villagers know about this. Ask anybody in the village, nobody knows anything." (Mr Chauhan, interview 21.10.04)

Amitbhai is a leading farmer in Mota Vato, and leader of the Watershed Programme committee in Krushigam. According to the list of WUA committee members, Mr Chauhan

[181] Source: household survey 2004.
[182] The *sarpanch* seat is reserved for all the major castes in the village on a rotational basis. In the case of Krushigam, the rotation is as follows: woman, SC, ST, OBC, General Caste (=upper caste).

was on the WUA committee and also on the Watershed Programme committee, but he said this was only on paper, and he never participated.

The situation did not improve much in the year that went by before my next visit to Krushigam. When, in March 2006, I asked about the progress of the project to farmers in different areas of the village, the repeated answer was that there was no progress, that they had no idea what was going on because nobody told them anything, and that the Subminors would probably not be complete for another ten years. One poor farmer in Baria Faliu, who owned 6 acres of land of which 4.5 acres were mortgaged to another farmer, complained that he had just learned by coincidence from an acquaintance in a neighbouring village that the water in Baroda Branch Canal would be stopped on March 15th. To save his winter wheat, he needed water until April, and the talk in the village had been that there would be water until April[183]. The source of this information had been the "leaders in the village", he said. I asked who the leaders are, and he said "Rajubhai and those people", which meant Rajendrasinh and Sanjaysinh Sindha and their relatives. He described the leaders further:

> "These people grow aubergines, and have their own machines, two-three machines, and we have to rent pipes and machines and kerosene. They can take all the water they need. All the *sahebs* [government officials] only come to their house and talk."

It did not go unnoticed in the village that some farmers who could secure themselves Narmada water had introduced the new crop aubergine. The poor farmer was clear about the lack of information to the rest of the village:

> "When the field channels [Subminor canals] come, we will benefit more. But no contractors come and talk to us. Nobody will give information. They are all dirty people; they don't share information with us. You people come and explain things to us, how else can we know anything." (poor Koli Patel farmer, interview, 10.3.06)

The "they" that he refers to here are the leading Sindha farmers, and although the strength of his language ("dirty people") may be attributed to his fresh frustration over the end of water delivery, his message about the lack of information is clear. Information is given to the leading farmers in Mota Vato, who tend to monopolize it.

[183] I later found out that the gates were actually left half open until the end of April to save the crops. The dilemmas of governance implied in this decision will be further discussed in Chapter 11.

Process 1: Obstructing canal construction

In Krushigam, as in most of the SSP command area, the leading farmers refused to take charge of Subminor canal construction. They argued that they neither had the technical knowledge nor the financial means to initiate such work or hire suitable contractors for it.

I came to Krushigam in October 2004, arriving the day before Contractors Ltd, who had the subcontract for constructing 150 kilometres of Subminor canals in the area around Krushigam. The contractor was surveying the area, and had discovered that the plans and maps of existing canals that they had got from the SSNNL did not fit with what existed on the ground. The maps of the canals in the area were based on a survey from 1992, before the distributaries and minor canals were built. In many places the farmers had asked for minor alterations in the planned design, to avoid cutting fields in two. The locations of some Subminor outlets were therefore changed. Now, Contractors Ltd had to resurvey the area to find out what it really looked like.

However, the problems did not stop there. The contractor started by digging out soil from the small lake in Navagam, the resettlement colony of Narmada oustees about 5 km outside main Krushigam. The practice in canal construction in the SSP is to take soil from existing lakes and ponds. This is a technical innovation adopted by the SSNNL. It solves the old construction problem of borrow pits (which creates shallow water pits of the type known for having spread malaria along the railway lines constructed by the British) while at the same time improving water storage in the command area. Sanat Mehta explained the benefits of this innovation in a note to the Gujarat Government in 1994:

> "SSNNL has adopted a novel technique in construction of canals. Earlier in all projects, soil required for the construction of canals was being taken from acquired land for such purpose and was known as 'Borrow Pit Area'. Instead of this, SSNNL has adopted a policy of taking soil from nearby village ponds. This experiment has resulted in deepening of village ponds, thereby augmenting water resource capacity of the State by rain water conservation. This has created a new awakening amongst rural area. At many places, such deepened village ponds are able to supply water for domestic use round the year and in some cases, even for irrigation. As such deepening is done mechanically, it has yielded much better results than deepening done during scarcity relief works." (Mehta 1994a:17-18)

However, this logic was not entirely obvious to all farmers of Krushigam. On the second day of construction work in Krushigam, the *Sarpanch* and the husband of the Deputy *Sarpanch*[184] had ordered the work to stop. The contractors were not allowed to build Subminors in Krushigam. Concerned about the financial losses of delayed work, Contractors Ltd abandoned work in Krushigam and started in a neighbouring village instead. But Krushigam was not the only problem village. The leader of Contractors Ltd expected the same sort of problems in several other villages, and postponed these until later (interviews October/December 2004). He knew about contractors in other parts of Jambusar who had faced so much trouble with villagers that they left the work altogether.

Far from all farmers in Krushigam were aware of the obstruction of the Subminor construction. The conflicts and negotiations over this involved the Panchayat and the leading Sindha-Rana farmers in Nano and Mota Vato. When I asked different farmers in these neighbourhoods why they were not more eager to finish the canal network, most of them would bring up the question of quality of government constructions. They argued that everything the government builds will whither and collapse within few years after completion. "Look at that bridge," said one farmer to me, pointing to a small bridge over a natural drainage line, "it is already rupturing and it was built only eight years back. My house is fifty years old, and still has no cracks". The farmers were concerned about the many breaches in the bigger canals and said that they would not allow the government to construct any more canals before they had repaired what was already built. A repeated explanation from Panchayat members for stopping Subminor construction was that the contractors were taking mud from the lake in Navagam without asking for permission, and this mud was needed for building houses in Krushigam. The *Sarpanch* told me he felt trapped by some villagers who on the one hand told the contractor to take soil wherever he liked, but on the other hand would complain if the *Sarpanch* was not making sure the contractor followed procedures and asked

[184] If the *Sarpanch* is a man, the Deputy has to be a woman according to the law. This is followed on paper, but not in reality. Although the current Deputy was a woman, it was her husband who was practicing in the position. Most people referred to *him* as Deputy *Sarpanch* most of the time, but sometimes they would refer to him as the husband of the Deputy. He had contested for *Sarpanch* in the elections, but when he lost, the panchayat had offered his wife the Deputy position to reduce the level of conflict. In the previous period, Seemaben Sindha, my landlady, had been *Sarpanch*, and her husband, Vijendrabhai was very proud of this. I asked her what she had done as *Sarpanch*, and she said she had signed papers, but that as she was pregnant and nursing a baby and toddler during most of the period, she had not been able to travel to meetings. Vijendrabhai had been the actual *Sarpanch*.

for permission and paid commission before taking soil. Several farmers and the *Sarpanch* also said that one of the reasons for non-cooperation with Subminor construction was that access roads to fields would be blocked by the canals. The explanations for the delay in Subminor construction were therefore varied and confusing.

The contractor said that the mud-story was just an excuse for extorting bribes from him, as the Deputy *Sarpanch* was a "lumpen man":

> "The Deputy *Sarpanch* and her husband are playing the role of Baba Amte and Medha Patkar[185]. I said to the Deputy *Sarpanch*, "Give me a letter that says that you don't want Subminor canals and I will remove all my machinery. We lose two *lakhs* every day our work is delayed". The Deputy, Arjunsinh, said, "I am everything in this village, give me money and nobody will cause problems for you"." (interview, Mr Patel, 11.12.04)

I was unable to hear the Deputy *Sarpanch*'s version of the story, as he (or more precisely, her husband) unfortunately seemed to avoid me all through my stays in Krushigam. However, the point I see in the contractor's claim, which was also supported by leading Sindha farmers, is not whether the Deputy actually demanded a bribe. Rather, I noted again how widespread the accusations of corruption and bribes are for explaining conflicts and things that go wrong in India.

The *Sarpanch* was a Brahmin from Brahminvas, and the Deputy *Sarpanch* was a Sindha Rajput from Mota Vato, who had an ongoing conflict with the other leading Rajput farmers. According to the leading Sindha Rajput farmers and the contractor, the power and agency of the *Sarpanch* was limited as he was heavily indebted and spent most of his time negotiating with his creditors. The whole panchayat was also under investigation for cutting down and selling trees without permission from the Forest Department, and therefore under threat of suspension. The *Sarpanch* was held responsible for this, and this too allegedly took a lot of his time. The illegal tree cutting had been reported by Vijendrabhai Sindha, the nephew of Rajendrasinh and Sanjaysinh (and my landlord), an act which did not improve an already strained relation.

I left Krushigam in the end of December 2004, and returned in March 2005. The contractor and his workers were still in Krushigam. The leader told me that the problem with the

[185] Leaders of the Save the Narmada-movement.

Panchayat had been solved. Rajendrasinh Sindha, the chairman of one of the WUAs, had intervened on the 5th of January and held a meeting with the *Sarpanch*. The contractor now expected to begin work in Krushigam after the festival Holi in the end of March 2005 and complete the work just after the monsoon the same year.

I returned once again to Krushigam in March 2006, two years after my first visit and the first assurances that the Subminor canals would be complete within 3-4 months, expecting to find a completed canal system and the beginnings of rotational, volumetric water delivery as per the project plan. However, the construction work had just started, and only one Subminor canal was under construction in Krushigam. The Sindha farmers complained about the poor quality of the canal and had low expectations of its performance. I went to see the canal and understood their frustration. The lining of the canal was porous, and we could easily break pieces off it with our fingers.

Picture 2. The first Subminor Canal in Krushigam, incomplete, March 2006

(Photo: Guro Aandahl)

Picture 3. A Krushigam farmer breaking off a piece of the new Subminor Canal, March 2006

(Photo: Guro Aandahl)

Process 2: Farmers' campaign for project performance

The second ongoing process in Krushigam was farmers' struggle for the repair and maintenance of the existing canal network. This struggle was related to the opposition to Subminor construction: the present state of the canals was part of the justification for the opposition to the Subminor construction.

The Baroda Branch Canal and Distributory canals had caused severe problems since they started carrying Narmada water. The canals had broken several times and Narmada water had flooded large areas of farmland destroying crops. The Krushigam Distributory Canal had been broken near the canal head for two years when I arrived, and water was gushing out of the crumbled canal wall into a drainage line leading to the village pond in neighbouring Tingam.

The Branch and smaller canals were also cracking because of intrusion of vegetation, and the access roads overgrown with the thorny "Crazy Babool"[186] (see Pictures 4-6).

Picture 4. Baroda Branch Canal, November 5th 2004. Note the marks from a pipe or siphon on the canal bank in the middle of the picture.

(Photo: Guro Aandahl)

[186] A dense thorny tree (Latin name: *Prosopis juliflora*) with little commercial or livelihood benefits which is spreading at alarming rates in Gujarat to the chagrin of farmers. The tree thrives in dry, saline conditions and was therefore introduced to Gujarat to check deforestation in the 1950s.

Picture 5. Broken Krushigam Distributory Canal, October 7th 2004.

(Photo: Guro Aandahl)

Picture 6. The service road along Krushigam Distributory Canal. The Canal is behind the bushes to the right in the picture. October 7th 2004

(Photo: Guro Aandahl)

The leading farmers of the village had approached the Nigam officials in Jambusar about the problems several times over the last two years, without success. Frustrated by the lack of cooperation from the local office, they directed their grievances to superior authorities, starting at the top with a letter to Chief Minister Narendra Modi dated November 11th 2003. Next, a letter to the Mamlatdar[187] of Jambusar was handed over during a sit-down fast in front of his office on August 23, 2004. Finally, a letter was sent to the "Director of Canal and Water Resources" in Gandhinagar on October 23, 2004. The letters are long, detailed, and repetitive. The core message of the letters is the same: that the canals in Krushigam have been cracked and broken since before the release of Narmada water and because of this, water supply to farmers is highly irregular. The breakages flood and destroy crops without any compensation given, drainage is poor and pits left along the canals get waterlogged during monsoon. Most importantly, the Nigam officials in the Jambusar office do nothing to solve these problems, but rather behave rudely towards the farmers. The farmers "smell large-scale corruption between officials and contractors", and demand a judicial enquiry into the matter.

The letter to the Chief Minister is a demand for the transfer of three named Nigam officials:

> "The problem is that whenever we go to the SSNNL office at Jambusar, above-mentioned officials have invariably been rude with us and we found their language highly abusive. They have often said to us that "we can do our worst and even MLA [Member of Legislative Assembly] or CM [Chief Minister] cannot do anything to us". We find such language very abusive and more so when used for CM like you. They also said that as long as they are there, water will be released as and when they feel it necessary to, not as and when farmers require it and nobody can force them to do anything. We farmers demand that such officials, who have been posted there for many years, should be transferred immediately in other departments." (letter from chairmen of WUA 1 and WUA 2 of Krushigam to Chief Minister of Gujarat, 11.11.2003[188])

In August 2004, the farmers threatened to "take the path of agitation shown by Gandhi" if nothing was done about the problems. The sit-down fast and the letter in August were also a joint action on behalf of all farmers of Jambusar *taluka*, where many villages had never received Narmada water for irrigation. In the last letter of 2004, they ask "the million-dollar question: Will water ever come into their farms?" They repeat the allegation that the only reason for the repeated breaks in the canals is the poor quality of construction, but "instead of taking action against contractors, officials accuse farmers of breaking the canals for lifting

[187] Chief Civil Officer in charge of district of sub-district.
[188] Translated from Gujarati by Mahesh Langa.

water". They argue that "officials make big and inflated estimates for repairing works" and thereby "are busy looting and exploiting government resources". From the letters, we can also see a certain indignation about the way ideas of participatory water-users' management of the canals is communicated from the local officials:

> "Whenever we draw the concerned officials' attention, they promptly direct farmers to do all this work on their own, as finally, they say, farmers are going to be beneficiaries of Narmada water." (letter from Rajendrasinh Sindha, 23 October 2004)

It is possible that the message from the engineers, rendered by the farmers in an arrogant and dismissive tone, is actually a translation of ideas of participation and farmers' ownership of the project. In the letter quoted above, the farmers tell the Chief Minister that the engineers say that "water will be released as and when they feel it necessary to (...) and nobody can force them to do anything". The farmers interpret this as abuse of power of the officials who neglect the needs of farmers, although it is SSP policy that the water should be delivered according to predetermined schedules and not at the random requests of farmers. At what level the ideas of PIM and judicial water use were interpreted in this negative manner, is hard to say, it may have happened gradually as the policy orders were handed down through the bureaucratic hierarchy. Rather than being beneficiaries, Rajendrasinh writes that "we feel that the canal is creating more problems than solving existing ones". The farmers did not see any justification why they should bear the costs caused by the corrupt nexus between officials and contractors.

The farmers of Krushigam never received any replies to their letters to the authorities. During the sit-down fast in front of the Mamlatdar office in August 2004, officials had assured them, in the presence of the Mamlatdar, that a survey of the losses would be done and "all efforts made to give justice to the farmers" (repeated in the last letter from the Krushigam farmers). When I arrived in October, I was immediately taken on a tour of the cracked canals and the overgrown access road. On October 15th 2004, I interviewed Dr. Chaudhry, Chief Engineer of Baroda Branch Canal in the Baroda SSNNL office, and mentioned the broken canal in Krushigam. He said that he knew about the problem, but that it had recently been repaired and that water had been test-delivered in the Krushigam Distributory the preceding week. When I told him that I had been in Krushigam the preceding week, and the damage had not been repaired, he picked up the phone and called the person in charge and ordered the work to be

done. He then told me that repair work would start next week, which did not happen. The big hole in the Distributory was finally repaired in early 2005 and the access road along the canal was cleared of bushes. But the intrusion of vegetation in the Baroda Branch Canal, Distributory and Minors continued through my last visit in 2006, weakening the structures and reducing their water carrying capacity.

Is Jambusar exceptional?

The reception of the SSP in Krushigam is not unique in the command area. First of all, pumping from main and branch canals was widespread in all the canals I saw. As water is flowing in the main and branch canals, enterprising, wealthy farmers have installed pumps which continuously run and irrigate nearby fields. Driving along the Narmada Main Canal from the Mahi Aqueduct to Kadi just north of Gandhinagar in 2004, I could observe diesel pumps every 2-3 hundred meters in all canals with water. Many have invested in new diesel pumps after the Narmada water arrived, and their investment is quickly recovered as they rent out the pumps to other farmers.

Picture 7. Cluster of pumps in Narmada Main Canal, March 2004

(Photo: Guro Aandahl)

Pumping from the Main Canal is not allowed and SSNNL staff routinely issue warnings to the illicit pumpers ordering the removal of pumps. I met a few pump operators along the Main Canal, and they informed me that after receiving such warnings they remove the pumps, only to reinstall them a couple of days later.

Subminor Canal contractors in other regions faced similar problems as in Jambusar. In tubewell areas, I was told by several of the engineers I interviewed in the SSNNL, one reason is that the water level in tubewells had increased with Narmada water and well owners now had a nice income from renting out pumps and selling well water to less fortunate farmers.

Other villages

The Executive Engineer of Command Area Development attributed some of the SSP problems in Jambusar to the "low level of entrepreneurial spirit" among the farmers in this region, and I asked in which villages I could see successful implementation of Participatory Irrigation Management and even WUA-led Subminor construction. He directed me to a village in Naswadi *taluka* in Baroda district. This was a success village for the Nigam, he said, where the Water Users Association had agreed to take charge of Subminor construction and was successfully practicing rotational water delivery. However, in this village I discovered that this was, literally speaking, only half the story. There were two WUAs in this village, organised around two Minor canals. One of the associations was not functioning. This association had refused to take charge of Subminor construction, and the contract had gone to one of the main contractors on the SSP. The group of farmers I talked to told a story by now familiar to me, describing a corrupt understanding between government engineers and contractors, through which money went into the pockets of government officials at the expense of construction quality. As a result of poor quality work, the Distributory Canal feeding their Minor had breached repeatedly over the last years causing damaging floods. The progress of Subminor construction in this Village Service Area was nil because one large farmer refused to have his land cut by the canals as he feared the damage from breaching structures.

The success was in the other Village Service Area. They practiced rotational delivery and had around 50% membership. The WUA was in the process of forming the prescribed sub-committees, but the secretary said that it was still difficult to get farmers to cooperate, because "they don't understand yet". This WUA had taken charge of Subminor construction, and the secretary could tell me why: The chairman of the WUA had a son who was a civil engineer and ran a contracting firm, and the contract was given to him. As far as I could see, and according to the farmers who showed me the canals, the Subminor canal network was complete and solid, not poor quality like I had seen in Krushigam (see Picture 8).

Picture 8. Subminor Canals built on WUA contract in "success village", Navsadi *taluka*, 2006

(Photo: Guro Aandahl)

The secretary of the "success" WUA expected the Subminors of the other VSA to be of poor quality. The contractor who was going to build those canals had relations with upper-level

government officials, he said, and "*E badha percentagewalah chhe!*" ("They are all percentage-*wallahs*" [189]).

Other studies of SSP: Broken canals and broken promises

Other studies of the Sardar Sarovar Project confirm my experiences in the command area. IWMI researchers have studied the functioning of Participatory Irrigation Management structures in 40 villages in the Central Gujarat command area in the first irrigation season of the SSP (*rabi* 2002) (Talati and Pandya 2004; Talati and Shah 2004; 2007). They found that the farmers refused to take on the management responsibilities of the Narmada water as long as the distribution network was not completed. At the same time, farmers objected to Subminor construction because of loss of land and division of plots without compensation. Siphoning and pumping of Narmada water from the canal was prevalent and the recovery rate of water charges very low. "The experience of the first irrigation season (Rabi 2002-2003) clearly indicates that the wisdom of planners and policy makers is not getting realised in practice," write the IWMI researchers (Talati and Pandya 2004). They found it likely that the beneficiaries of the SSP in the future would prefer to pump or siphon water from the bigger SSP canals rather than contribute to the completion of the lower levels of the canal network. The same study found that farmers generally thought the credibility of the SSP officials was low, a perception which was nourished by inconsistent messages about policies and procedures from SSP field staff, poor-quality canal network and frequent breakages, and broken promises of canal repair (Talati and Shah 2004).

They also report a widespread perception in the command area that the need of the Nigam to deliver water to the farmers is greater than the need of the farmers to use canal water. Combined with the experience of lack of sanctions on rule violation, this made farmers ignore government rules.

> "It seemed to us that farmers take the SSP and the government so lightly that they were totally nonchalant about SSP's new water policy, which they did not believe would be vigorously implemented." (Talati and Shah 2004:3507)

[189] "*Wallah*" means "person" in an informal way, a person associated with something, for example tea-*wallah* (man selling tea), or rickshaw-*wallah*. Here, it means a person associated with a corrupt percentage-based commission system.

Two other case studies of farmers' responses to PIM in the SSP in Central Gujarat report similar findings. Thomas (2004) studied PIM in three villages near the head of Baroda Branch Canal in 2003 and found that powerful farmers altered the canal system, created new field channels and changed the location of outlets. Rules for water distribution were not agreed upon, and the Water Users' Association had no legitimacy for conflict resolution as the farmers saw the *mandalis* as only vehicles for fee collection for the government. Field research in another region in Central Gujarat in 2006 confirmed this picture. In this area, farmers preferred to pump water from the canals rather than practice the rotational water-delivery system through participatory management even though the canal network is complete down to Subminor level. Farmers complained that the Subminor canals broke every fifteen days, they saw the *Piyat mandali* as a tool for fee collection for the government only, and argued that the Nigam people only come to drink tea with "big people" (Shilpi Raonka, MA-student, CEPT, interview, March 2006).

Irrigators in the past

If we turn to historical research on canal irrigation in India, we find that controlling the behaviour of irrigating farmers in canal systems is an old problem. In the comprehensive Damodar Valley Project of the 1940s and 1950s, project authorities introduced an irrigation 'betterment fee' and a user charge on the water users (Klingensmith 2007). The planners expected the productivity increase following assured irrigation to justify these fees for the beneficiaries of water. But contrary to the expectations of the project planners, the farmers did not introduce a new cropping season, and they only used the canal water when the monsoon rain occasionally failed. Therefore, they did not see any reason for paying an additional tax. Klingensmith argues that water charges made economic sense, but not political sense. For politicians seeking votes, the introduction and enforcement of water fees was a recipe for failure. Quite contrary to the economic rationality of economic incentives for reduced water consumption, the politicians played on the strong anti-British sentiments in newly independent India and promised the removal or reduction of unnecessary irrigation taxes. As one politician quoted by Klingensmith argued, such taxes were after all one of the reasons why they had fought the British for so many years. The collection of water fees was therefore never enforced. And beneficiaries of the DVC violated the irrigation rules in ways similar to the behaviour of SSP beneficiaries:

> "Far from passively conforming to the expectations of [the DVC planners] many peasant cultivators appropriated irrigation water for their own use, stealing it from the DVC by surreptitiously breaching DVC channels, and even building their own channels from DVC canals to their fields." (Klingensmith 2007:193-4)

This behaviour is also known from colonial canal-irrigation systems. In a historical study of canal irrigation in colonial Punjab in the early 20th century, Gilmartin (1998) demonstrates that problems of canal-irrigation management are not new. In fact, the problems recorded by colonial irrigation officers are strikingly similar to the problems described in canal-irrigation management all through the 20th century. The engineers struggled to design canal systems in a way which would create incentives for optimal water use: To delineate the precise *chak* attached to each outlet so that water use could be measured and efficient water-pricing systems could be designed, and to create tamper-proof canal gauges. The rational water-distribution systems prescribed by the engineers were sabotaged by powerful local elite farmers, who created breaches in the canals, took excessive water, made dams in the watercourse etc, at the expense of competing individuals and factions in village politics. Farmers tried to influence Irrigation Department officials through bribes or kinship ties, and petitions against the actions of lower-level staff were common (Gilmartin 1998). We thus see that the problems facing the SSP are similar to what have always been problems in canal irrigation.

Another well-known problem is how to construct a large canal system so that storage and distribution structures are completed at the same time. It is widely recognized in India that the phasing of construction of large canal systems influence their success. The problems encountered today in the SSP following an unfinished canal system while water is available in the dam and the larger canals are typical of Indian canal irrigation projects. Healey (1968) analysed the fourth five-year plan (1969-1974) and pointed out that phasing of canal-system construction was an old and important problem. Instructions about proper synchronization of canal construction had come from the Indian Planning Commissions since the 2nd five-year plan of 1958, he wrote, but without any new incentives or sanctions which would help achieve it:

> "Concerted action is to be taken by the Irrigation and Agricultural Department of State Governments to synchronize the programmes for construction of head works, canals, and field channels. Measures are also required to ensure that cultivators are prepared in advance for the use of water made available, and for the supply of complementary

> inputs. All this was said in the Third Plan, and, indeed, in the Second Plan before it. It is not clear, however, what new measures or new administrative vigour are to be applied to the task." (Healey 1968:162)

In Gujarat's Perspective Plan for 1974-1984 (Government of Gujarat 1972), the phasing problem is highlighted. The time lag between completion of storage and completion of canals is "really serious as crores of rupees spent on the scheme do not yield the returns they ought to" (Government of Gujarat 1972:131).

In 1988, the proper construction of phasing was one of the Planning Commission's conditions for the clearance of the SSP:

> "Past experience of irrigation projects have revealed that Main and Branch Canals are completed up to the end but in absence of micro level net-work to take irrigation water up to the outlet, corresponding irrigation benefits do not start accruing despite huge financial investment made." (Planning Commission condition from 1988, quoted in SSNNL 1993:16)

In response, the SSNNL reported that: "The work schedules have been prepared. The work of canal system of SSP is so planned that it will be possible to irrigate lands in Phase-I area even before the dam is fully constructed" (SSNNL 1993:16).

However, as we have seen, the SSNNL did not manage to synchronize the construction, despite this condition. As the case of the SSP shows, the problem of phasing of construction of large systems has not been solved over the last 50 years.

The planners emphasised the *economic* aspects of the problem of phasing of construction, as the returns to the investment rest on the assumption that irrigation water is delivered to all beneficiaries through gravity flow as soon as possible. But there are also distributional and political aspects to the unsynchronized completion. When water is available from main and branch canals, but the smallest veins in the system (Subminors) are not built, the incentives and opportunities for illicit irrigation increase considerably. Such violations become established practices and perceived entitlements because the time gap between completion of main canals and the smallest canals is large. This has been the rule rather than the exception in canal irrigation systems in Independent India, and the SSP is no different despite its ambitions.

Conclusion: Revisiting the disempowerment argument

Contrary to the state-domination argument of authors critical of high-modernist engineering in general or large-scale irrigation projects in particular (Wittfogel 1957; Worster 1985; Scott 1998; McCully 2001), the very nature of water running in a large-scale canal system is actually *not* conducive to centralised power and control, especially not in a democracy. A command area of 1.8 million hectares and up to a million farmers[190] demands quite an extensive panopticon for the government to supervise all its subjects. Partly, the plan to computerize water delivery is an attempt to create this panopticon by creating a centralised and automatic system where the operator, sitting in a central hub of information in Gandhinagar knows the demand for and use of water in all parts of the 66,000 kilometres of canals (Joshi 2001). "The root cause" for the poor performance of Indian irrigation systems, writes Joshi, a high-level engineer in the SSNNL Main Canal Design Circle, "may be the lack of a scientific approach to their operation and management", and a solution will be the automated, centralised computer control (Joshi 2001:109).

This chapter has detailed experiences from Jambusar, from the rest of the SSP command area, and from previous canal irrigation projects in India dating back to the British. Farmers disregarded the irrigation policy, did not pay water charges, and obstructed construction of canals. The canals of the SSP were of poor quality and broke frequently, damaging nearby crops. The Water User Associations exist mainly on paper, and do not yet have legitimacy among the beneficiaries as conflict-minimizing cooperative management institutions.

The experiences from the SSP command area suggest that the reasons for the implementation problems must be sought both within a *technical* and a *political* realm. One partly technical issue is the problem of synchronizing the construction of a huge system of water storage and distribution. When there is water available in the larger canals and no distributory system to the field level, the incentives and possibilities for illicit irrigation and policy violation increase. As described in Chapter 4, this is also a question of priorities: Financial constraints

[190] I don't have data on the number of landowners in the command area, but various government engineers told me numbers in the range of 316,000 to 443,587 landowners in Phase 1 of the command area, which covers the area from the dam to the Mahi Aquaduct. There are two more phases in the command area, Phase 2A with 110,000 landowners, and 2B, for which I did not get any estimate of number of farmers. Hence my estimation of around a million farmers.

in the 1990s led to a slow-down in construction and a prioritization of dam construction over canal construction. But the situation is not unique to the SSP; it is a notorious feature of canal construction in India (Healey 1968; Government of Gujarat 1972; SSNNL 1993). It could perhaps be argued that the political and bureaucratic leaders of Gujarat preferred to construct a dam as a modernist icon, showpiece, and vote-grabber rather than distribute water to needy farmers. However, such an explanation seems insufficient. For canal construction, for example, it is a real challenge to find enough competent contractors to take the job of constructing the thousands of Subminor canals of the SSP.

Another technical factor is the lack of efficient sanctions at the level of the individual farmer. When and if the automated control system becomes operational, it will not solve the problems of controlling the behaviour of individual farmers below the Minor Canal level, nor will it in itself prevent illicit pumping from any of the canals. Technically, the government can cut off the water delivery to the Minor canal if the farmers don't follow the water-use regulations. In practice, however, this is a power not easily exercised, a fact which will become clearer in the next chapter. The computerized panopticon planned for the SSP can not "see" the individual farmers. The system has to rely on village communities, because the only possibility for closing the gate is at the Minor canal head. Below this level, there are as many as hundreds of farmers who have to agree about water management. That is why the idea of Participatory Irrigation Management through Water Users' Associations seemed so attractive to irrigation planners. This was their way of adapting state-of-the-art technological solutions from the USA to "Asian peasant agriculture" (Alagh 1991a).

This leads to the other aspect of the explanation for implementation challenges, what may be called the political or human factors. This involves the agency of the troublesome beneficiaries with its intended and unintended outcomes. The planners assumed they knew what would be the rational response of Gujarati peasants to the arrival of the Narmada water. "It is extremely likely that at the village level, institutions will develop to use the waters well," said Alagh in one of his lectures about the project during the peak of the Narmada conflict (Alagh 1991a).

It is possible that the lack of compliance with PIM policies from the farmers of the SSP command area is only a problem in the beginning of the operational phase of the project, and

will improve with time. However, as there is no volumetric control on the individual pumping of water in the interim phase, there is a real danger that the patterns of water use that are established in this early phase will be hard to change in the future. The more equitable and judicial water distribution that the project is aiming at is not going to be achieved without conflict. As we have seen, the idea of Water Users' Associations did not resonate readily with the lived experience of the farmers. To understand why, we need a more realistic picture of village society. First of all, it is not one community of fairly homogeneous medium-sized "peasants", but a stratified society of "big" and "small" people with diverging interests. The larger and more influential farmers did not see the need for organising meetings and informing their fellow villagers as long as 1) the canal network was neither completed nor repaired, and 2) they had access to Narmada water through their own pipes and pumps. The broken canals, floods, and overgrown access roads were much higher on the agenda of the farmers than organising a cooperative water users' association as dictated and encouraged by the government. As we shall see in the next chapter, the dilapidated canal network confirmed a widespread and already negative perception of the state.

11. Beyond corruption

So far I have described the situation I encountered in Krushigam and other parts of the command area: The completion of the SSP canal network was delayed because of obstructive farmers, and the management policy decided by the government was largely ignored. There was no volumetric and rotational water delivery, because there was no distribution network. Farmers were nearly sabotaging the project, not only in Krushigam but also in numerous other command-area villages. Why were the intended beneficiaries of the project so uncooperative? And why was the canal network of this highly prestigious project of such poor standard? This chapter will present the explanations given by the different actors in the implementation process, farmers, contractors, and SSNNL engineers. Whereas the previous chapter focused on the actions of the SSP beneficiaries, the analysis in this chapter will centre on the perspectives and role of the government engineers.

"They are all percentage-*wallahs*" – the discourse of corruption

The first explanation the farmers gave me for the dilapidated canal network was that corruption was to blame. The farmers explained the frequent breaks in the existing canals with poor quality construction due to a corrupt nexus between Nigam officials and the contractors. "They are all percentage-*wallahs*," was a frequently repeated claim from the leading farmers in the village. This is also what the Krushigam farmers argue in the three letters of complaint described earlier, and what I was told by farmers in other villages. In line with what Wade (1982; 1985) described for the systematic corruption canal irrigation in South India, the SSP farmers say that the irrigation engineers in the Nigam expect a kick-back from the contracting firm that gets the tender: a fixed percentage of the contract sum is paid to the engineers, hence the term "percentage-*wallah*". The contractor will not pay this percentage from his own pocket and thereby reduce his profit, but will save the money by diluting the quality of building material. For example, he will reduce the amount of cement and replace it with sand.

Alternatively, if the government agency provides the material, the contractor will sell some of the cement sacks[191].

This explanation would most often be followed by stories of corruption in other sectors of society, like a diagnosis of a disease. People would tell me that rather than paying 10 rupees for a bus ticket for Jambusar, the conductor would charge 7 rs and pocket the money. When walking around the village, people would point at the heaps of rocks lying along the village connection roads, and say that due to a "corrupt nexus" between the contractors and the road department officials, the work was abandoned. Where the roads had been improved, the rocks used were too big and sharp and destroyed the bullock carts, all because of the same corruption. The Government Labour Office in each district is supposed to monitor the Minimum Wage Act for agricultural labourers, but in Krushigam the office had appointed a farmer in charge of collecting an annual bribe from the farmers. After receiving this, the office did not check the adherence to the Act in the village[192]. On a couple of occasions I asked why neighbours did not call the police about repeated instances of severe wife beating, and I was told that there was no point in calling the police as they would not do anything but demand a bribe from the perpetrator and nothing would change. Not only government employees were accused of corrupt practices, so were fellow villagers. During interviews and evening chats, I was told that the committee of farmers in charge of the government-financed Watershed Programme in the village pocketed money meant to pay for labourers to dig field bunds and field ponds. And as mentioned earlier, the contractor in Krushigam blamed the panchayat members for extorting bribes from him before he could start working.

Jonathan Parry (2000) analyses similar observations of widespread popular perceptions of pathological corruption in Indian society: the prevalent belief that corruption has been continuously escalating to unprecedented levels in India since Independence. "A content

[191] I visited one command area village in Ahmedabad District where farmers laughingly told me that they had all bought cheap cement from the contractor who built Narmada canals in their village. The NGO working on PIM in that village also told me that the contractor had sold cement from the site.

[192] The practice of the Government Labour Officer (GLO) in Gujarat was described by Jan Breman in 1985 (Breman 1985). At this time, according to Breman's article, the Government Labour Officer would actually tour the villages and ask labourers and employers about wages paid, although the sanctions against violations of the Minimum Wage were few and far between because the GLO staff sympathised with the farmers and the labourers feared sanctions if the reported on their employers. Twenty years later, it seems the GLO limits his check on the wage level to the collection of bribes, as I was told was the practice in Krushigam and Motugam. This is also confirmed by (Breman 2007).

analysis of *chay*-shop conversation would probably reveal that corruption beats even the state of the crops," he says (Parry 2000:28). But Parry questions whether this talk is an accurate description of the real state of affairs. The incidence of corruption seems to be inflated by popular discourse, and Parry suggests some explanations for where this belief in an increasingly corrupt state has come from. One factor is that the government has expanded since Independence and is present (in the forms of schools, electricity, clinics, etc) in areas where it was not before. It may thus not be that the government is more corrupt, only that it is larger, and the possibilities of experiencing corruption, or practices which may be interpreted as corruption, are also correspondingly larger. His main conclusion differs from other theories of Indian corruption which argue that the universalistic values of modern bureaucracy are based on a Western historical experience and incompatible with an Indian culture based on particularistic ties of caste and kinship. On the contrary, argues Parry,

> "If corruption is the misuse of public office or assets for private interest, then the notion obviously presupposes a clear conceptual separation between the two." (Parry 2000:52)

The widespread idea of a 'crisis of corruption' may be "as much a product of a growing acceptance of universalistic bureaucratic norms as of its actual increase. Corruption has seemed to get worse and worse not (only) because it has, but also because it subverts a set of values to which people are increasingly committed" (Parry 2000:53).

The widespread belief in a crisis of corruption is not a new phenomenon in India. Corruption has been a recognized problem since the early independent years. In fact, Gunnar Myrdal argued along lines similar to Parry's in *Asian Drama* (1968). According to him, the belief in widespread corruption in India amounts to a "corruption folklore" which may or may not exaggerate the level of corruption in the Indian state, but which "embodies important social facts on its own" (1968:940). This folklore, says Myrdal, has a bearing on the way "people conduct their private lives and how they view their government's efforts to consolidate the nation and to direct and spur development" (1968:940).

Parry also suggests some effects of this discourse or folklore. Like Myrdal, he argues that belief may turn into reality when people think that, for instance, access to a government job is unavailable without the costly services of a middleman (a *dalal*). Parry explains:

> "The corrupt may certainly have some incentive to be reticent about their own corruption; but the louder the cry that nothing can be accomplished without it the fuller their pockets. Corruption is often said to thrive on secrecy. It does pretty well on publicity too." (Parry 2000:37)

For example, those without the means to pay a middleman, may not even try for the job, whereas those who do will seek out the 'services' of a middleman before they are even asked for a bribe.

Like Parry, I experienced that most of the stories of corruption relayed to me were second- or third-hand, and the sources of many was the print media. After a while, when the stories and complaints about corruption came popping up during conversations and interviews, I started asking whether my informant himself or herself had actually had to pay a bribe for a public service, and most frequently I would get a negative answer, but invariably they knew of someone who had been forced to do so. Out of hundreds of brief and long conversations I have had about the issue, I can count on one hand the instances when my informant had been forced to pay a bribe.

Gradually, I started suspecting that the discourse of corruption may also influence the interpretation of government policies and regulations. Take the example of the opposition to Subminor construction in Krushigam. Nigam policy is that the contractor should get the panchayat's permission to take the soil needed for construction. The company should further pay a "royalty" for the soil, a royalty which is deducted from the contractor's bill by the Narmada officials and then deposited in the Collector's office, and repaid in whole to the Panchayat (Deputy Executive Engineer for Subminor construction, SSNNL Baroda, interview, 11.01.05). Earlier I described how the explanations for the obstruction of Subminor construction in Krushigam were diverging and confusing: Some said that the Navagam mud was needed for house building, others said the Subminors would block roads, the Sindhas of Mota Vato said the Deputy *Sarpanch* was corrupt and wanted money for himself, or even worse that the whole panchayat wanted bribes for allowing construction. The *Sarpanch* told me that he had to stop the work because the contractor had not followed procedures and asked for permission and paid a commission for the soil[193]. In hindsight, it now seems plausible that

[193] Not only is this Nigam policy, but it is apparently also customary law in India that the state has to pay the Panchayat for the use of Panchayat land (personal communication with Dr Loes Schenk-Sandbergen, May 2009)

there was some confusion about the correct procedure for the payment of royalty for the use of panchayat soil, and that the contractor interpreted the demands of the Panchayat members for a commission/royalty through the filter of the corruption discourse in which all holders of public office are immediately suspected of siphoning off public resources for their private gain[194]. However, as I have not witnessed any of the exchanges between the contractor and the panchayat members, I cannot say for certain what actually happened. But that also means I should be open to the possibility that other interpretations are possible. As we shall see later, there were other plausible explanations for the sorry state of affairs in the canals of Jambusar.

I asked the leader of Contractors Ltd whether he had ever experienced that they had to pay bribes to the Nigam officials, to which he laughed and shook his head. "Single officials never ask for bribes," he said, "but of course there is a commission to be paid when a contract is signed" (contractor, interview, 16.12.2004). I did not realise it at the time, but the contractor here confirmed Parry's finding that there are different types of corruption associated with different degrees of moral condemnation:

> "More precisely, we should distinguish (in ascending order of moral culpability) between 'gifts', 'commissions' and 'bribes'. (…) The 'commission' is a fixed rate percentage on the value of all contracts – so much to the clerk, so much to his immediate superior, so much to the manager in charge of the section. (…) [w]hile the 'gift' is for having invitations to tender placed your way; the 'commission' is for getting the order, and the 'bribe' – a negotiable amount – is paid for passing sub-standard goods or sanctioning payments for phantom supplies." (Parry 2000:45)

Another contractor also confirmed a percentage system like the one described by Wade (1982; 1985) and Parry (2000). According to this informant, a total of 5% of the bill is paid directly to the different staff at the Nigam office: one percent each for the section officer, the deputy engineer, the executive engineer, and the quality controller, 0.2% each for the accountant, the secretary and some of the other staff (small SSP contractor, interview, 31.3.2006). A percentage system seems to have been informally institutionalised for a relatively long time.

[194] I also encountered the corruption discourse during field research for my Master thesis in Ahmedabad slums in 1998 (Aandahl 2002). I then found that only a minority of slum dwellers had ever contacted a government office for help. The main reasons given were that they did not think they would get any help anyway and that they did not now where to go or how to approach the government. Personal contacts or bribes, or both in combination, were the most frequently given answers to the question of what is important to get help from a government office. However, the majority had this view not based on personal experience but on what other people had said. Most people had never approached a government office directly for solving their problems, because they believed that bribes and personal contacts were necessary.

The Indian government appointed a commission in the early 1960s to investigate ways to prevent corruption, and the report of this Santhanam commission documented among other things that a regular percentage was demanded by government offices and shared among various government officials for allocation of construction contracts in public works (Wade 1985).

The contractors also confirmed that the standard of construction was not always up to the mark. However, neither of them would admit that they did poor quality work *because of the commission*. The reason for the poor quality construction is not mainly this percentage, but the many obstacles in the construction process: interfering farmers who demand changes in the network design, delayed construction and escalating production costs. "We are forced to do bad quality work because of this," said one of the contractors I interviewed (small SSP contractor, interview, 31.3.2006).

Although I am not able to prove whether a percentage system or delay is the main reason for the frequent breaches in the Sardar Sarovar canal network, it is safe to suggest that the prevalent corruption discourse has an effect on its own, regardless of the degree to which it is the correct diagnosis of the problems of governance and policy implementation: It contributes to the very same governance problems by providing justification for policy violation and private acquisition of public goods. That the discourse has effects can be seen also in other studies of bureaucratic performance: For example, Banik (2001) shows that unfounded accusations of corrupt practices are used to justify punitive or politically-motivated transfers of government officials and that such transfers demoralise government staff, while Mollinga and Bolding (2004b) argue that widespread and unfounded accusations of systemic corruption put irrigation bureaucrats on the defensive and make them unreceptive of necessary reforms. In Jambusar, the result is a vicious circle in which delays lead to construction shortcuts and weak canals that break more easily under water pressure, which the farmers perceive as confirmation of their "percentage-*wallah*-thesis", and then use to legitimize their illegal pumping from the canals and obstruction of the construction work; the illegal pumping further damages the canals and the obstruction of construction leads to delays which again lead to poor quality construction.

”We are not social workers”

According to SSNNL engineers, the reason for the delays in repair and maintenance was the lack of funds on the budget for 2003 (Superintendent Engineer, Canal Wing SSNNL Baroda, interview, 15.10.04). Without funds released from the central office, the regional SSNNL offices cannot hire contractors and initiate repair work. As we shall see, the explanations provided by the government engineers are more in line with the arguments of Harriss-White (2004), that shortage of government funds and resources is the main reason for poor performance, rather than corruption. The resource situation is clearly frustrating for the Nigam field engineers, too, who have to face the demands and the scolding of angry farmers.

The SSNNL office in Jambusar is located in a rather smelly and worn-down building even by Indian local-government standards. It has a staff of around 30 engineers and one computer. The leader of the office, Executive Engineer V. Amin, had held the position for six months when I first met him in December 2004. Since the establishment of the office in April 2001, there had been 14 other men in his position, an example of the rapid rate of transfers in Indian bureaucracy. Their responsibilities are many: to 1) construct the Subminor canals, 2) prepare and motivate farmers for WUA membership and participation, 3) motivate farmers to build field channels, and 4) monitor water delivery and irrigation. Each field assistant has to cover the work in 2000 hectares of land, “a huge task,” complained the Executive Engineer. With only one computer in the Jambusar office, the amount of paperwork to be done also took much time. In particular, the Executive Engineer complained about the task of motivating farmers to enrol and participate in WUAs:

> “This is a very difficult task. We are breaking our heads on this task. Illiteracy is much more. At present, we cannot do as much progress as we want. Progress is zero.” (Executive Engineer, SSNNL Jambusar division, interview 13.12.2004)

Only “strong people” come to the meetings they hold to inform farmers, he said: “We inform the *talati*, the leader of the WUA, and the *sarpanch* about the meetings, but the weaker never come. They are prevented from coming.” According to him, there is little the SSNNL can do about this: “We are not social workers,” he said.

The SSNNL regional engineers argue that an important reason for the many breakages in the canals is farmers’ illicit pumping from, and frequently also deliberate breaking of, the canals.

Firstly, they say, the canals have been unused for six to ten years since their completion, and the wear and tear of time has affected them. Secondly, the unauthorized pumping of water destroys the canal lining. Pipes make indents into the lining, as we saw in Picture 4 in Chapter 10, and weaken the structures. And when farmers pump water during daytime, the water level in the canal is lowered. The canals have to run at full level for the water to reach the tail ends. The canal operators therefore adjust the water level by opening gates to increase the flow to the prescribed level. When, at night, the farmers shut down their pumps, the water level increases and the pressure exceeds what the canal is designed to tolerate (Executive Engineer, Jambusar division of SSNNL, interview, 14.12.04).

Amin admitted the problems of keeping the schedule of Subminor construction. In Krushigam, he said, "this Motu fellow[195] is trying, but he is harassed like anything". Only one village in his region had completed the Subminor network. There were many reasons for the success in this area, he said, but the main reason he could find was that the *sarpanch* and the leader of the WUA in this village were both members of the Swaminarayan sect, and so was his field assistant, "so somehow we could manage".

The field-level officers complained about the amount of work they were supposed to do. One evening in March 2006, a team of three field engineers from the SSNNL led by Additional Assistant Engineer Madrasi, stopped by Rajendrasinh and Sanjaysinh's veranda for tea when I was there. They were not responsible for the SSP work in Krushigam, but knew the Sindha brothers from earlier. Now, they were on the way back from inspecting Subminor construction and Minor restoration in their area. We talked about the problem of poor-quality construction and the lack of cooperation between the villagers and the contractors. The Nigam field officers said that the farmers refuse to let their land be cut in two by the canal network, and some people harass the contractor and demand money. The farmers know how much money the contractor loses if the work is delayed and use this as leverage for pressing him for money, they said, to which the Sindha brothers agreed. So is the case in Krushigam, they said, mentioning names but asking me to write "some people" only.

[195] Contractors Ltd had the subcontract for Krushigam from Motu Construction.

I asked about the *Piyat mandali*s and whether they had started collecting water charges now in Krushigam and elsewhere. Both the Sindha brothers and the SSNNL officers said yes, and told me the current rates. But is this really happening, I wanted to know. "Well, no," they replied jointly, "there is no public support for paying water charges. Some people refuse to pay". After some back and forth on the issue, they agreed that most frequently, people are *not* paying. Rajendrasinh said that this is wrong; the government cannot pay everything on its own if people are taking water all the time. "The project is done with the aim of making people happy and raising their standard of living," he said, "but how can this happen if no one is paying?" Madrasi nodded in agreement and said that 100 hectares are irrigated in the neighbouring village Tingam, but no one is paying. His assistant looked in the files, a big book with records of hectares irrigated and charges collected, and gave the precise figure: in Tingam 125 hectares are irrigated and no one has paid anything. The engineers finally admitted that nobody in *any* village in their sub-division was paying anything. People give lots of excuses, and they say that "the other villages are not paying so why should we?"

The problem described by Mr Madrasi was the following: The field officers responsible for collecting the fees do not have the power to stop water if farmers don't pay. Farmers are angry and uncooperative because broken canals are not repaired in time. But the Nigam office in Jambusar lacks funds as advance funding has not been given from the main office, and they can't hire contractors. In some villages, people are "good" and cooperative and help with the repair of broken canals, said Madrasi, but he was unable to explain why. "It depends on caste also," he said, "but it is hard to guess".

Madrasi argued that it would be much better if the WUAs built the Subminors themselves, but Rajendrasinh and Sanjaysinh protested: "We don't have machinery, and payment from the government is never done in time. So how much time and money can we spend on our own?" This was, as we saw in Chapter 10, the widely held view of the leading farmers of Krushigam. Madrasi suggested the farmers should hire a guy to keep an eye on the contractor and make sure he did good work. The wage for the watchman would be an expense for the *mandali*, but the work would be done in time, and the investment would be recovered when the canals started giving more profitable farming. "I can't work in five places in one time," Madrasi complained, reminding the farmers why it is impossible for the field engineers to supervise all work done by the contractors. Vijay agreed that this procedure would be a good way of

avoiding the corrupt agreement between government officials and the contractor. “But,” he suggested, “it is possible that the hired guy will also be corrupt!” “So the committee must keep an eye on the guy!” Madrasi exclaimed, “How can I do so much work!” Vijay laughingly commented: “If you do too much work, the contractor will get you transferred.”

The main problem for repair and maintenance, according to Madrasi, was that the Irrigation Department used to have labourers working under the engineers, and these would be used for regular maintenance. But they changed the system and introduced the contract system. “This is the problem,” he said, “the previous system was more expensive, but it worked, the repair and maintenance was done in time.” He was frustrated that farmers could get away with taking water without paying for it, and asked what advice I would give. I said I am only an amateur, but it seemed a good idea to stop the water if people don’t pay. They all nodded, and Madrasi opened his notebook and wrote: *“Stop water if people don’t pay”.* Unfortunately, he said, it is impossible to suggest such things further up the system. The system works the other way:

> “I get a phone call from Gandhinagar saying “I want all information about committees and irrigation in your area before evening”. But how is it possible to give information that fast, when there is no organisation? They want information about irrigated area, released water, charges collected, such information. We don’t have an organisation to collect all that information that quickly. They keep reducing our staff, there is too little staff.” (Additional Assistant Engineer, SSNNL Jambusar, interview 06.03.2006)

“So what do you tell them”, I asked.

> “*Gappa* [lies]. We give false information. Everybody does that. If it is not possible, how can we do anything else? And it is not possible to tell them that it is impossible to give such information. They don’t accept that.” (Additional Assistant Engineer, SSNNL Jambusar, interview 06.03.2006)

His colleagues joined in, and everybody agreed. They said that maybe you can send such a message two or three times, but if you keep saying it, they kick you out, or transfer you, “like Amin”. They all laughed at the mention of the transfer of their superior. The general feeling among farmers and these engineers was that this was a punitive transfer due to slow progress. “They will order an inquiry into your work and remove all your powers or harass you”, they said.

> “So we just add to the previous information: if we said 100 last time, we say 105 now.” (field engineer, SSNNL Jambusar, interview 06.03.2006)

This information is then passed upwards in the system and aggregated, from section officer (Madrasi), to Deputy Engineer, to Superintendent Engineer, to Chief Engineer, to the Director and finally to P.K. Lehri, the Chairman of the SSNNL. Aggregated, it becomes the official statistics of progress in the project, the numbers quoted to researchers like me, published on the project website, given to journalists, and from there on to the general public.

A standard bureaucratic "pathology" is the tendency to displace the original project goals of social transformation, progress, and improved well-being with quantitative and measurable indicators of performance (Scott 1998). Scott uses the Tanzanian *ujamaa* villagisation scheme to illustrate this. In the Tanzanian case, qualitative development goals were replaced by readily measurable indicators: the numbers of people moved, number of villages created, acreage cleared and ploughed, and tons of fertilizer delivered. This simplification permitted aggregation and comparison, and these indicators became the measures of success, regardless of how well or poorly the new villages functioned. There are clear signs of the same process happening in the SSP.

Almost all the government officials I talked to about the SSP knew the numbers of the project by heart. Quite early on in our conversations, whether the occasions were an interview or a request for a map or a list of command area villages, they would spontaneously tell me the status of the project through its numbers. One fact was repeated by all, that in Phase 1 of the SSP, from the Dam at Kevadia to the Mahi Aqueduct, 1192 Water Users' Associations had been registered. This number did not change from March 2004 to March 2006 when I did the last interview. This would be supplemented with other quantitative facts. One official would say that there were 443,587 farmers in Phase 1 of the command area, another would say 3.16 lakh landowners, one would add that of the 1192 WUAs, 1179 had been registered under the Cooperative Act, yet another would tell me that they had held 3000 village-level farmers' meetings, 200 *taluka*-level meetings, and 50-70 district-level meetings, or that 85 Village Service Areas had completed the canal network down to the Subminor level and that in the current season 1-1.5 lakh hectares of the 4.46 lakh hectares in Phase 1 were irrigated. None of the officials ever had to look these numbers up in a file or report.

Like with the goal displacement in Tanzania's ujamaa scheme (Scott 1998), quantification and enumeration has replaced quality and function in the evaluation of success. These

numbers were the measures of the progress of the SSP, and proof of the immense efforts the government had invested in the project. A new bureaucratic management model adopted by the SSNNL in 2003 may strengthen this quantitative focus. The organisation introduced the MBO-model: "Management By Objectives". At the beginning of every year, every officer establishes targets for himself. Then the required activities for reaching the target are identified "stage and component wise", and responsibility for tasks are allocated. The progress is monitored and targets revised every six months (Executive Engineer, CAD Wing SSNNL Gandhinagar, interview, 2005). The pressure to meet these targets does not encourage field engineers to report more truthfully about the state of project implementation in their sub-divisions.

Farmer-government encounter at Khandha Test Farm

The SSNNL organises several large Farmers' Meetings where command area farmers are informed about agricultural techniques and irrigation policies. I participated in one such meeting at the SSNNL Irrigation Test Farm in Khandha village in Karjan *taluka* on February 28th 2006. The test farm is run by Anand Agricultural University. There were interesting dynamics between farmers and the government to be observed at this meeting. Around five hundred farmers were present, listening to plenary talks by six prominent experts, leaders of the SSNNL and experts from the University. On the podium were also the chairman of the local cotton gin and the chairman of the local cooperative sugar factory.

Picture 9. Farmers at the Farmers' function at Khandha Test Farm, March 2006

(Photo: Guro Aandahl)

The farmers present were members of the WUA committees of their villages, along with other big farmers. I talked to one farmer who said he was the leader of the WUA in his village, and that 17 farmers from his village had come to the meeting. These were the largest landowners of his village. He had been to seven such meetings the last year, and found them useful. They apply the new methods at home and then other farmers copy them when they see that it works. As in Jambusar, the Subminors were not completed in his village, and farmers were irrigating through siphons, he said. I asked whether they also used diesel pumps. The farmer first denied this, saying it is not allowed. When I said I knew that this was common in other villages in the absence of Subminor Canals, he admitted that the Nigam was liberal on this and that they indeed did use pumps. As we have seen, diesel pumps were not more illegal than siphons, as long as the procedures in the interim irrigation policy was followed, but the exact contents of the interim policy was clearly confusing to many farmers. In Krushigam, for

example, many were of the mistaken opinion that one was allowed to install pumps in the canals only after paying a 1000 Rs fee to the Nigam office (not a bribe).

The meeting started. "Like we charge our mobile phones at night, you are here to be recharged," opened the first speaker, an academic expert from Anand Agricultural University. The various speakers talked about the importance of water-saving techniques like drip and sprinkler irrigation, about vermicompost and organic farming, about domestic and international markets and price fluctuations. The farmers listened in concentration and with interest.

"*A naher amaaru nathi, a naher tamaaru chhe!* – This canal is not ours, this canal is yours," said Chairman of the SSNNL, Mr. P.K. Lehri, continuing "*Pani tamaaru chhe, ane pani tamaaru mate chhe!* – The water is yours, and the water is *for* you!" However, there is a tension between this rhetoric of farmer ownership and the policies that limit the possible uses of the water. When the chairman of Khandha Cooperative Sugar Factory asked the Nigam to release water in the summer for fodder production, the entire crowd broke out in spontaneous applause and cheering. One farmer went to the podium and requested that water should be released through June, and the audience again applauded. The order of the meeting was disturbed and the tent was filled with shouts and murmurs demanding water longer, if not until June, then at least until May; if not until May then at least until April. Chairman Lehri tried in vain to calm the crowd down. At last he was heard and said the water is not only for them. He stressed that the Narmada water is limited and has to reach "our brothers in the North and Saurashtra". It has to be shared. If it is to reach Kutch and Rajasthan the farmers cannot get all the water they want. He further said that sugarcane requires lots of water, continuous irrigation for 15 months. It will only be allowed if the whole village adopts drip or sprinkler irrigation. An expert from Anand Agricultural University then told the audience that the Test Farm would do experiments to develop less water-intensive varieties of sugarcane.

The presence of a chairman of a sugar factory at an SSNNL Farmers' Meeting is in itself interesting. One of the main charges of the critics of the SSP is that the powerful sugarcane lobby in Central Gujarat will seize most of the Narmada water for their water-intensive crop so that water will not reach Kutch or other tail ends of the canal network. The SSNNL and the SSP planners have vehemently insisted that they will not allow cultivation of sugarcane with

Narmada water. In *Planning for prosperity,* they emphasise that "[T]emptation to go in for water intensive agriculture involving perennials like sugarcane, bananas and seasonals like paddy will be strictly controlled" (Narmada Planning Group 1989:185). D.B.Vyas, Executive Engineer of CAD Wing, SSNNL, later explained to me that the sugar-factory chairman was invited by the local organisers in Khandha:

> "He might be a leading person in the area. Keeping him away would have created more problems. And things were made clear to him by the CMD [Chairman and Managing Director, i.e. Lehri]. So it was good that he was there, that things came out clearer. Now they know that if people want to grow sugarcane, they have to use drip or sprinkler irrigation." (Vyas, interview, 27.3.2006)

When the session at the podium was over, the farmers could visit stalls with information on agricultural techniques and inputs. I found myself in the middle of a heated exchange between a scientist from Anand Agricultural University and two farmers, one of which from Kheda. The two farmers complained about the useless government and all the problems in agriculture, from erratic rain and pests to labour. The scientist interrogated the Kheda farmer: "Do you visit your farm every day? Do you know how to drive the tractor? Do you know how to spray pesticides?" To which the farmer replied that the *labourers* do all these things. "Right," said the scientist and turned to me "See, the problem is that these people are not farmers. They are *supervisors*." I asked the other farmer to elaborate on the labour problems. He explained that to find labourers is always difficult, and for drip irrigation you need a lot of labourers who can deal with the technicalities. "For you it is easier," he said to the Kheda farmer, "In Kheda, farmers have only ten acres of land, right? Whereas I have fifty acres and it is very difficult to supervise labourers on all that land." The scientist asked him whether he goes to his farm every day, and the farmer replied: "That is the problem. I live in Baroda, where I have service. How can I possibly supervise my farm every day?"

These farmers are examples of a class of farmers who are not engaged in the daily operations of farming. The largest land owner even had a permanent job in the city but still kept his land. "Service", or *naukri* in Gujarati, is a salaried job. This is a highly valued position to which most medium and large farmers I met aspired, if not for themselves so for their sons. I don't have any statistics of the prevalence of combining agriculture with having a job in the urban sectors, but I found that landed families rarely sold their land to invest in other businesses, but kept the land and labour under supervision of family members or gave it for share-cropping

when they moved out of the village. In Krushigam, there were only a few instances of such absentee landowners. In Motugam, with a more diversified economy and more central location, the combination of service and agriculture was more common. Land was usually only sold in extreme distress conditions, and even then most preferred to mortgage the land and not sell it. The same relations to land is found in Breman's study sites in South Gujarat (Breman 2007). These are a more modern kind of absentee landlords, the old class of whom was largely abolished with the first round of land reform after Independence (Shah 2002). If these conditions of modern absentee landownership prevail in large parts of rural Gujarat, this might pose yet another challenge to the prescribed policy of the SSP: A precondition for participatory irrigation management must be that farmers actually live in the village and interact day-to-day with neighbouring farmers and co-shareholders in the WUA, and that they can participate in meetings and conflict resolutions.

Dilemmas seen from the top level

In the head office of SSNNL in Gandhinagar, the problems of implementing Participatory Irrigation Management (PIM) and getting farmers to cooperate with each other and with the government were acknowledged. Executive Engineer of the Command Area Development Wing of the SSNNL, D.B.Vyas, said that PIM is a new concept for farmers as well as engineers:

> "The engineers will naturally focus more on the construction process, and the farmers expect the government to deliver at the doorstep. But the Narmada project is of such dimensions that it is not possible to deliver at the doorstep. Gujarat has a long history of successful cooperatives, as seen in the Amul story. So we thought that farmers should be involved. The farmers will have to invest something, therefore they are not responding initially. But over the last ten months the picture has been quite good, the membership drive is finally working, enrolment has increased, even cooperative societies have started registering." (Vyas, interview, 3.3.2005)

But this is a difficult job for the engineers, he said, as "they have never done this sort of social engineering before" (interview, 3.3.05). In 2006, he repeated that the main challenge of the project was Participatory Irrigation Management: "Making people participate in the way we want is hard" (interview, 27.3.06). The challenge of social engineering, of making the farmers behave in the manner necessary for the functioning of the scheme, was recognised and echoed by most engineers I talked to. One Deputy Executive Engineer in the Baroda office of the Nigam complained about the problems of formation of WUAs:

> "In certain areas farmers are saying 'first you show us the water, then we will become members'. The farmers don't visualize the actual beauty of the water users' association, so they don't come forward." (Deputy Executive Engineer, SSNNL Baroda, interview, 11.01.2005)

One experienced irrigation engineer who had worked six years in the SSNNL and before that several years as Executive Engineer in the Irrigation Department's Central Design Organisation, complained about the lack of training for such tasks:

> "Engineers are taught how to acquire land, survey it, prepare the tendering etc. He is not taught the socio-economic aspects which are needed after the engineering work is done."(SSNNL engineer, interview, 03.03.2005)

Several of the Narmada engineers and planners I interviewed referred to the successful Amul story in Gujarat as a model for irrigation management. Amul is one of the most widely acclaimed success stories of rural development in Gujarat, and a model which has spread to other states. It was initiated by Professor Verghese Kurien in 1946 as a cooperative dairy, and the National Dairy Development Board (NDDB) took the model further through what was called "Operation Flood" or India's "white revolution" in 1970. Through village-level marketing cooperatives, even the smallest farmer can deliver as little as half a litre of milk to the local dairy cooperative and get a fair price for it. "If you feel the NDDB was a success," said Sanat Mehta, former Finance Minister of Gujarat and former Chairman of the Nigam, "then this can also be fulfilled: water co-operations from below" (Sanat Mehta, interview March 2006).

The reluctance to participate in WUAs in the SSP has been explained partly with a recent breakdown in the cooperative movement in Gujarat (Shah 2004; Talati and Pandya 2007). In their study areas, cooperative credit banks for agriculture had gone bankrupt, and the Amul cooperatives were not established there. Talati, Pandya, and Shah therefore suggest that people in these areas have lost trust in the cooperative movement. However, in Krushigam and surrounding villages, the cooperative credit bank and Amul dairy cooperative were operating successfully, with low levels of conflict and high levels of participation and loan recovery. The answer may therefore lie not in the viability of "cooperatives" as a general model, but what kind of cooperatives. The Amul cooperatives are *marketing* cooperatives and require little cooperation and negotiation between farmers beyond organising a board and a milk collection centre in each village. An irrigation cooperative is a *management* cooperative,

where farmers have to organise and negotiate the fair sharing of a limited resource. This has proved to be much more difficult.

In a pilot scheme, the SSNNL had subcontracted the PIM work to some NGOs in parts of the command area[196]. But the NGOs and the Nigam did not agree on the best organisation of PIM. One NGO had in 2005 (just before my meetings with Vyas) recommended that the formal Minor-Canal administration rights were handed over to the WUA when only 51% of the farmers had enrolled, but the SSNNL refused this. If the administration rights were given to these 51% farmers, Vyas feared that they would monopolize the water, not take care that the Subminor canals were built, and sell the water to other farmers. The SSNNL wanted there to be at least 80% enrolment and also that 25% of the members of the WUA should be "tail enders", i.e. have land in the tail end of the canals. "One would believe that these concerns would be held by the NGOs, who are supposed to be pro-poor, and not the government" said Vyas (interview, 15.3.05). A year later, the SSNNL had apparently accepted that 51% enrolment had to be sufficient before the formal management rights were handed over to the WUA. At this time, Vyas told me that the policy was that 51% of the farmers should be members and that 25% should be tail enders. The SSNNL probably realised that 80% enrolment was unrealistic in many of the VSAs.

A similar negotiability of irrigation policy and adaptability of government was shown when it came to the irrigation schedule. Although the initial schedule for the winter irrigation season of 2006 was to end water delivery on March 15th, the season was prolonged fifteen days because of demands from farmers. Vyas commented on the issue:

> "The question is whether this is a problem or if it is good? If they get water longer, they get protective irrigation, it is good. So we gave extra water for a week or so. The water was meant for drinking water, but winter wheat was sown late this season, and water was needed longer." (Vyas, interview, 27.3.2006)

The lack of sanctions for violation of irrigation policy can be seen as the result of a dilemma. The irrigation department and the SSNNL want the farmers to use water:

[196]As we saw in Chapter 8, NGOs had been involved in the implementation of PIM in the SSP since 1994, because the planners and SSNNL engineers assumed that the NGOs were closer to the people and would be able to communicate more easily with farmers.

> "Water is an essential commodity. If we stop the water, the crop will fail and you will loose the production. We *want* the farmers to use irrigation water. They know this, and play this card." (Vyas, interview, 27.3.2006)

I believe Vyas here provided an important clue to understand the implementation problems of the SSP. Rather than being disempowered and deskilled by a centralised high-modernist canal irrigation scheme, the farmers may have 'cards to play', and the relationship between government and farmer is less a question of state dominance than has been suggested.

As was also documented in the study by Talati and Shah (2004), there is a widespread perception among project beneficiaries that the need of the state to deliver water is greater than the need of the farmers to use canal water. The state provides irrigation water with the aim of increasing agricultural production which is necessary to achieve the projected returns on the huge investment made in the SSP. In addition, with the long history of intense conflict, it is important for the government to prove that the controversial SSP is a 'success', and success depends on agricultural productivity. There are two sanctions available to the government: to stop water or to fine individual farmers. The first would be a collective punishment of an entire Village Service Area, and would thus seriously undermine the need of the SSP to demonstrate that the project increases agricultural productivity. The second sanction, fines, seems equally unlikely to work as the government is already not able to collect the water fee[197].

The field officers are furthermore not of sufficient authority to go against the powerful local elites, especially not in politically important areas. Vyas and other engineers blamed the "lack of political will" for the irrational water use. Vyas explained that politicians are part of the reason for the lack of efficient sanctions against policy violations. Firstly, politicians will too easily accommodate the farmers' demand for water:

> "If we stop the water, the farmers will make a delegation to the Chief Minister and the politicians. They will claim that they will pay later if the water starts running again, and they will get this agreement with the politicians." (Vyas, interview, 27.3.2006)

[197] A third option was never even mentioned to me by the SSNNL engineers: confiscation of pumps that were pumping water illegally. This would likely have been a very efficient threat against illicit irrigators, but seems to have been a too politically controversial punishment to even consider.

And secondly, it has been politically difficult to remove distorting agricultural subsidies and charge appropriate water fees. As described in Chapter 3, cheap electricity for farm pumps has been an efficient vote getter in Gujarat since 1988 (Dubash 2002), and so is the promise of water. Many engineers complained to me about the political clout of the farmers and the irrational water use resulting from it, as exemplified by the following quote from an engineer who concluded that "our only problem is democracy":

> "Agriculture is subsidised at all levels. Farmers are not paying the actual costs. We are providing water at negligible cost to the farmer. If water is available so cheap, then will he be inclined to invest lots in drip irrigation? At the least we could have charged more for the electricity used to pump water. Groundwater is now pumped with subsidized electricity. So will the farmer be inclined to save that water? Nobody will understand the scarcity of water unless it is costly." (SSNNL engineer, interview 2005)

The political use of the Narmada water was evident in the weeks leading up to the elections in Gujarat in March 2004. Along the banks of the Main Canal north of Gandhinagar near the offtake of Saurashtra Branch Canal, I met a sub-contractor responsible for the ongoing lining work on the canal. Because the work was unfinished, both the Main Canal and the Saurashtra Branch Canal were dry, but he had received a letter from the SSNNL that water would be released into the (still unfinished) Saurashtra Branch Canal between the 22nd and 30th of March because of the elections. This was clearly an attempt of the sitting BJP government to make political capital of the Narmada water.

Furthermore, the unsynchronized construction of the reservoir and the distribution system presents the government with a dilemma: In the absence of a complete canal network, there are large volumes of water available from the Sardar Sarovar Dam and in the larger canals. What should one do with this water? In the interim phase, the SSNNL has decided for interim allocation of water. As we saw in Chapter 10, the interim policy allows pumping from the canals and the government looks through its fingers at the lack of compliance with the interim policy rules. In addition, the government decided to fill Narmada water in existing village ponds, lakes, and rivers, even outside the command area. This served to recharge severely depleted groundwater, and improved irrigation availability in many areas. A question is what will happen when the canal system is finished, and the government tries to impose austerity

on the water users with stricter rules? One irrigation department official[198] commented on the dilemma:

> "If you give water for ten years and then stop, there will be riots. Some will say we should therefore not give outside the command area. But the other school says: Should we waste water for ten years?" (Joshi, Executive Engineer Kalpasar project, interview 17.03.2004)

BJP politician and former Irrigation Minister Jaynarayan Vyas[199] was known to have voiced strong words about the creation of "rivers of blood" because of the lack of control of water use in the interim phase after the release of Narmada water in the unfinished network[200]. To me, he would admit no such strong comment[201] but he admitted to having worried in public about the lack of volumetric pricing, which "should be implemented at the earliest". Giving Narmada water to areas which will not get water in the future is creating water rights, he said, "and nowhere in the world can any politician take away water rights once they are established". However, it is "not possible to withhold water from people when it is flowing in front of their eyes", he said. His strong advice was therefore to complete the canal network and enforce volumetric control and pricing at the earliest, and in the mean time "educate the farmers that the water will be rationed in the future" (Jaynarayan Vyas, interview, 7.12.2004).

The balancing acts of government engineers

The preceding discussion suggests that the SSNNL's power to punish policy violation and enforce implementation is severely curtailed. Firstly, the SSNNL offices are overburdened with the task of managing both physical and social engineering in the command area. They lack sufficient funds to hire contractors for repair and maintenance work, which in turn leads to resentment and lack of cooperation from the farmers. Construction is delayed for several reasons. One thing is that individuals or groups of farmers or the Panchayat blocks construction. Another reason is that the actually existing canal network does not correspond to

[198] Formerly with the SSNNL over many years, now Executive Engineer for the new Kalpasar project in the Department of Narmada, Water Resources, Water Supply & Kalpasar (name of Department of Irrigation in Gujarat Government in 2004).
[199] Former Minister for Narmada and Major Irrigation Projects of the Government of Gujarat (1995-1997, and 1998-2000), and former chairman of the Sardar Sarovar Narmada Nigam Ltd (1995-97) during the BJP Government.
[200] Y.K.Alagh told me this and suggested I interview Vyas for a critical perspective on project implementation.
[201] Presumably because he perceived me as likely to be a supporter of the Narmada Bachao Andolan, and also because he was planning a comeback as politician in the next Gujarat Assembly elections.

the SSNNL maps, because the government officials altered the location of outlets or direction of canals after requests from the farmers during the construction of the bigger canals. This, as we saw in the previous chapter, was the case in Krushigam, and I was told by contractors that this was a common phenomenon.

The work of the government engineers can be described just as well in terms of balancing and negotiation as in terms of dominance and rent seeking. It is often claimed that the reason for the implementation problems of participatory management models at the field level is that the process is thwarted by field engineers realising that the transfer of powers to farmers will deprive them of an additional source of income through bribes (a claim found in for example Singh 2002; Mosse 2003; Wood 2007). My field research does not corroborate such a claim. It may well be that the SSNNL field engineers occasionally also demand bribes for their services from command area farmers, as popular belief would have it, but I did not come across any direct accusations of this kind. A percentage system for contracts, however, seems well documented, but this works more indirectly to upset the implementation of plans, by depleting the government of financial resources, and through a possible lack of control with the quality of the work of contractors.

We have seen that the power of the SSNNL engineers are limited both from above and from below, they have to balance the needs, demands and concerns of both project beneficiary farmers and policy makers and politicians. At the field level, the field engineers are unable to carry out efficiently their supervisory and advisory task because of the sheer size of the area they are supposed to cover. In addition, they told me about a heavily top-down communication structure where orders are handed down from above and feedback from the ground level is not welcomed but fake statistics are accepted as fact. To be able to do their job – to motivate farmers to organise water users' associations and spread information about policies and regulations – the field engineers must rely on and use already existing structures of authority in the village. They call for village meetings, but for the information to be spread around the village, they must use the leading farmers who are in charge of the WUA but who see no need to make it functional before there is any water to deliver. All government officials who pass by Krushigam stop at Rajendrasinh and Sanjaysinh's veranda, which gives these farmers and the circle around them a clear advantage over other farmers in access to the government. When asked to explain why implementation was easier in the very few villages

deemed a success, the lower-level engineers mentioned for example that in one village the field engineer and the leader of the WUA belonged to the same Swaminarayan sect and that it was therefore easier to build trust, or they mentioned that "it depends on caste also" but refused to explain that any further. Thus we see that the implementation of formal plans and policies depends on the pre-existing, informal or traditional structures of village society.

The importance of local powerful figures was also seen at the Farmers' Function organised by the SSNNL at Khandha test farm. The chairman of the local cooperative sugar factory was invited to the meeting, most probably because he was "a leading person in the area" and keeping him away would have caused more problems, according to Executive Engineer Vyas, who thus indicated the dependence of the government on being on good terms with the powerful local forces.

Above the government engineers, the elected politicians have the power to overrule their decisions, and the allocation of water to important constituencies is an important political resource. The government engineers say they resent the irrational water use that results from this practice, but it is not within their power to stop it. As documented by other studies of Indian bureaucracies (Wade 1985; Banik 2001; Harriss-White 2004), they may also have reason to fear punitive transfers if they complain too loudly about it.

Summary

This chapter has discussed the explanations for the poor quality of the SSP canal system and the problems of implementing Participatory Irrigation Management in the command area. It has shown how a common belief in widespread government corruption, what I call a corruption discourse, is used by farmers to legitimize non-cooperation. The farmers explain the poor quality of the canals with a "corrupt nexus" between the government officials and the contractors, and use this to justify non-cooperation with and obstruction of the canal construction. At the same time, the evidence suggests that the farmers' uncontrolled pumping from the canals is one of the reasons why the canals are damaged and burst under pressure, and that the many delays (some caused by farmers' resistance) in the construction process are important reasons for poor quality construction. My research may thus confirm what was suggested by Myrdal (1968) and Parry (2000): that the belief in a corrupt government has an

effect on its own because it will influence how people behave towards the government and its policies.

The government engineers in general do not enforce the interim irrigation policy on unwilling farmers. Instead, their role is one of balancing and negotiating between sometimes conflicting aims and demands. The interim irrigation policy is a compromise between the original SSP aim of volumetrically controlled water use and the need to put the Narmada water to productive use as soon as possible. The longer farmers are allowed to pump uncontrolled from the canal network, the stronger the perceived entitlements to Narmada water will be. The farmers have cards to play in the management decisions of the SSNNL, as both the SSNNL and the political leadership of the state want the farmers to use water. The electoral power of the farmers has proven to be a strong force in agricultural policy making in the State, and the SSNNL engineers are frustrated over the impacts this has on sound and sustainable resource use. The power to allocate water and other resources where this will pay off in the elections is an important political resource.

At the local level, the SSNNL field engineers depend on the cooperation of the local elites and informal social structures for getting their work done, and factors that enhance the level of trust between the engineers and the local leaders, like caste and religion, also seem to play a role. As the local offices are overburdened with tasks, lack funding to carry out necessary repair work, and lack realistic sanctions against policy violation, the engineers find themselves in a vulnerable position. The power of the engineers is thus constricted by both the demands of the local population and the interests of the politicians who can overrule their decisions and have them punished with unfavourable transfers.

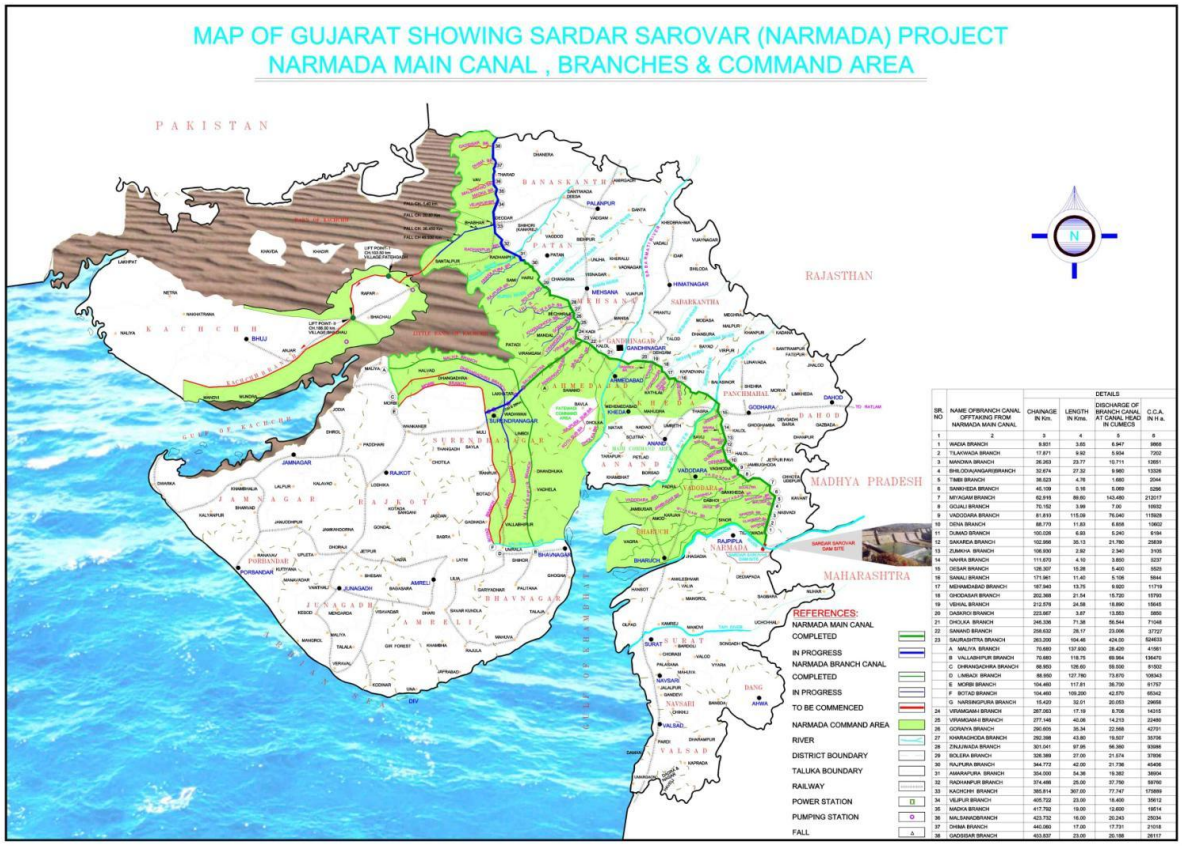
12. Water: an unwieldy and political resource

As we saw in Chapter 5, critics of the SSP claim that the water will benefit only the rich and politically powerful farmers of Central Gujarat. In Motugam, I found the possibility to explore this claim, as it is one of those politically powerful villages in Central Gujarat. The case of Motugam further illuminates how water is a political and rather unwieldy resource, as well as the complexities involved in managing water at the village level. Motugam is located on the left side of the Narmada Canal and would have been included in the SSP command area if it were not for the fact that it was supposed to be served by another canal-irrigation scheme: Panam. Motugam was therefore never included in the SSP. As we saw in Part 2, the SSP command area was planned based on topographic and geo-hydrological constraints and the social benefits of water in different regions. Areas that were already under canal irrigation were excluded from the SSP command, like the large Mahi command area in Kheda district in Central Gujarat. The large white field in the middle of the green command area shown on the map of the SSP command represent the Mahi command (see Map 6).

Another canal-irrigation scheme came into operation in the same years as the SSP planning started: the Panam Scheme in Panchmahals district in Central Gujarat, construction of which had started in 1971 (Government of Gujarat 1972). Motugam and the tail end of Panam command falls in the area east of Mahi River and west of the Narmada Main Canal, and is too small to be shown on the SSNNL map. The problem is that the Panam scheme, with a command area of 36,400 hectares, has never been able to serve around 6000 hectares at its tail end. Of these tail hectares, 840 ha belong to Motugam. The canals were never able to carry the amount of water necessary to flow all the way to the tail. In addition to poor maintenance, documents from the Panam officials indicate that the dimensions of the canals were probably wrong from the beginning[202].

[202] Indicated in the many letters received by the *sarpanch* of Motugam (List of letters in Appendix 7)

Map 6. The Sardar Sarovar Project command area



(Source: www.sardarsarovardam.org)

The farmers of Motugam had therefore installed three large iron pipes, what they call a *baknari* ("siphon" in Gujarati), in the Narmada Main Canal, helping themselves to Narmada water. SSNNL field engineers repeatedly asked them to remove the pipes but farmers refused. "I am *taluka*-level leader of the BJP," said Chandabhai Patel, the *sarpanch* of Motugam, "the Nigam officials dare not remove our pipes, because I have political connections. The farmers' lobby is too powerful. The Nigam will not deny us water" (interview, 21.3.2004).

The story of the Narmada *baknari*

Motugam tried to be included in the Narmada command area legally well before installing the *baknari*. The panchayat of Motugam first applied for formal inclusion in the SSP command area in the *kharif* season of 2001, but the SSNNL repeatedly rejected their applications. The reply to an application sent in July 2002 reads:

> "The western area of Godhra *taluka* is included in Panam command area, and thus it is not included in Narmada command area. According to the judgement of the Tribunal,

> the water from Narmada canal is not enough and we don't have extra water which we can transfer to the Panam command." (letter from SSNNL to *sarpanch* of Motugam[203])

In August 2002, Narmada water was released in the Main Canal and started flowing along the fields of Motugam. It did not take long before the farmers took the matter into their own hands. The rains in Central Gujarat failed the farmers in 2002. According to the leaders of the *baknari* association it was this autumn that the farmers came up with the idea of filling the Panam canals of their village with Narmada water. Because of the failed crops, the farmers were not busy and sat talking in the market complaining about the drought, and gradually they developed the idea of a big *baknari*. At first, they thought of a small pipe, but the *sarpanch* thought this would not suffice. He called a meeting and suggested they fill the capacity of the existing Panam canal network with Narmada water. They decided to collect the money themselves. They designed a siphon of three iron pipes, each with a capacity to carry eight cusecs of water. The Panam canals could only carry 24 cusecs, so this was the maximum. An appropriate location for the *baknari* was found by carefully measuring the level of the land along the Man Canal bank until a spot at the level just below the water level in the canal was found[204]. Funds were raised from each farmer in the command area, 9 rupees per *gunta*[205] from 140 farmers. On November 10th 2002, the *baknari* was installed. Some were reluctant to pay, so others contributed more than their share. One well-off farmer even contributed 30,000 rupees from his own pocket, and when the water started flowing, the other farmers paid him back. The *baknari* association still collects a water charge from the users and deposits the money in a bank account while they wait for formal recognition from the SSNNL (interview Chimanbhai, chairman of Narmada Suchit *Piyat mandali*, February 2005).

[203] Translated by my interpreter Mehali Patel during interview with *sarpanch* 21.3.2004.
[204] A siphon transfers liquid from a higher to a lower level by suction driven by the force of the atmospheric pressure differentials, and there is no need for pumping.
[205] "Gunta" is a Gujarati land unit measuring 1/40 acre.

Picture 10. The Motugam *baknari* pipes in Narmada Main Canal, 2005

(Photo: Guro Aandahl)

Picture 11. Panam canal network with Narmada water, 2005

(Photo: Guro Aandahl)

Unlike most other illegal pipes which sucked and pumped water from the Narmada main canal, the Motugam *baknari* was collectively owned and the farmers who got water through it paid water charges. They had formed a Water Users' Association and called it the *Narmada Suchit Piyat mandali*. This means "The Narmada Suggested Irrigation Association", indicating the farmers' aspirations for future official recognition of their WUA under the Sardar Sarovar Project.

With the *baknari* installed, Motugam continued applying for Narmada water, now for legalisation of the *baknari*. On December 12, 2003, *Sarpanch* Chandabhai approached State Minister Prabhatsinh Chauhan with an application for receiving water from Narmada Canal by lift irrigation, and was assured in a letter from the Minister's Personal Secretary that the Minister had asked the Chairman of the SSNNL to "take quick action on the issue"[206]. Nevertheless, the application was rejected. "It is not mechanically advisable to give water by

[206] Letter of 7.1.2004 to Chandabhai Patel from personal secretary of Prabhatsinh Chauhan.

the system of lift irrigation by putting a machine in the Narmada Main Canal," writes S.J.Desai, Manager of Canals in the SSNNL, and continues,

> "it is also not the policy of the Sardar Sarovar Project. At present in the Sardar Sarovar Project, only after satisfying the need of the irrigated area additional water is used for recharging the rivers and other projects. As mentioned above, it is not possible to accept the demand for water by lift irrigation in the main canal." (letter from SSNNL to Prabhatsinh Chauhan, 15.4.2004)

Prabhatsinh Chauhan sent a new letter to the Minister of Water Supply and Water Resources, Narottambhai Patel, towards the end of 2004, and in a letter of December 31, 2004, the Water Minister replies that his letter on the "inclusion of non-irrigated lands of Godhra *taluka* in the Narmada command areas" has been sent to the Secretary of the Department of Water Resources asking them for "for quick actions on it" and "to do the needful and solving the problem"[207]. But permission for lift irrigation from the Main Canal was never granted.

Despite the rejections, the Motugam farmers kept siphoning water from the Narmada Main Canal into the Panam distributory canals. When SSNNL officials patrolling the Main Canal ordered them to remove the pipes, the *baknari* guard would send them to Chandabhai who would threaten them with reprisal from his political contacts high up in the BJP apparatus and from angry farmers:

> "We threaten the Nigam that if they remove the pipes, the farmers will break the canals. We have to go to this step, because we must do anything to get water. If not this way, then that way." (Chandabhai, interview, 3.2.2005)

In January and February 2005 when I returned to Motugam, everyone I talked to were confident that the *baknari* could continue. The refrain I heard over and over was that Chandabhai has connections, and therefore no official would dare to go against him. The statement from one small farmer is typical of the sentiment in 2005:

> "Our panchayat members know the politics and are related to political parties and they make sure we get the water. We know it is illegal, but our *baknari* is the best. We plan to get it registered and made legal." (Patel marginal farmer, interview, January 2005)

Not only farmers were concerned about the prospects for continued supply of Narmada water. For the cattle-herding *rabaris*, the perennial flow of Narmada water in the Kundh River

[207] Letter of 31.12.2004 from Narottambhai Patel, Minister of Water Supply and Water Resources to Prabhatsinh Chauhan, Minister of State, Cow Protection, Holy Places and Pilgrim Place Development.

provided water for the cattle and improved the grazing conditions. They were also aware of the *baknari*, which they thought would be allowed to continue. A group of *rabari* women expressed confidently that the villagers of Western Panchmahals were properly represented in Gandhinagar. "Ministers of Gujarat are mostly from around here", they told me, and the Ministers "take care of villagers". They mentioned Bhupendrasinh Solanki, Member of Parliament from Lunavada, Prabhatsinh Chauhan, MLA from Kalol and Tourist Minister of Gujarat, and Harish Bhatt, MLA from Godhra. The contact with the Ministers was maintained by the *sarpanch* Chandabhai:

> "Chandabhai is into charity and social work. He is talking to the higher ministers and asking them to let the water flow" (Rabari women, group interview, January 2005).

After the installation of the *baknari*, the Panam authorities stopped maintaining the Panam canals in Motugam. The Suchit *Piyat mandali* now took care of this, as well as the hiring of a guard to watch the pipes in the canal, supervise irrigation, and collect the water charge. The *Mandali* also organised maintenance of the pipes. The *baknari* had frequently stopped working, either because it was blocked by debris carried in the canal or because the water level in the Narmada Main Canal dropped. In 2004, the *baknari* had to be restarted 17 times. Each restart requires a tractor and 4-5 labourers and is therefore expensive, amounting to around 400 rupees. Early in 2005, they therefore installed a 255 kg iron net to prevent objects from blocking the pipes (interview, Chimanbhai, Chairman of *baknari* association, 2.2.2005).

Chimanbhai, as head of the Suchit *Piyat mandali*, had in winter 2005 received a notice from the SSNNL to remove the *baknari*, but the farmers still did not comply. The message from the SSNNL was also unclear. In a way, they treated the Motugam *baknari* with semi-recognition, as they said the farmers could take water if they paid for it, at a rate of 80 Rs/acre, and asked them to make a list of irrigators for the basis of fee collection. The Suchit *Piyat mandali* performed their duties, they collected water charges and had prepared a list of *baknari* members for the Nigam, although with an adjustment as they only reported to irrigate around 30 to 50% of the actually irrigated land in order to keep some money for maintenance and administration of the *Mandali*.

However, when I returned to Motugam in March 2006, the *baknari* was removed. The SSNNL had finally filed a police case against the chairman and vice-chairman of the Suchit

Piyat mandali. The reason for the strict action against the Motugam *baknari* and not the other pipes installed in the Main Canal was that the pipes were of iron. In the interim irrigation phase, they could allow plastic pipes in the Narmada Main Canal, but not iron pipes because they destroy the lining of the canal. The farmers had argued about the pipes with an Executive Engineer from the Nigam, who had told them: "We are pressurised from high level in the government and our jobs are in danger". However, it was not sympathy with field officers but the threat of losing the pipes to the police which made the farmers remove the *baknari* (Chimanbhai, interview, 16.3.2006).

The removal of the *baknari* was well known in the village, although detailed knowledge of the process was limited to the leading circle of farmers. "Narendra Modi closed the *baknari*," said a labourer in Baria Faliu, summing up at least one core part of the process. In May 2005, a delegation of five farmers including Chandabhai and Chimanbhai had gone to Gandhinagar to present their case before Chief Minister Narendra Modi, accompanied by Prabhatsinh Chauhan, now Minister for Tribal Affairs. Chauhan had explained to Modi that the Narmada water was flowing to waste in the rivers, and it was better to give it to the farmers. Modi had said that they "would think this over carefully and decide later whether they think this is proper" (interview with Chimanbhai Patel, 16.3.06). "Don't ignite them on this issue," he had said to Chauhan, "We will think this over carefully and then later decide". To the farmers, Modi had said: "You are stealing water and you should not. You should remove the *baknari*" (Chimanbhai, interview, 16.3.2006).

The leaders of the *baknari* had their own theory of why it happened. Medha Patkar was to blame. "Medha Patkar is arguing that if Narmada water is given outside the command area mid-way, it will never reach Kutch," explained Chimanbhai, the chairman of the Narmada Suchit *Piyat mandali*, "Therefore, the Narmada authorities are saying "let it be illegal for the moment, and let us finish the canal network and see after it is finished whether there is enough water"" (interview, 02.02.2005). This is the reason why Nigam officials cannot give water to Motugam even if they personally approve of it, agreed Chandabhai. The problem is, he said, that foreign countries support Medha Patkar because she supported the dam-affected areas, "and foreign countries are not really in favour of Gujarat's prosperity". But he knew that the previous irrigation minister and the Chairman of the SSNNL had promised all the people of Gujarat water as soon as the Supreme Court case over the increase of the dam to

122 meters was over. Chandabhai was sure that once the case is solved, other areas that really need water will also get it (Chandabhai, interview 03.02.2005).

The solution: the Panam High-Level Canal

The attempt to be incorporated in the Sardar Sarovar Project was a new phase in a more than a decade-long struggle to get the Panam Scheme to work properly. The *sarpanch* of Motugam, Chandabhai Patel, is a politically adept farmer. His political career started with the Panam problems, by demanding performance of the Panam Authorities in the early 1990s. He was a widely respected *sarpanch* of Motugam between 1995 and 2005, and then he moved on to become the leader of the *taluka* panchayat. He joined the BJP in 1998 and became the leader of Godhra *taluka* BJP in 2000. Documentation of his lobbying activities was ample in the pile of official letters stored in his cupboard, and he shared these freely with me. Most of the 62 letters were replies to requests sent from Chandabhai or copies of requests done by MLAs and MPs on behalf of him between 1992 and 2004, and most of the letters concerned the malfunctioning Panam Scheme[208]. After he became the leader of Godhra BJP, Chandabhai also sent letters through the party apparatus directing them to the President of the District-level BJP-office. The letters reflect the typical trajectory of local demands in the governance structure. The demand is sent via the MLA or MP to one or more concerned Ministers. The Minister passes the so-called "representation" on to the responsible high-level government

[208] The range of requests reflect the broad concerns of the village: an application for stoppage on the long distance bus route from Godhra to Somnath at the nearest bus-stand to Motugam, Udhalpur Chowkdi on the interstate highway (1998); application for allocation of new car and staff quarter for the Primary Health Centre of Motugam (1999); the construction of buildings for a Police Out-post in Motugam (1998-1999) and the appointment of a Police Sub-inspector for the same (1999); a request for electric wires between the streetlight poles installed in Indira Colony (1998); and several applications for funds for road construction and improvement (1999-2000). In 2004, 11 requests were sent through the BJP secretariat: an application for inclusion of Godhra land in the Narmada Command Area; an application for checkdams in the rivers and deepening of the ponds of the *taluka* under the Sujalam Suphalam Scheme; a request for 24 hours electricity supply for the Shri Raj lift irrigation scheme which at present only gets 8 hours electricity; an application for new roads and completion of existing road construction projects which are delayed for unknown reasons; a request for allocation of the same amount of subsidised kerosene for sale in ration shops in Godhra *taluka* as that received in other *taluka*s; an application for new ration shops in 7 villages where ration shops are badly needed; a request for the incentive grant of 60,000 Rs given to panchayats that carry out unanimous selection of panchayat members following the "Samras" policy; a complaint about the new system for receiving disability certificates, which Chandabhai fears will make it more difficult for persons with disabilities to get their certificates; a request for sanctioning new rooms in primary schools in Motugam Panchayat village; a request for the transfer of the Circle Inspector in Motugam Panchayat as he is "careless in his government job"; a request for the appointment of a new Medical Officer in the Motugam Public Health Centre as the previous one left; and a request for making computerised land records available from the Village Panchayat Office and not only the Mamlatdar Office as suggested in new policy.

official with a message “to do the needful”, the official orders his subordinates to execute the “needful”, for example repair work, and the Executive Engineer typically informs Chandabhai and the MLA or MP that action has been taken and water will soon start flowing.

Many such promises were made over the years. After repeated representations, repair work and improvements on the Panam canals were carried out several times during the 1990s, and major improvement works were done on the Panam Main Canal in the winter and summer season of 1995, but to no avail for the tail-end farmers. Letters from Panam officials assuring that the problems were about to be solved through new canal repair were sent to Chandabhai in April 1996, January 1997, and August 1999. But already in 1995, the Panam Executive Engineer in the Godhra Circle wrote to the Superintendent Engineer that the problems with capacity of the Panam Main Canal were due to technical faults, and that they were seeking a budget sanction for a feeder canal to improve the capacity. The Panam engineers had by then realised that the existing structures were not capable of serving the entire command area.

The Panam engineers also tried to get part of their command area transferred to the SSP. In May-June 2004, the two authorities (Panam and SSP) carried out joint survey work to see what was feasible (Mr. More, Deputy Executive Engineer, SSNNL Baroda, interview, 11.01.2005). Chaudhry, Chief Engineer of Baroda Branch Canal, SSNNL, said their concluding report recommended the inclusion of 800-1000 hectares of the Panam command in the SSP (interview, 15.10.2004). However, Motugam is not part of this proposed extended command area, because technically water cannot be given directly from the Main Canal and lift irrigation from the Main Canal is prohibited. They can only include areas near the Desar Branch Canal of the SSP, and only where topography allows gravity flow. Although this is technically feasible, it is also a financial question as the Branch Canal must be modified to allow for carrying more water, and this will mean expenses to the SSNNL (Additional Assistant Engineer, SSNNL Baroda, interview 11.01.2005). In 2006, the proposal was still pending the decision of the Chairman of the SSNNL.

Parallel to the requests for inclusion of Panam areas in the SSP, the Irrigation Department was exploring the possibilities for a new structure, a “feeder canal” which would improve the performance of the Panam scheme. The result is the “Panam High Level Canal”, a 3.5 km long underground water canal funded under the Sujalam Suphalam water scheme at the cost

of 130 *crores* rupees. This "Lifeline of Panchmahals" was inaugurated with much publicity by Prime Minister Narendra Modi in January 2009, on the occasion of the 60th celebration of Republic Day. It promises to provide irrigation to 18,000 hectares and 25,000 families of the 75 villages of Godhra, Sehera, and Lunavada *taluka*s[209]. The Modi government presents the scheme as a new irrigation initiative taken by a farmer-friendly government:

> "The corrupt deals to the tunes of crores of rupees by the previous governments, they never paid any attention to the water crisis, against the present government has materialized the dream of the farmers; it will also recharge the groundwater. (…). All the previous governments were responsible for the sinful negligence by not providing electricity and irrigation facilities to the farmers. The farmers need irrigation facilities and water for the crops, which are being provided to them by the present government." (Chief Minister Narendra Modi at opening function 25.01.2009[210])

Water Minister Nitinbhai Patel said that the scheme is meant to provide irrigation facilities to villages not covered under the Narmada scheme[211]. Nowhere does the Modi government mention that the Panam High-Level Canal is the result of 25 years of lobbying for fulfilment of the promises of the Panam Scheme, and of technical explorations begun in 1995[212].

The Shriraj check-dam scheme

Wells, rivers, and Narmada *baknari* were not the only irrigation options in Motugam. A lift irrigation scheme was in its first years of operation, and its management sheds lights on some of the challenges involved in managing water resources jointly. The Shri Raj lift irrigation scheme from Kundh River to Motugam fields was inaugurated on 2 February, 2002, and consists of a check dam in the Kundh, a pump house with a 22 HP electric motor, and a network of pipelines and field channels irrigating a command area of 300 acres. Funding for the scheme had been allocated to Motugam after skilful lobbying efforts by Chandabhai since 1998. "Every district demands more and more irrigation funding," said Chandabhai to me, "so here only political contacts and pressure works" (interview, 3.2.2005).

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[209] News, 25th January 2009: "Modi dedicates 3,362 km-long Panam high level canal". At www.newkerala.com/topstory-fullnews-81420.html . Accessed 24.4.2009. And "The 60th Republic Day Festival-2009-Panchmahal:Vanbandhu Farmers Mega-Convention at Shahera". At http://www.gujaratindia.com/media%5Cnewdetail.aspx?News_id=1205 Accessed 03.03.09

[210] http://deshgujarat.com/2009/01/25/modi-dedicates-35-km-long-underground-irrigation-tunnel/ Accessed 16.10.09

[211] Same as above.

[212] Letter of 5.9.1995 from Executive Engineer to Superintendent Engineer in Panam Scheme

The *Shri Raj Kripa Piyat mandali*, a cooperative Water Users' Association, was registered in 2002, and the scheme was operational by 2005. But in 2006, the pump house was closed and the scheme non-functioning. Electricity bills and repair bills in the order of 36,000 Rs were pending, and as the *Mandali* secretary had been unable to collect water charges from the users of the pump, the Shriraj scheme was virtually bankrupt. The repair costs had been high because the pipes were of poor quality, and one Panchayat member told me the reason for the poor quality was lack of supervision of the contractors and significant delays due to late release of money from the government. Allegations of nepotism and poor management flourished; frustrated farmers claimed that the leaders of the associations had allowed their kin and friends free waterings, and that many of the leading farmers in the command area of Shriraj had private wells and were worried about losing customers if the Shriraj scheme worked properly. They would therefore not prioritise to get the scheme up and running again. This view was also held by one of the members of the Shriraj *Piyat mandali* who told me:

> "Narmada water increased the water level in their wells and they are doing business of it now." (Patel middle farmer, Shriraj *Piyat mandali* Member, interview, 18.3.2006)

A small farmer in the command area said that those who took water should pay and then the scheme would be running again, but he could not suggest this to the leaders in the *mandali*:

> "We are small people, so we can't object. To big people like them, we would not have a say, they would not listen anyway. We have a very small piece of land, so what we say doesn't matter." (Chamar, small farmer, interview 18.3.2006)

The problems encountered in the managing of the Shriraj Scheme were typical: lack of sanctions against violations, little control with water use, and distrust of the intentions of the leaders of the scheme.

Farmers prefer wells

When the Sardar Sarovar Project was planned in the early 1980s, the planners assumed that the farmers would need to be *encouraged* to use groundwater in combination with canal water. They did not envision that farmers would be interested in using groundwater if canal

water was available[213]. The planners spent great efforts to ensure that groundwater would be used in conjunction with the canal water to ensure drainage and prevent water logging. As described in Chapter 8, a network of public piezometers is planned at a density of one per 100 square kilometres as well as monitoring of water levels in public wells. If the farmers would fail to pump groundwater, and the water table would rise to critical levels, government-installed tubewells will pump water back into the canal system (Narmada Planning Group 1989). The planners argued that farmers will shift from expensive well irrigation to relatively cheaper canal irrigation and therefore save government expenses in power subsidies to farmers, for example in this memo from SSNNL Chairman Sanat Mehta on the financial status of the project:

> "One perhaps does not know much about the indirect benefit which will accrue to the State by saving in agricultural power consumption, once irrigation starts. Once flow irrigation starts, present power consumption required for pumping of water from wells in Saurashtra and North Gujarat will go down. This will indirectly result in saving of power and subsidy which the State gives to GEB for power used by farmers. My rough estimate is of few hundred MW at least. This saving will be of sizeable magnitude." (Mehta 1994a:17)

At the time of planning, in the early 1980s, tubewell technology was still expensive for farmers and not as widespread in Gujarat as it later became. The basis for the SSP planning was data on groundwater irrigation from 1978-79, which showed that only 14% of groundwater irrigation in the command area was through tubewells, and the rest was through dug wells and mechanized shallow wells with much lower irrigation capacity (Narmada Planning Group 1989). The problem of groundwater depletion was not as widespread and severe in this period as it became during the decade that followed. As described in Chapter 3, tubewell irrigation increased dramatically during the 1980s, as the technology, and electricity to drive it, became cheaper and more available.

Now, and contrary to the expectations of the planners, the general preference of most farmers I met is for well irrigation, rather than canal irrigation. There are several reasons for this. Firstly, the farmers say that canal water is colder than well water, and therefore not as good for the crop. Many farmers told me that some crops yield less if they are watered from the

[213] For example, *Planning for Prosperity* states that the government will pump water for drainage "In areas where ground water pumping is required for drainage in earlier stages of development when ample canal water is available and a farmer is not interested in pumping that water" (NPG 1989:393).

canal. Large and small farmers in all the villages I visited were certain about the detrimental effects of canal water. A retired agricultural extension worker in Motugam had experimented on his farm, and compared the yields from crops watered from well and from canal, and could document a clear difference. He found that canal water was not good for tobacco, castor and cotton, but did no harm to paddy and wheat. Others told me canal water could be used for chillies without causing harm. Some also said that the canal water carried salts that were damaging to the crops, or they were sure that canal water would damage the soil in the future because of salinisation. Many said that canal-irrigated land after a few years will become white and hard as rock. To recover the soil, they would have to apply large amounts of manure that they would have to buy at high prices because they would need much more manure than they could produce from their own cattle. This was the general view among farmers in all areas I visited, but it is not recognized by the engineers in the SSNNL who assured me that they had conducted numerous field experiments on crops and found no difference between canal water and ground water.

Another reason for the preference for well water is its benefits in terms of control over timing of waterings. Even where several farmers use the same well, there would be more farmers sharing the same canal than one well. The risk of missing the optimal timing of watering is therefore larger with rotational water delivery from a canal than with buying a watering slot from a private well. For well owners the choice of well over canal seemed obvious, even with the cost of electricity. But even some who rented the use of others' well, said they preferred paying to get water when it was most needed rather than waiting for cheaper canal water until it was almost too late. "Canal water is cheaper, but well water is more predictable," explained one marginal farmer who shared a well with his two brothers. Quarrels over the irrigation schedules are frequent and a constant source of conflicts in the village. Disagreements may even turn to fist fights, said some. Clearly, the fewer people one must negotiate water access with, the fewer potential sources of conflict. On the other hand, some did say that the good thing with canal water is that it is as good as free. One group of farmers said there is less supervision of water use and one can break canals at night and irrigate without being noticed. Two other farmers explained that with canal irrigation one can report and pay water fee for the irrigation of only one vigha, whereas one really has irrigated five. This is sometimes done in collaboration with the government field officer, one farmer told me: The field officer will

register less irrigated acres, in exchange for a share of the water fee then saved by the farmer. This is not possible with private wells which are more strictly supervised. Watering on credit is allowed, and one can pay after the harvest, and the sanctions against defaulters are strict: they will be excluded from the use of the well next year.

A third reason for the preference for well irrigation is the incentives inherent in the pricing structure of electricity for farms. As the electricity connections for most private wells in Motugam were installed before the re-introduction of metered billing (described in Chapter 3), the farmers pay a fixed monthly electricity bill based on the power of the engine and unrelated to how much electricity they consume. The pricing system therefore encourages the farmers to use the pump as much as possible, and to rent it out to others to recover part or all of the electricity bill. This effect of the old fixed-price system is, in fact, beneficial from a perspective of equity, as it makes water available also to small and marginal farmers with plots in operational distance from wells. An effect of the new, metered, pricing system, has been that well owners have withdrawn their well from the groundwater market or increased the price for use of the well. While the mining of groundwater has decreased, access to well irrigation has decreased for small and marginal farmers (Shah and Verma 2008).

It is, however, important to notice that the choice of irrigation source depends on the location of land. For many plots, farmers would not have the luxury of choosing, but only one available source nearby, and whether the source carried enough water is also a matter of hydrological conditions.

The ups and downs of cooperative irrigation management

Cooperative management of irrigation resources, known as Participatory Irrigation Management (PIM), has been adopted worldwide as a promising solution to the problems of local resource management (Mollinga and Bolding 2004a). In Part Two, we saw how the SSP planners saw PIM as crucial for the success of the Sardar Sarovar Project. "If water management by farmers fail, the entire project may fail," said Sanat Mehta in 1994 (WALMI 1994). In the previous chapters, we saw how the farmers of the SSP command area neglected the PIM policy, and how the SSNNL engineers struggled to motivate the project beneficiaries to organise Water Users' Associations. In Motugam, we have found a successful example of

cooperative or participatory irrigation management: The *baknari* was a spontaneous farmer-managed project complete with a full-blown WUA, the Narmada Suchit *Piyat mandali* which collected water fees and maintained the pipes and canals. But Motugam also had another cooperative water association which struggled with compliance to rules and lack of leadership. Why did the *baknari* association succeed and the others not?

To find answers to this question, we can follow Wade's advice and look to "the conditions of emergence and maintenance, and effects on resource use" of the cooperative organisations (Wade 1988:213). The *baknari* initiative came during a drought when many wells had run dry. It was part of a longer struggle to fill the dry tail-end Panam canals with water, and the compliance with PIM regulations, in this case collection of water fees and preparation of records of irrigated land, is best understood as a strategy to get a favourable decision on their applications for Narmada water. This is also implied in the name of their association: The Narmada *Suggested* Irrigation Association. By 2005, the underlying conditions of water need had changed. Narmada water had recharged the wells in the village. Half the original members of the *baknari* association had left, and two of the three pipes had been closed, as farmers preferred the flexibility of private well irrigation (Chimanbhai, interview, 2.2.2005). The Shriraj Scheme was also inaugurated in 2002 during the drought, but enthusiasm waned when Narmada water recharged the wells. By 2006, the scheme had collapsed because people did not pay water charges. Unlike for the *baknari* association were fee collection was part of a strategy for official recognition, there was no external pressure for fee collection in the Shriraj Scheme, and leading members were allegedly more interested in selling water from their wells. We saw the same factors influencing the Water Users' Associations within the SSP command area. Farmers preferred to pump from the canals or from recharged wells, rather than go through the cumbersome process of cooperative and participatory management.

The experiences of the cooperative management of water resources in Motugam supports the conclusions of Wade's work on "Village Republics": that cooperative management institutions emerge only when the net material benefits to most or all cultivators, including the village elite, is at stake, "when without it all or most cultivators would face continual collision and constant risk of crop loss" (Wade 1988:186). In fact, such unified action is very likely when the risk of crop loss is high, Wade argues, but *only* in conditions when the costs of not organising are high. He finds it unlikely that autonomous organisation of the type found in the

high-risk parts of his study area in South India "could be made a model for *widespread* state-promoted adoption elsewhere" (1988:211, emphasis in original).

The available water resources of Motugam are many and interrelated: the Narmada Main Canal, the Kundh and Mahi Rivers, the Shriraj Check dam and Lift Irrigation, and the private wells. Some plots may be watered from several of these sources, while others have only one option. The Narmada water is recharging the groundwater both through the interim discharge of water in the Kundh River and through the legal and illegal use of it for irrigation. The water in the Kundh River, from which the Shriraj Scheme was pumping, was Narmada water, released a little further upstream where the Narmada Main Canal crosses the Kundh River. The water in the wells was also supplemented with Narmada water. It seems likely that the conditions that Wade sees as necessary for cooperative management of resources, scarcity and risk even for the local elites, are disappearing with the arrival of the canal water.

If the Narmada water use is more strictly regulated in the future, and the Kundh reverts to being a monsoon-fed river, water may again be scarce for a significant number of farmers of influence. In that situation, it may be likely that some sort of cooperative organisation will emerge again. However, it seems clear that the conflicts of interest and social stratification of village societies will influence the degree to which such organisations in themselves will "build the capacity of the smallest man", as envisioned by Executive Engineer Vyas in the SSNNL. In Motugam, the smallest members of the Shriraj Lift Irrigation Scheme were not even trying to suggest improved management of the organisation precisely because they are "small people" in the village and therefore not listened to.

Resource allocation and political mediators

Mollinga (2003) argues that the farmers' main channel for influencing the distribution of irrigation water is *not* through bribing of irrigation department officials, as may be inferred from the studies of corruption in canal irrigation by Wade (1982; 1985), but through the mediation or brokerage by the locally elected politicians, in particular the MLAs. The relationship between politicians and farmers is an electoral relationship, Mollinga maintains, because the main way MLAs secure re-election is through channelling resources to voters. We have seen that the villagers of Motugam were quite confident that they were well-

represented in Gandhinagar. We have also seen that the political skills of the *sarpanch* Chandabhai were important for securing resources to Motugam. The check dam, streetlights, electrification of hamlets, school buildings, police station, and primary health centre, were all allocated to Motugam through Chandabhai's skilful use of the locally elected MLAs and MPs from Godhra and neighbouring *taluka*s. Godhra is an important constituency for the BJP, and one of the party strongholds in Gujarat. Chandabhai was a rising star in the BJP which added to his leverage when lobbying for resources. Yet another factor which may have contributed to the allocation of resources to Motugam was its status as one of the most important villages in the sub-caste of Leva Patels. The contrast to the farmers of Krushigam is striking. Whereas a delegation of Motugam farmers was received at the absolutely highest level of government in Gujarat, by Chief Minister Narendra Modi, the farmers of Krushigam never even got a reply to their letters of complaint regarding the broken SSP canals.

Despite these political advantages, the farmers of Motugam did not succeed in being incorporated in the SSP and in the end had to remove their illegal *baknari*. The politicians who pleaded their case to the various Ministers of Water and Irrigation did not really believe it was possible to include Motugam and surroundings in the SSP command "because the Narmada water has to reach Kutch", but had to represent the case of their constituency anyway (MLA Harish Bhatt, interview, 20.03.2006). However, the efforts of the farmers bore fruits in the end with the allocation of a brand new project for the area: the high-tech Panam High-Level Canal which would carry water to the tail end of the Panam command area in the world's longest irrigation tunnel. From the perspective of politicians, the provision of fresh resources and new projects are preferable to the gradual improvement of existing projects. It is therefore not surprising that the BJP created publicity around the Panam High-Level Canal without mentioning it as part of the old Panam Scheme that never performed properly.

Summary

This chapter has shown that the use of Narmada water for irrigation in Gujarat does not follow the boundaries of the scientifically planned command area of the SSP. As we also saw in Chapter 10, farmers who are not in the command area are continuously pumping from the Main Canal, and the government engineers have a hard time preventing them from doing so. The case of Motugam is a special one, as Motugam would have been included in the SSP

command area if they had not been included in another canal irrigation command area which never worked properly. As such, the village is deprived of promised water from two canal projects that both promised to end the water scarcity of farmers based on the assumption that everything would go according to plan.

The chapter has further demonstrated how the allocation of resources to one's constituency is an important political resource for MLAs seeking re-election. This is bound to upset any scientifically-based resource allocation of the kind that we saw the SSP planners attempted. Still, the Government of Gujarat did not allow the Motugam farmers to continue siphoning water from the Main Canal, nor did it incorporate them in the SSP command area. The solution was found in the Panam High-Level Canal, a new high-tech irrigation canal and tunnel that would finally fill the dry tail-end Panam canals with water. The sitting BJP government branded the project as a new idea from a proactive farmer-friendly government.

The case of Motugam has further shown at the village level, there are different skills and social relations needed for *getting resources to the village*, than for managing the resources within the village. Whereas Chandabhai's personal skills and the village's political importance helped in getting resources to the village, cooperative management of water was a problem here as many other places. The experiences of Motugam suggest that cooperative water management is not the first choice of farmers under all conditions. The fate of the Narmada *baknari* association and the Shriraj check dam association supports Wade's conclusions in "Village Republics" (1988): that unified, cooperative management organisations are most likely to occur in conditions of scarcity when the alternative of *not* organising would mean net material losses and high level of conflicts. Furthermore, the case of the *baknari* organisation suggests that the farmers' compliance with the SSNNL PIM regulations was partly a strategy to improve the chances of a favourable decision on the applications. It was not necessarily a sign of preferences for the cooperative and participatory management models grounded in village traditions, as the new traditionalist environmental discourse would argue.

Contrary to the expectations of the government and the SSP planners, the farmers prefer well irrigation over canal irrigation. The reasons for this are partly because they think groundwater is better for the crops and partly because it involves less conflict over water and more control

with the timing of irrigation. With the old fixed-price system for pump electricity, it is also more economical for well owners to rent out their pump and well to as many others farmers as possible. This creates an incentive for well owners to *not* cooperate with the cooperative water schemes like the *baknari* and the Shriraj Lift Irrigation Scheme, because these water sources may provide water cheaper, and they might lose customers to their well.

The case of Motugam has further illustrated an important aspect of water as a resource, its unwieldy nature: The canal water recharges groundwater and turns monsoon rivers into perennial rivers. In other areas than Motugam, the SSNNL also releases Narmada water directly into village ponds. In these forms, especially groundwater and river water, the Narmada water is more available for private use, and the need for collective management of a scarce resource does not seem as urgent. However, this may change if farmers to a large extent stop using canal water for irrigation, and if the SSNNL stops releasing Narmada water into rivers and ponds. Recharge may then stop, groundwater scarcity may again increase, and farmers may again initiate and take part in collective organisation to avoid material losses and increased conflicts.

Conclusion

The Narmada water in Gujarat binds this dissertation together. From its imaginary form in the minds of the Narmada Planning Group to its application in the fields of Gujarati farmers, this water is the main object of the Sardar Sarovar Project. The SSP diverts water from the course of a natural river to a vast network of carefully planned canals. The purpose is to help Gujarati farmers raise agricultural productivity and reduce poverty. However, as this study has shown, both the farmers and the water have taken paths neither intended nor foreseen by the planners.

Large dams, built for irrigation and power, were the iconic projects of the modernisation approach to development. To the 20th century modernisers dams represented the conquest of nature, the control of its destructive forces, and the promise of growth, prosperity, and freedom from drudgery. In the last thirty years, this techno-optimistic approach has been challenged with increasing force. The Sardar Sarovar Project has not merely been one of the dam projects challenged, but a 'cause célèbre' – probably the single most controversial of these projects.

The aim of the dissertation has been to reach a deeper understanding of the Sardar Sarovar Project by contextualizing the project within the history of 'development'. This was not the aim I set out with when I embarked on the project. It was an aim that forced itself on me as I talked to the SSP planners and the government engineers and as I discovered planning material and pro-SSP publications I had not known existed. Despite all that had been written about the Narmada issue, I found that the many Narmada analyses could not provide convincing answers to important questions: Why were the dam builders so adamant to dam the Narmada River? And why did the Sardar Sarovar Project take the form it did? I believe that satisfactory explanations of these questions need to include the role of ideas.

I have sought to give a nuanced picture of the Sardar Sarovar Project and the conflict it created, by avoiding both prejudging the merits of the project and drawing normative conclusions about the goodness or badness of dams in general. More specifically, I have studied two areas hitherto neglected in the Narmada research: 1) the perspectives of the planners and engineers, and 2) the actions and perceptions of the beneficiaries of the project.

Technocratic dreams

The planning material of the Sardar Sarovar Project, as argued in Chapter 8, reveal the idealism and enthusiasm of the planners. They were not merely following the wishes of their political masters, as argued by Wood (2007), but shared a vision of the materialisation of a "dream", a word used by two of the most important actors in the planning process, Professor and Chairman of the NPG Y.K. Alagh and former Finance Minister and Chairman of the SSNNL Sanat Mehta, to describe the project. The dream was of dependable irrigation water to every command-area farmer at the time of need, ensured by a semi-automatic, computerised delivery system.

While anti-dam activists, as shown in Chapter 5, have claimed that the project is planned and executed with technical incompetence, the Narmada Planning Group, the Planning Commission of India, and the World Bank argue that it is the most studied and best planned project in India. There seems to be truth in this. The Sardar Sarovar Project was planned by academics and scientists who saw themselves as development planners rather than irrigation specialists. They took the broader perspective of the economic development of Gujarat state as a whole and included in their plans a range of elements that meant to optimise the social benefits from the Narmada water in the State.

Where previous canal irrigation projects had allocated the same amount of water to all branches of the command area, irrespective of the rainfall, soil and drainage conditions of different areas, the SSP planners divided the command area into different agro-ecological zones, designed the dimensions of the different branch canals based on econometric models that maximised the social benefits from the water in the command area as a whole, and prescribed specific precautionary principles, limiting water delivery to coastal zones with large risks of salinisation. They allocated more water to regions where models predicted that the water would create more employment, in order to ensure the optimal social benefits from the water for Gujarat as a whole. The SSP planners attempted to tailor the project to the different regional conditions within the large command area.

However, as discussed in Chapter 8, many of these elements - such as land consolidation, the establishment of agroprocessing industries on the right side of the canal, and optimal crop sets for each region of the command area – were either not politically feasible or not within the

responsibilities of the implementing and executing agency, the SSNNL. What the planners did not consider, were the social and political factors that may come in the way of the optimal, equitable water distribution that they planned for. Their plans were made as if everything would go according to plan. While they explicitly and repeatedly acknowledge the physical, topographical constraints to directing water where it is most needed, a conspicuous silence surrounds intra-village inequalities and structures that may affect the Narmada water's ability to reduce poverty. Landlessness and unequal landownership is hardly mentioned, and Gujarat's villages are presented as populated by a largely homogeneous peasantry of "medium-sized farmers". Twenty years after they started their scientific planning of the project, the planners now complain that the project has become a political weapon, that politicians are disregarding the plans and using the project to get votes by promising water to areas not entitled to it.

I have argued that the planners' approach was an example of a deeply apolitical stand on development taken in Indian development planning since the establishment of the Planning Commission upon Independence. This can be seen not only as an Indian approach, but a feature of development interventions in general: in order to make the problems of poverty, resource access, and unemployment manageable, they tend to be seen as *technical* problems. As argued by Chatterjee (1986, 2001), this approach sought to pursue a science-based economic planning strategy without interference from particularistic interests and the squabbles and conflicts of politics, as Prime Minister Nehru put it. As we have seen, Narmada Planning Group Chairman Y.K. Alagh had the same concern about the SSP, that the planning of the project would have been impossible if every rupee had been contested in the State Assembly. This approach is characteristic of high-modernism as described by Scott (1998): faith in the superiority of expert knowledge, and an unscientific optimism about the comprehensive planning of human settlement and production.

The troublesome beneficiaries

In Part Three of the dissertation, I followed the SSP canals and the Narmada water to the ground level, and found that the farmers do not behave as the planners expected them to.

Chapter 10 showed how registered Water Users' Associations in the SSP command area are largely paper organisations not anchored in democratic membership structures, at least in their initial years of existence. My findings in Krushigam are supported by studies in other parts of the command area and confirmed by the government engineers of the SSNNL: the most difficult task they face is the task of social engineering, of creating local-level institutions in which the voices of everyone is heard and their rights are respected. In areas where Subminor Canals had been constructed, and water could flow to fields without the expenses of pump fuel, farmers continued to pump or siphon water directly from the larger canals and also changed the location of outlets, broke canals to direct water where they wanted it, and saw the WUAs as instruments of the government for fee collection (Talati and Pandya 2004; Thomas 2004; Talati and Pandya 2007). In general, non-payment of water fees is an important problem for the SSNNL, and historical research show that this is not a new phenomenon in canal irrigation (Gilmartin 1998; Klingensmith 2007).

In Krushigam, the leaders of the WUAs said that it was too early to organise water users as the canal system was not completed yet. The smaller farmers of lower castes, on the other hand, complained that they were not informed about when the water would come or how it would be managed. Most villages of the command area are heterogeneous, stratified societies, constituted by multiple castes in more or less strict hierarchies of status and power, to a large extent overlapping with a highly unequal pattern of landownership, which translates into differential command over resources. Cooperative management organizations in villages will therefore face the challenge of overcoming deeply rooted hierarchies and inequalities in village society. This was also confirmed by the evidence from Motugam, as discussed in Chapter 12. The poorer farmers spoke of the village in terms of "big people" (the rich others) and "small people" (themselves), and complained that information about the project and decisions on management and allocation of resources were taken by the "big people". As was the case in Krushigam and Motugam, the influential farmers tend to come from the dominant caste of the village. If, as in Krushigam, the leaders of the WUA do not organise information meetings and actively inform all groups, hamlets, and neighbourhoods in the village about water management issues, information tends to stay within the neighbourhoods of the leaders, and reach mostly those that are in their circle of friends and kin.

The case of Motugam, discussed in Chapter 12, furthermore illustrated the strategic, political, and unwieldy nature of water as a resource. Firstly, it showed that the allocation of resources to villages is highly influenced by the calculations of electoral politics. Secondly, it supported the conclusion of Wade (1988) that emergence and success of cooperative management institutions to a large extent depend on the underlying conditions of resource scarcity and conflict. Such institutions are likely to emerge when the net material benefit to most or all cultivators, including the village elite, is at stake. In Motugam, the compliance to cooperative management regulations was part of a broader strategy by the farmers to get a favourable decision on their applications to be included in the Narmada command area. As the canal water is released into rivers and applied on the fields, it seeps into the ground and recharges depleted groundwater aquifers and private wells, thus further undermining what might be a necessary condition for cooperative management.

Farmers along all the canals of the SSP network were siphoning and pumping water illegally from the canals, seriously disrupting the carefully calculated planning of the use of the Narmada water. The state of the existing canal network was poor, roads and canals overgrown with bushes, and canals broke frequently. This was much higher on the leading farmers' agenda than organising a Water Users' Association as prescribed by the government. Most of the better-off farmers in Krushigam and the command area furthermore had access to Narmada water through pipes or wells, and saw no urgency in completion of the canal network.

An important reason for the lack of cooperation with the project authorities and contractors seems to be a general distrust in the quality of government works. In Chapter 11, I argued that a corruption discourse prevails which holds that all government officials are "percentage-*wallahs*" busy with corrupt practices that line their own pockets. The findings from the SSP command area suggest, as has been argued by Myrdal (1968) and Parry (2000), that this corruption discourse has an effect in and of itself, regardless of the actual prevalence of such corruption in the irrigation bureaucracy. It is used by the farmers to legitimise policy violation and private acquisition of public goods; more precisely, they use it to legitimise the obstruction of Subminor Canal construction and illicit pumping from the larger canals. It is highly plausible that this illicit pumping and the delays caused by farmers' obstruction of canal construction is part of the reason for the poor standard of the canal network. The

evidence from Jambusar suggests that a vicious circle is operating, where delays cause construction shortcuts, leading to weak canals that break more easily under water pressure.

Seeing like an engineer?

Chapter 2 showed that an important argument running through the critical analyses of dams and hydraulic engineering is that large-scale dam and canal irrigation projects disempower and deskill local communities and consolidate the power of central institutions and the central state. This is also the core argument of Scott's *Seeing like a state* which sees dams and canal irrigation as typical high-modernist projects and manifestations of the state's "optic of power". However, when we look at the role of the state in the Sardar Sarovar Project, the category 'state' merges several distinct actor categories. The role of 'the state' in the Sardar Sarovar Project has been acted out by at least five distinct groups: 1) the early planning bureaucrats involved in the planning of the project during the phase of the inter-state conflict, 2) the expert planners in the Narmada Planning Group selected to plan the project after the Tribunal Award, 3) the politicians in the Legislative Assembly and the various Governments of Gujarat from the inception of the project to today, 4) the SSNNL engineers in the head offices of the agency in Gandhinagar and Baroda, and 5) the regional and field level SSNNL engineers operating at the *taluka* and village level. Is it meaningful to cluster the perspectives of distinct group of state actors and talk of "seeing like a state?" Are dam projects like the SSP mainly the products of a 'state's' vision, or is it more meaningful to talk of "seeing like" an engineer, a bureaucrat, or a politician? Or an economist planner equipped with econometrics?

High-modernist vision is an "optic of power", argued Scott. Its simplifying abstractions create objects – both natural and human – that are easier to rule and control, and high modernism is therefore an ideology that suits the interests of and increases the power of the state and its bureaucratic intelligentsia: planners, technical experts, and engineers. The phrase "seeing like a state" brings attention to the *power* effects of these plans, their intended of unintended effects in increasing the power of the state bureaucracy at the expense of local communities and traditional practices. However, when we follow the SSP canals and the Narmada water to the villages of Gujarat, it is hard to conclude that the state is expanding its power over the cultivators.

The planners sought to strengthen the control of water use in the SSP by introducing remote-monitored, computerised water surveillance of the entire canal network, a centralised and automatic system where the operator in a Main Control Centre in Gandhinagar knows the demand for and use of water in all the branches of the canal network and can direct water to the areas where it is needed by closing and opening gates. This may seem like the ultimate Panopticon of government control, moving decision-making power from the cultivating communities to the central government experts, as is described in most dam-critical literature (like Wittfogel 1957; Worster 1985; McCully 2001; Roy 2002), and in Scott's argument about high-modernist ideologies (Scott 1998). However, although this is the ambition, the reality is different, because the Panopticon cannot "see" below the level of the Minor Canal head, which is where we find the individual farmers, and the farmers know that there are no real sanctions against policy violation. I have argued that the effect of large-scale canal irrigation in a democracy is actually not conducive to centralised power and control, as the system is simply too large, the farmers too many, and the government too weak to supervise the behaviour of all the farmers who take water.

The government engineers occupy the difficult and important position of mediating between the technocratic dreams of the planners and the complex rationalities of the farmers. While subscribing to the view that Participatory Irrigation Management was a nice idea with the potential to build the rights of the smallest man sharing an irrigation canal, engineers complained about the lack of training and resources for such a task. The field engineers of Jambusar were at the receiving end of both the bureaucratic chain of command and the farmers' grievances over the poor quality canal system. Whereas it is common in analyses of Indian irrigation bureaucracies to highlight the notorious corruption of their staff and their extortion of bribes from powerless farmers who depend on their services, I found no evidence of this type of government misconduct during field research. Rather, the main concern of the engineers were to negotiate the competing demands from the farmers and from their superiors in a system that provided them with few real sanctions and resources that could help them implement the project as planned. In the field, they depend on the local elites for dissemination of information and implementation of the canal construction and management policies. And in the bureaucratic chain of command they invent success numbers and field information that are demanded from the top.

Also at the higher level, an important feature of the work of the SSNNL engineers is to balance competing aims and demands. The interim policy, for example, is in itself a compromise between the aim of volumetrically controlled water use and the need to put Narmada water to use as soon as possible. The farmers know that the government wants them to use water, and this gives them a card to play when they demand and use more water than what has been scientifically planned and allocated for each command-area acre of land.

Ideas matter

As shown in Chapter 5, many have argued that the SSP is a project intended to serve the vested interests of the elites of Gujarat, and that this is a typical feature of infrastructure projects built in the name of 'development' everywhere. I have argued that this explanation is too simplistic and fails to explain much of what we want to understand.

The case of the Sardar Sarovar Project has shown how development strategies, both at the overall level and at the more detailed level of practical management, spring out of the hegemonic development ideas of their time. When the SSP was conceived in 1946, converting rivers into resources of irrigation and power was a key part of the hegemonic development strategies in India as well as the rest of the world, as discussed in Part Two of the dissertation. The strategy of state-led exploitation of natural resources for industrialisation and economic growth was not seriously challenged until the 1970s, and even then the change happened gradually.

I have argued that the scale of the conflict around the SSP is not primarily due to the particular features of this dam as opposed to other dams in India, but to the timing of the planning and construction of the dam, starting in 1980. The new zeitgeist emerging in the 1980s had several elements with direct consequences for the SSP. As shown in Chapter 2 and Chapter 7, the most important were 1) an increased awareness of environmental sustainability in development, and 2) a critique of the state as an actor in the development process (and in economic policy making in general). For the development debate, this meant that the concept of 'development' itself was challenged, and the virtues of the, until then, hegemonic development strategies of industrialisation and modernisation were questioned and even dismissed. In contrast to the old modernisation discourse, prevailing both within capitalist and

socialist countries and circles, a new "traditionalist" discourse emerged valuing what the modernisers had seen as impediments to progress: the sanctity of nature, traditions, and the past. As the critique of the state came both in a neoliberal version from the political right and a communitarian version from the political left, the way was paved for a new, and seemingly reduced, role of the state.

These changes in development thinking affected the SSP both from the outside, by fostering an unprecedented opposition movement which threatened to stop the entire project, and from the inside, by bringing about new models for state involvement in and management of infrastructure projects, - models that were adopted by the Narmada Planning Group and the Sardar Sarovar Narmada Nigam Limited.

Chapter 5 showed how the planning of the SSP coincided with the growth and consolidation of an international movement mobilizing against industrialisation and modernisation in general, and large dams in particular. During the 1980s, the World Bank was coming under increasing pressure from social movements for its structural adjustment policies and institutional failures in securing the rights of victimised people and nature. The SSP became a major symbolic issue for this international movement, a change in battlefield that the Government of Gujarat and its planners had not seen coming. Chapter 8 described how the formation of the Narmada Bachao Andolan in 1988 and its international alliance with the global anti-dam and anti-World Bank movement forced the planners on the defensive, as they had to produce arguments on terms set by the opposition.

The planners' appealed to the imperatives of modernisation, industrialisation, increased productivity, improvement of nature, and the necessity of the *adivasis* of the Narmada valley to think of a greater common good and, as they said, accept a little sacrifice by moving their habitat. Through this, they demonstrated how they were acting within a different, and by the 1990s seemingly outdated, development discourse. Theirs were the guiding ideas of the development strategies of the decades from the mid-1930s to around 1970, strategies that were directly based on the economic planning base provided by the most important development economists of the time.

Furthermore, the analysis of the planning material has shown how the planners of the project were guided by their own academic background and field of expertise in the science of economics. The increasing mathematisation of economics through econometric modelling gave to its disciples renewed confidence in the ability of this tool to handle large amounts of complex data and arrive at scientific conclusions about optimal allocation of resources, a self-confidence that is evident in the SSP planning documents.

The communitarian turn of the late 1980s lead to changes in policies of resource management. The planning of the SSP spans the period from the heydays of state-led development to the neoliberal and communitarian turn, and I have shown how the changing ideas of the role of the state and of local communities also affected the management policies adopted by the project planners. Around 1990, a new model of irrigation management was spreading rapidly around the world, Participatory Irrigation Management, which meant that the management responsibilities for irrigation resources at the local level should be transferred to communities of users. Chapter 8 showed how the planners received the model with enthusiasm, and also involved NGOs in the task of motivating farmers for cooperative organisation. A solution to a persistent problem in canal irrigation seemed within reach: how to get the farmers to share the water equitably, and avoid conflicts. The model of cooperative organisation of water users below the Minor Gate provided the missing link to the designed delivery system of the SSP. If water management by farmers fail, the entire project may fail, warned Sanat Mehta in 1994, while Alagh was confident that the farmers would recognize the necessary rationality of developing local-level management institutions.

The involvement of user groups in water management was gradually extended to the construction of the system. As I described in Chapter 10, the behaviour of canal irrigators have been held as one of the main reasons for the failure to utilise the full potential of canal irrigation schemes, in particular the failure of the irrigators to co-operate and construct field channels. In the 1970s and early 1980s, the solution was seen in expanding the responsibility of the state to encompass also the construction of the field channels, and this was taken up by the SSP planners who planned to let even field channels be laid out scientifically and constructed by the expert planners. After the communitarian shift of the late 1980s, the advice is to again return to the old practice of leaving the construction of the smallest canals to the irrigators. Now, this policy advice has got a new and different legitimacy. It is backed by the

renewed strength of the view that village communities know best how to manage their own resources and have had vital traditional management institutions for centuries before the interference of the modern state. As described in Chapter 2, this was part of a wider awakening globally, recognising that the commons were in fact not open access resources that needed to either be privatised or state-managed, but that local communities had traditional practices and institutions to manage scarce, common resources. In India a new environmental narrative emerged, emphasising the ecological harmony and equitable resource management institutions of pre-colonial Indian villages. The core argument of this narrative is that this harmony was disturbed when modern state institutions interfered at the local level. Although historical research shows that this description is probably based on a construction, it is a powerful narrative in current policy debates in India.

The experiences from Motugam, Krushigam, and other parts of the SSP command area presented in Part Three of this dissertation, suggest that the new traditionalist discourse is based on unhelpful simplifications and idyllisation of village society and traditions. A problem with the standard environmental narrative is that it easily creates the impression that cooperative village institutions and the "dying wisdom" can be *revived* – quite easily – through some sort of external reminder of village communities' own capacities, traditions, and common interests, if the state withdraws and leaves village communities to themselves. This is the underlying message in the success stories told in Centre for Science and Environment's *Making Water Everybody's Business.* The SSP planners were equally optimistic about the likelihood of SSP beneficiary farmers to embrace participatory irrigation management and join Water Users' Associations. And the SSNNL engineers, who continuously face the problems of motivating farmers to enrol in and organise Water Users' Associations despite continuously facing the trouble of creating these cooperative organisations, talk of the "beauty" of the model. The establishment of community-based cooperative management institutions needs a more realistic understanding of the reasons and conditions for cooperative local resource management and of village society in general.

The years covered by this research is not the final stage of the Sardar Sarovar Project. At present, in January 2010, the canal system is still not complete. A final stage of the project is unlikely to come. As long as there is rain in the Narmada Valley, there will be Narmada water, and gradually it will flow to parts of Gujarat and Rajasthan that would never have been

touched by it if it had not been for a massive intervention by humans: engineers and development planners. The water is recharging severely depleted groundwater and has alleviated the impacts of low rainfall. Yet, at present it seems unlikely that the equitable and volumetrically controlled delivery of water through gravity flow in canals as planned will be the main feature of the project. It also seems unlikely that a solution to the problems of equitable distribution, and to the larger challenge and moral imperative of poverty reduction, can be sought without involvement of the state.

This is a book about tomorrow, said Lilienthal about his homage to the TVA, and the SSP planners claimed that tomorrow cannot be cancelled. The problem is that 'tomorrow' had in store new and unforeseen conditions and new norms and values of 'development' with consequences for choice and judgments of development policies and strategies. In the introduction, I said that a contextualised analysis of the Sardar Sarovar Project could contribute to reflexivity within the field of development research. By focusing on the ideas embedded in the SSP, this dissertation has shown that development academics, from economists to philosophers, are also development *actors*, by providing the theories, concepts, justifications, and causal models that are among the factors that shape policies. However, our contributions are not independent of the context in which we operate, a context that includes not only our political views and disciplinary training, but also the broader zeitgeist. Furthermore, a Panopticon is not available to us either, there will always be things we do not see. I believe that a fruitful approach for critical development scholars, who are not only driven by academic curiosity but also by a wish to address poverty and injustice, is to challenge our own preconceptions by trying to also understand positions with which we disagree. If we merely explain controversial development projects with vested interests, we may forget that we have blind spots too.

Appendices

1. Informants

Interviews with SSP planners

- Yoginder K. Alagh, former leader of NPG, December 1st 2004 and March 14th 2006
- Sanat Mehta, former Minister of Finance and former Chairman of SSNNL, March 3rd and 25th 2006
- S.S. Mehta, Professor School of Planning, CEPT, Ahmedabad, December 9th 2004

Interviews with SSNNL staff

- Mr Ravi Orvi, Director of Command Area Development, IAS Officer, Gandhinagar, March 24th 2004
- Mr. A.G. Dixit, Director of Agricultural Development, Gandhinagar, February 27th 2006
- Dhimant B. Vyas, Executive Engineer, CAD Wing, Gandhinagar, March 3rd and15th 2005, February 27th 2006, March 27th 2006.
- Mr. A.P. Ganpati, Deputy General Manager SSNNL, IT and administrative work, Gandhinagar, March 3rd 2005.
- Dr. M.B. Joshi, Executive Engineer, Kalpasar Department, Gandhinagar, March 17th 2004.
- Dr. J.C. Chaudhry, Chief Engineer, Baroda Branch Canal, Baroda, October 15th 2004
- Mr. K.A. Patel, Superintendent Engineer Canal Wing, Krushigam area of Baroda Branch Canal, Baroda, October 15th 2004.
- Mr. J.U. Kodnan, Executive Engineer, Baroda Branch Canal, Baroda, October 15th 2004.
- Mr D.K. More, Deputy Executive Engineer and Personal Secretary to Chief Engineer, Baroda Branch Canal, Baroda Branch Canal, Baroda, January 11th 2005.
- Mr Hemant Vaidya, Deputy Executive Engineer, Subminor construction in Block 11B, near Baroda, Baroda, January 11th 2005.
- Mr Raju Gehani, Additional Assistant Engineer Canals, Baroda Branch Canal, Baroda, January 11th 2005.
- Mr "Amin", Deputy Executive Engineer, Jambusar region, SSNNL Jambusar, December 14th 2004, March 14th 2005, and March 24th 2006 (then in Karjan division).
- Mr "Madrasi", Additional Assistant Engineer, SSNNL Jambusar, in Krushigam, March 6th 2006.
- Labourer, Supervisor of Baroda Branch Canal, Minor Gate, Krushigam, November 5th 2004.

Other interviews

- Anil Shah, Development Support Centre, Ahmedabad, March 3rd 2006
- Umesh Desai, AKRSP, Ahmedabad, February 23rd 2006
- Apoorva Oza, AKRSP, February 23rd 2006
- Jaynarayan Vyas, BJP, former Minister of Irrigation, December 7th 2004
- Harish Bhatt, MLA from Godhra, Gandhinagar, March 20 2006
- Indira Hirway, Centre for Development Alternatives, Ahmedabad, March 3rd 2006

- Ashok Shrimali, SETU, February 27th 2006
- Shilpi Raonka, Master student at CEPT, March 27th 2006

2. Questionnaires

Socio-economic household survey, Krushigam

Interview no:_____ Time: _____ Date:_____

Respondent (*describe):*

1. Background variables

Ask for the head of the household

1.1. Male/female: _____ 1.2. Age: _____1.3. Religion:_____ 1.4. Caste: _____

1.5. Main occupation/livelihood:_____

1.6. Education: _____

If low education (<standard 5) ask about literacy.

2. The household

2.1. Number of people living in this household in the village: _____

2.2. Number of children: _____

2.3. Who has the highest education in the household, and to which level:

_____

2.4. Children between 5 and 14 in school:

All	Some	None

2.5. Number of children born to respondent: _____ And number of children alive: _____

3. Income sources and estimated income:

3.1. What was your major source of income in the last agricultural year?

3.2. Sources of income in the household:

Type of work	*Who works*	*Income good month*	*Income bad month*

Ask specifically about income from milk!

3.3. If NRI/city dwellers in family: Do they contribute to the household income?_____

3.4. Are there or have there been any government employees in the family?

Who, when and where:_____

3.5. Do you have a bank account (Yes/No):_____

3.6. Do you have loan (including to the agriculture credit society):

a) To a bank, amount: _____ Interest rate: _____

b) To private lenders, amount: _____ Interest rate: _____

3.7. Do you have a ration card? Which colour? _____

3.8. Standard of house (observe and tick off):

Condition/size	Small	Medium	Large	Very large
Bad				
OK				
Good				
Very good				

3.9. Facilities (ask):

Electricity	*Yes*		*No:*
Own toilet (Y/N)			
Bathroom (Y/N)			
Own water tap/pump	*Tap*	*Pump*	*No – distance:*

3.10. Cattle	**#**

Cow	
Bull	
Buffalo	
Goat	
Chicken	

3.11. Do all members of your household always get two square/proper meals per day (every day of the year)?
If no: a) In which season do you not get two meals per day? _____
b) Approximately how many days per year do you not get two meals?_____
3.12. Do you own or rent land? _____
If no: a) Any other access to land which you cultivate? _____
4. If the family owns or rents land:
4.1. How much land does your household own? _____
4.2. How much do you cultivate? _____
4.3. How much do you lease out? _____
4.4. Are you leasing any land:
a) How much:_____ b) From whom:_____
c) Rent (in cash or kind): _____
Make sure to ask whether sharecropping rent (1/2 of income from crop) is of net or gross income.
4.5. How many plots of land do you cultivate? _____
4.6. Location of plots relative to Narmada canals
(show a map of the canals and make them point out their plots):
4.6.1. Distance from branch and distributary (appr.) (*number of plots in each category*):

Close (1):	Middle (2):	Far (3):

4.6.2.

		Subminor		
		Head (1)	Middle (2)	Tail (3)
Minor	Head (1)			
	Middle (2)			
	Tail (3)			

4.7. Who in the family are doing physical labour on the fields? What kind of work?
4.8. When did you last buy or sell land? _____
a) How much? _____
b) Why? _____
4.9. What are you growing?

Crop	**Acres**	**Crops per year**
Traditional cotton		
BT cotton		
Tuwer		
Jowar		
Other:		

4.10. Have you changed to new crops in the last five years? (Tell me about it)
4.11. How much of your land is irrigated (acres and no.of plots):
4.12. Irrigation source (*Get details of how and from where they take water (canal, pond, etc)):*_____

4.13. Irrigation since when:_____
4.14. In which season(s) do you use irrigation water: _____
4.15. If not using Narmada water: Why not? _____
4.16.Do you think you will use Narmada-water in the future, when? _____
4.17. Do you own a dieselpump? _____
4.18. If not: Cost of renting a dieselpump: _____
4.19. How much did you spend on pumping last year: _____
If they use N.- water:
4.20. What was your required water needs last year and how much did you get?

Waterings	*Number*
Required (min)	
- Achieved	
=Access	

4.21. How much did you pay for the water last year (water charge)? _____
4.22. How many crops (harvests) per year did you have before the Narmada water came?
4.23. And how many do you have now?_____
4.24. Has each crop's yield increased because of Narmada water?_____
4.25. Has your total income increased because of Narmada water?_____
4.26. Will you start growing something else now that you have (alt. if you get) canal water? What and why?

5. If landless agricultural labourers:

5.1. After last monsoon, which months had the most work available for you?
a) What kind of work did you do and where? _____
b) How many days per month did you get work then? _____
c) How much were you paid in these months (cash or kind)? _____
5.2. And after last monsoon, which months had the least work available?
a) What kind of work did you get and where? _____
b) How many days per month did you get work then? _____
c) How much were you paid in these months (cash or kind)? _____
5.3. Do you ever go for work outside Krushigam, where? _____
5.4. Did you or anyone in your family work on the construction of the canal? _____
5.5. Has work availability increased after the arrival of water in the canal? *(Describe how)*
5.6. Has wages increased after the arrival of water in the canal? *(Describe)*
If cattle:
5.7. Is there more fodder and water for cattle now than before the arrival of canal water?
5.8. Has your income from cattle increased after Narmada-water?
5.9. Are there any other changes in working conditions after the arrival of the canal and the water?_____

6. On participation

6.1. Is anyone in the household a member of / participating in any village organisation?

Organisation	**Member of exec. Committee**	**Leader**
Panchayat		
N. Piyat Sahakari *Mandali*		
Milk Union		
Caste associations		
Political party		
Mahila Mandal		
Other:		

6.2. Have you participated in any meetings held by the Sardar Sarovar Nigam to inform you about the Narmada project?
a) When was the last time you took part in such a meeting?

7. Knowledge of Narmada water management (PIM)
Questions aim not at getting the answers, but to see whether and how much they know.
7.1. When did you first hear about the Narmada project?
7.2. Do you know who are responsible for distributing Narmada water in the village?
7.3. What are the other responsibilities of the Narmada Sahakari *Piyat mandali*?
7.4. Who is leading the *Piyat mandali*?
7.5. Who are members of the steering committee of the *Piyat mandali*?
7.6. What is the selection procedure for the steering committee of the *Piyat mandali*?
7.7. What are the rules and regulations for distribution of Narmada water?
7.8. What is the cost of the water?
7.9. From where do you usually get information about the progress of the Narmada-project?
(media, Nigam-representatives, panchayat, friends, neighbours and gossip)

8. Perceptions of and opinions on development and the Narmada-project
8.1. What do you think is most important for development in the village?
8.2. What do you need to live a good life? What is most important?
8.3. What do you think are the biggest problems in this village?
8.4. Who can do something to solve these problems?
8.5. In what way do you think the Narmada water will affect your life?
8.6. Which people in the village do you think will benefit the most from the Narmada water?
8.7. Who are responsible for the construction of:

Plan	Government	Farmers/WUA	Others / Don't know
Subminors			
Field channels			

8.8. And who are currently doing it?

Reality	Government	Farmers/WUA	Others / Don't know
Subminors			
Field channels			

8.9. Who are/will be responsible for the maintenance and repair of:

Plan	Government	Farmers/WUA	Others / Don't know
Distributary			
Minors			
Subminors			
Field channels			

8.10. And who are currently doing it?

Reality	Government	Farmers/WUA	Others / Don't know
Distributary			
Minors			
Subminors			
Field channels			

8.11. What do you think is the reason why the subminors and field channels have not yet been built?
8.12. Do you know why the Krushigam distributary has not yet been repaired?
8.13. What should be done about it?

Socio-economic household survey - Motugam

Interview number:_____ Time: _____Date:_____Interviewer_____
Description (very poor/rich, hostile/cooperative, etc):_____

Respondent

1. Name	2. Street/Faliya	3. Sex	4. Age	5. Caste	6. Religion/Sect
7. Occupation		8. Education		9. Literacy (ask if no or very low edu)	

The household

10. People living in the house, sharing same income (economic unit)

Member (relation to respondent)	Age	Education	Occupation

11. Did you ever have any children who died? (note down number)

	Infant	1-5 years	above 5 years
Boy			
Girl			

Income and assets

12. Ration card: A) BPL (white) __ B) APL (red/pink script) __ C) Not having __
13. What was the major source of income in the household last year:
A) Own farm __ B) Skilled job __ C) Unskilled job __ D) Cattle/milk__ E) Farm labour __ F) Quarry __
G) Sweeping/ragpicking __ H) Other: _____
14. Household income (per month; but for day labourers, get daily wage and workdays per month):

Type of work	Income	Which months/seasons
Remittances from NRIs or relatives in city:		

Ask specifically about income from milk!

15. Are there or have there been any government employees in the family (who, what, when)?_____

16. Savings/debt	Savings (Y/N)	Debt (Amount)	Interest rate
Bank			
Private			

17. Have you ever mortgaged your land? When and for what reason?

Reason	Year	Acres	Amount taken	Repaid (Y/N)
Marriage/social function				
Medical expenses				
Other:				

18. Is your household's living standard now better, the same, or worse than 10 years ago?
A) Better ___ B) The same ____ C) Worse ____
19. What is the reason? _____
20. If you had a higher income, what would you spend on? (Open question)
A) House ___ B) Marriage/ceremonies ___ C) Education ____ D) Other:_____
21. Assets (number of each): (prompt)

Productive (agriculture)		*Productive*		*Unproductive (necessary)*		*Unproductive*	
Cow		Car		Fan		Fridge	

Bull		Motorbike		Enough quilts		TV	
Buffalo		Bicycle		Beds/charpoy		Radio	
Goat		Gas stove					
Chicken		Kerosene stove					
Tractor							
Engine/pump							

22. Do you employ other people (ask and tick off):

Domestic servant	Farm servant	Farm casual labour	Other

23. Do all members of your household always get two square/proper meals per day (all year)? _____

24. Households' landownership and access to land (ask for *acres*):

	Irrigated acres	Irrig number of plots	Non-irr acres	Non-irr plots
Own				
+ Rented extra				
+ Sharecropped extra				
- Rented out				
- Sharecropped out				
Total				

Farming and irrigation (only for landowners or sharecroppers)

25. Own well: Yes ___ Yes, but dry ___ No___

26. Other irrigation source: A) Narmada *baknari* __ B) Sriraj well __ C) Panchayat well __ D) Other's private well __ 27. Location on Narmada/Panam canal network for most land: A) Head __ B) Middle __ C) Tail __ D) Not at all __

28. Number of waterings last year according to source (required compared to actually achieved):

	Narmada *baknari*	Sriraj well	Panchayat well	Other's private well
Required				
Achieved				

29. Have you experienced any environmental problems caused by irrigation, like waterlogging or salinisation?
A) Water logging ___ B) Salinisation ____ C) Other _____

30. When did you last buy or sell land, how much and why (particularly why sell)?

31. What are you growing? (monsoon, winter, summer)

32. How many crops (harvests) per year did you have before the Narmada/Sriraj water came? _____

33. Have you started growing new crops after getting Narmada or Sriraj water? Specify.

34. Has each crop's yield increased because of Narmada/Sriraj water?_____

35. Has your total income increased because of Narmada/Sriraj water?_____

36. Who contributes actual farm labour (other than supervision) (tick off, ask specifically whether women work):

Household men	Household women	Household children	Hired labour

Labouring households

37. Farm labour in Motugam (What kind of work do you get):

	Main type of work	Full month, half, less than half	Wages
Winter			
Summer			

Monsoon			

38. Labour work outside Motugam (seasonal migration, in agriculture or other)

	Type and place of work	Full month, half, less than half	Wages
Winter			
Summer			
Monsoon			

39. Did you or anyone in your family work on the construction of the canal? _____
40. Is there more farm labour work in Motugam for you after the arrival of canal water (last two years)?
41. Changes in conditions (for labour and cattle) after Narmada canal water (prompt and tick off):

More work	Higher wages	More extras (tea, lunch, etc)	More water and fodder for cattle

On participation

42. Is or was anyone in the household a member of / participating in any village organisation?

Organization	*Regular member*	*Board/Committee member*	*Leader*
Panchayat			
Suchit *Piyat mandali* (Narmada)			
Sriraj *Piyat mandali* (checkdam/well)			
Kelavni Mandal (school board)			
Tobacco Federation *Mandali*			
Milk Cooperative			
Temple committee			
Micro-credit group (There are 3)			
Mai Mandal (cultural programs)			
Yug Shakti Mandal (public functions)			
Caste association			
Political party			
Farmers' org (Bharatiya Kisan Sangh)			
Other:			

43. Do you know about the IRD program (subsidised loans for poor farmers/landless)? Yes____ No ____
44. Have you applied for a loan through IRD? (When, for what, granted or not) _____
Ask poor households in bad houses:
45. Do you know about the Sardar Awas housing scheme for poor? Yes ____ No ____
46. Have you applied for a grant through Sardar Awas? (If not, why?) _____

Knowledge of Narmada water management

47. When did you first hear about the Narmada project? _____
48. What do you think of the Narmada project? _____
49. Who is chairman of: (leave open if they don't know)

Suchit *Piyat mandali*	
Sriraj *Piyat mandali*	

50. In what way is the Narmada water affecting your life?
51. Which people in the village do you think are benefitting the most from the Narmada water?

On development

52. What do you think are the biggest problems in this village?
53. What is the main reason why the poor are poor in Motugam?
54. What do you think would be most important to reduce poverty in Motugam?

Income and assets (contd.) (Ask to see house)

55. Housing standard: (note if Extremely bad___ or Extremely good ___)

Condition	No. of rooms	Bad	Good
Kaccha			
Pucca			

56. Facilities (tick off if having):

Kitchen	Toilet	Bathroom	Legal electricity	Illegal electricity	Water tap

3. Rainfall data for Gujarat and regionalisation

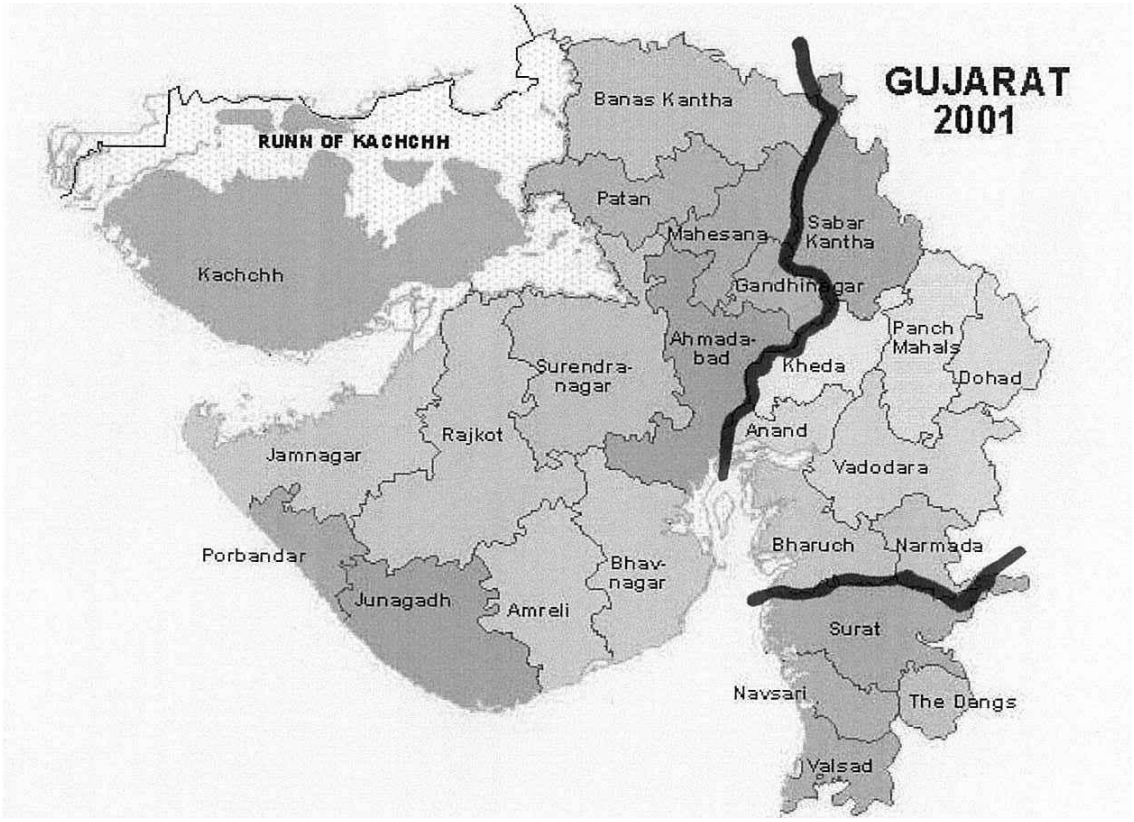
Figure 1 in Chapter 3 displays the interannual rainfall variability for three regions in Gujarat. I have delinated three regions, marked on Map 7 below:

Region 1. Arid and semi-arid north/north-west and Saurashtra:Ahmedabad, Amreli, Banaskantha, Bhavnagar, Gandhinagar, Jamnagar, Junagadh, Kutch, Mehsana, Surendranagar (The regional data for 1951 to 1990 includes data for the new districts Porbandar and Patan).

Region 2. Semi-arid central: Baroda, Bharuch, Kheda, Panchmahals, Sabarkantha. (The regional data for 1951 to 1990 includes data for the new districts Narmada, Anand and Dahod)

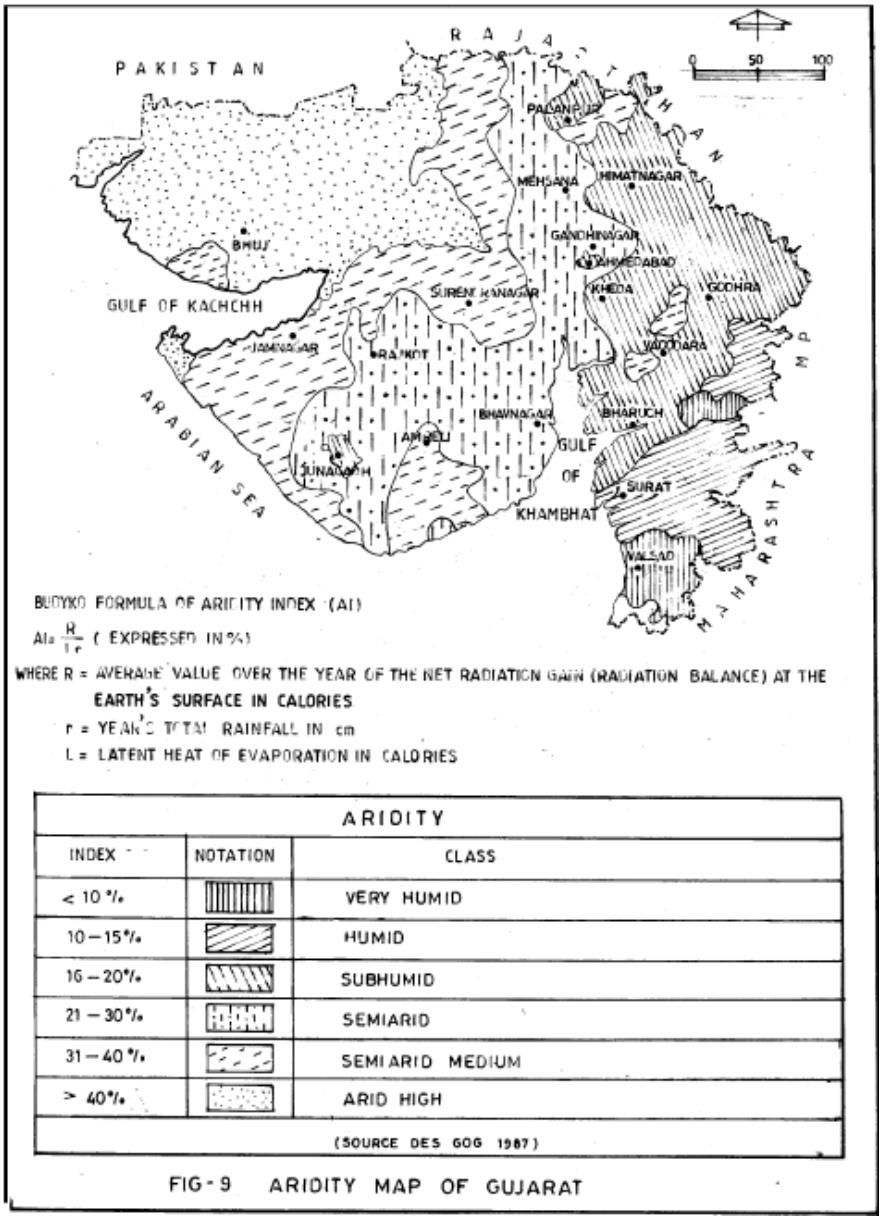
Region 3. Humid and sub-humid south: Dangs, Surat, Valsad (The regional data for 1951 to 1990 includes data for the new district Navsari)

Map 7. Gujarat districts, with borders of three rainfall regions.



I have grouped the districts of Gujarat into these three rainfall regions based on the aridity map in P.P. Patel's report "Ecoregions of Gujarat" (Patel 1997), reproduced as Map 8 below.

Map 8. Aridity map of Gujarat



(Source: Patel (1997))

Figure 1 in Chapter 3 shows the annual rainfall in these three regions calculated as the simple arithmetic mean of the districts in each region. Districtwise rainfall data for the years 1951 to 1990 was obtained from Bhatia (1992), and is reproduced in Table 17. Districtwise rainfall data from Indian Meteorological Department (IMD) for 2004-2008 was downloaded from the IndiaWaterportal (http://indiawaterportal.org/) and is reproduced in Table 18. The IMD

calculates this data as the arithmetic mean of rainfall in all the IMD measuring stations in the district. In 1997, five new districts were formed in Gujarat: *Anand* was split from Kheda, *Dahod* from Panchmahal, *Narmada* from Bharuch, *Navsari* from Valsad, and *Porbandar* from Junagadh. In 2000, another district was created, *Patan* from parts of Banaskantha and Mehsana.

I have excluded the new districts created in 1997 and 2000 from this calculation for reasons of simplicity. The figure is intended to illustrate the consistent inter-annual variability of rainfall in Gujarat. A more sophisticated analysis of rainfall patterns would have needed a more careful calculation taking into account for example area covered by each district, and also the effect of the creation of new administrative boundaries on the rainfall data. These considerations are beyond the scope of this dissertation and the purpose of the chapter.

Table 17. Districtwise annual rainfall, 1951-1990

Region	**Rainfall, mm**	**1951**	**1952**	**1953**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**
1	**Ahmedabad**	326	764	972	840	828	1198	371	982	1453
1	**Amreli**	405	323	909	733	428	633	696	724	
1	**Banaskantha**	376	662	623	835	566	1548	580	386	1190
1	**Mehsana**	287	737	757	785	785	1084	527	730	1107
1	**Bhavnagar**	315	320	751	762		652	668	849	1021
1	**Gandhinagar**									
1	**Jamnagar**	410	531		947	460	728	377	311	869
1	**Junagadh**	484	561	666	1002	556	1411	1072	1024	1797
1	**Kutch**	631	261	547	333	209	528	216	275	1153
1	**Rajkot**	389	539		600	527	1260	558	886	2050
1	**Surendranagar**	285	333	876	610	521	747	404	464	1130
2	**Baroda**	565	882	989	1176	1023	1310	777	1242	1475
2	**Bharuch**	374	728	755	1787	755	1359	736	960	1484
2	**Kheda**	406	711	1058	1046	707	1411	488	845	
2	**Panchmahals**	550	927	847	1276	923	1476	675	1263	1296
2	**Sabarkantha**	470	784	1044	1264	1016	986	328	743	1599
3	**Dangs**	1233	1344	1739	2203	2422	2774	1217	2467	2181
3	**Surat**	735	625	1712	2268	711	1209	932	1290	1966
3	**Valsad**	1365	1521	2153	3953	1737	1970	1262	3194	3328

Region	Rainfall, mm (cont'd)	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
1	**Ahmedabad**	394	831	756	1005	698	457	609	986	392	470
1	**Amreli**	417	215	356		845	865	256	448	404	332
1	**Banaskantha**	452	672	405	608	595	450	434	936	560	253
1	**Mehsana**	321	620	536	686	496	364	402	664	361	289
1	**Bhavnagar**	432	463	360	656	500	412	512	630	720	467
1	**Gandhinagar**										
1	**Jamnagar**	287	952	283	278	567	319	261	773	383	286
1	**Junagadh**	824	1760	750	690	1489	647	523	1093	896	640
1	**Kutch**	80	723	188	203	348	318	205	714	81	
1	**Rajkot**	570	747	405	505	765	466	437	484	591	317
1	**Surendranagar**	428	633	345	523	431	599	497	440	258	147
2	**Baroda**	564	883	620	1045	842	595	698	1020	513	1079
2	**Bharuch**	743	897	612	901	1149	647		736	815	645
2	**Kheda**		1017	746	203	783	613	666	942	358	
2	**Panchmahals**	494	944	1014	960	594	402	587	906	618	969
2	**Sabarkantha**	570	645	671	1009	606	470	679	545	523	384
3	**Dangs**	1251	1567	1235	1805	1892	1879	1713	2160	1771	2120
3	**Surat**	1000	1474	723	1220	2084	931	1008	4096	1022	943
3	**Valsad**	2077	760	1436	3162	2708	1780	1988	1488	1598	2264
Region	**Rainfall, mm (cont'd)**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**
1	**Ahmedabad**	1245	544	250	1043	412	1213	1282	1134	701	524
1	**Amreli**	929	638	242	297	394	434	528	720	436	738
1	**Banaskantha**	739	641	464	1002	196	1241	613	1274	793	454
1	**Mehsana**	658	419	183	682	331	1702	4036	1085	811	665
1	**Bhavnagar**	1430	534	192	829	147	579	1044	543	496	777
1	**Gandhinagar**									444	517
1	**Jamnagar**	735	698	239	383	142	996	525	448	592	971
1	**Junagadh**	1124	859	344	894	286	759	901	843	705	1424
1	**Kutch**		300	62	208	101	462	495	311	342	840
1	**Rajkot**	1152	544	355	325	297	802	750	722	553	1291
1	**Surendranagar**	1123	513		550		967	552	593	357	823

2	**Baroda**	1232	921	315	1228	262	814	1715	1344	1074	847
2	**Bharuch**	1604	962	323	998	315	1416	2467	1101	830	1086
2	**Kheda**	1532	686	281	1291	434		1924	1252	1068	651
2	**Panchmahals**	1086	828	507	1479	3381	1097	1941	1134	988	754
2	**Sabarkantha**	1405	552	412	1377	352	1330	1185	1197	879	620
3	**Dangs**	2082	1739	1239	1944	1249	1407	3443	2211	2581	2594
3	**Surat**	1628	918	565	1068	587	1446	2398	876	1305	1504
3	**Valsad**	2405	1984	1432	1908	1194	2155	2830	1199	1821	2177

Region	**Rainfall, mm, (cont'd)**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**
1	**Ahmedabad**	733	1264	759	1090	763	803	452	251	728	230	973
1	**Amreli**	855	805	843	1088	294	311	455	113	1317	364	342
1	**Banaskantha**	512	476	356	646	704	322	328	61	730	776	557
1	**Mehsana**	475	638	560	762	627	189	169	109	635	471	874
1	**Bhavnagar**	487	764	418	654	449	657	364	121	761	532	671
1	**Gandhinagar**	377	618	472	519	846	554	537	136	650	572	1151
1	**Jamnagar**	1210	1369	884	855	665	208	189	36	482	245	341
1	**Junagadh**	1653	1387	1131	2538	1215	449	762	194	2178	1032	798
1	**Kutch**	525	598	146	257	306	118	106	5	657	358	241
1	**Rajkot**	635	641	470	637	539	278	200	180	1017	837	474
1	**Surendranagar**	484	641	532	453	498	423	308	81	443	60	565
2	**Baroda**	1009	766	662	1389	707	634	304	419	1068	856	780
2	**Bharuch**	621	1131	501	1381	799	686	589	447	1147	1306	445
2	**Kheda**	943	1052	601	812	710	385		483	1256	412	662
2	**Panchmahals**	955	1054	634	1040	818	407	438	471	906	1187	1451
2	**Sabarkantha**	822	829	519	997	925	521	292	168	973	700	916
3	**Dangs**	2780	3064	1674	2915	2743	2497	1856	1959	3172	1978	1507
3	**Surat**	1038	1240	1182	1967	1053	761	828	632	2298	865	1527
3	**Valsad**	1964	1917	1523	3047	1823	1305	1442	1418	2269	1568	1507

(Source: Bhatia 1992).

Table 18. Districtwise annual rainfall Gujarat, 2004-2008

Region	Rainfall, mm	2004	2005	2006	2007	2008
1	Ahmedabad	820	1259	895	890	767
1	Amreli	567	1165	825	1045	728
1	Banaskantha	436	751	1375	863	539
1	Mehsana	617	1391	1418	1100	607
	Patan (new)	503	791	1044	850	573
1	Bhavnagar	578	991	732	967	741
1	Gandhinagar	759	1411	1056	1101	740
1	Jamnagar	563	576	774	1199	578
1	Junagadh	1032	953	979	1654	1122
	Porbandar (new)	528	695	916	1348	645
1	Kutch	300	387	561	564	314
1	Rajkot	653	732	900	1066	793
1	Surendranagar	516	803	632	821	739
2	Baroda	938	1365	1644	1160	851
2	Bharuch	781	956	978	926	758
	Narmada (new)	1074	1154	1493	1356	1103
2	Kheda	831	1139	1413	1144	758
	Anand (new)	771	1518	1050	898	760
2	Panchmahals	955	907	1418	986	674
	Dahod (new)	1056	530	1199	860	593
2	Sabarkantha	725	1059	1702	1310	669
3	Dangs	2459	3823	2617	1921	2593
3	Surat	1963	2611	2015	1572	1622
3	Valsad	2339	2793	2237	2197	2246
	Navsari (new)	2078	2969	2099	1737	2196

(Source: India Meteorological Department)

4. Members of Narmada Planning Group

This list is reproduced from *Planning for prosperity*, page xiii, "Experts and officers associated with the formulation of Sardar Sarovar Narmada Development Plan May 1983":

Dr. Y.K. Alagh	Executive Vice Chairman (Economics and Planning)
Dr. S.R. Hashim	Member (Economics)
Dr. B.N. Vishwanath	Member, Part time (Environment and Regional Planning)
Dr. S.S. Mehta	Member, Part time (Economics)
Dr. N.R. Patel	Member, Part time (Systems)

Advisors: Shri J.P. Naegamvala (Irrigation Engineering), Shri P.B. Buch (Statistics), Dr. G.A. Patel (Agriculture)
Officers on Special Duty: Shri K.G. More, Shri V.M. Patel, Shri D.T. Buch,
System Analyst: Shri G.L. Bavishi
Executive Engineers: Shri V.R. Parekh, Shri M.M. Chauhan, Shri A.V. Gururaja Rau, Shri M.R. Patel, Shri G.M.Shah, Shri B.L. Shah
Agriculture Officers: Shri I.M. Desai (Joint Director), Dr. Kum.V.S.Lad (-do-), Shri B.L. Patel (Deputy Director), Dr. D.G. Faldu (Agronomist)
Deputy Executive Engineers: Shri D.T. Patel, Shri A.V. Durkal, Shri K.M. Patel, Shri R.K. Patel, Shri S.N. Jotwani, Shri S.K. Naik, Shri, R.J. Patel.
Research Officers: Shri Y.M. Shukla, Shri G.B. Vaghela, Shri K.H. Vasavada
Assistant Engineers: Shri H.S. Patel, Shri M.M. Shah, Shri K.M. Patel, Shri K.K. Patel
Geologist: Shri M.P. Vyas
Administrative Officers: Shri R.S. Tatti, Shri P.V.N. Nambiar
Irrigation Department: Shri P.A. Raj, Secretary, and B.J. Desai, Special Secretary
Chief Engineers and Joint Secretary: Shri I.M. Shah, Shri B.J. Vasoya, Shri K.S. Chandrashekhar, Shri I.C. Patel
Superintending Engineers: Shri N Ramaswamy, Shri M.M. Shah, Shri R.A. Iyer, Shri R.V. Shah, Shri N.B. Desai
Geological Officers: Shri D. M Pancholi, Ahri C.S. Shah
Gujarat Water Resources Development Corporation: Shri M.H. Vakharia (Chief Engineer), Dr. S.C. Sharma (Director) and Shri N.C. Shah (Chief Engineer)
Area Development Organisation: Dr S.N. Joshi (Area Development Commissioner) and Shri P.P. Jethwa (Superintending Engineer)

5. Sardar Sarovar Project planning studies

From the booklet ”Sardar Sarovar Project On River Narmada. Meeting the Challenges of Development”, published by SSNNL.

STUDIES COMPLETED

No.	Studies	Name of Agency	Yr. Of Completion
1.	Pre-feasibility Study for Low Level Canal	Jyoti Consultants Ltd., Vadodara.	1981
2.	Mathematical Modeling of Ground Water System for Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara.	1982
3.	Pre-feasibility Level Drainage Study of Narmada Mahi Doab of SSP Command	Core Consultants Ltd. Ahmedabad	1982
4.	Some Aspects of Role of Panchayats and Institutional Arrangements for Canal Irrigation in Two Talukas of Ahmedabad District.	Institute of Cultural and Urban Anthropology, Ahmedabad.	1982
5.	A Study of Settlement Pattern (6 Talukas in the Narmada Command Area of Mahesana Dist. of Gujarat).	Department of Geography, Gujarat University, Ahmedabad	1982
6.	Regionalisation of Narmada Command	Operations Research Group, Vadodara.	1982
7.	Marginal Cost Study of Two Typical Distributories and Two Typical Branches	Dr. C.R.Shah, Vadodara	1983
8.	Socio-Economic Benchmark Survey of 62 Talukas (Sub-districts) of Narmada Command Area	Fourteens different Agencies including Universities, Research Institutions etc.	Between 1982 & 1983
9.	Population Projection and Migration Study of Narmada Command Area	Operation Research Group Vadodara	1983
10.	Study on Water Demand for Non-Agricultural Use from Narmada Project.	Gujarat Water Supply and Sewerage Board, Gandhinagar	1983
11.	Consumer Expenditure, Assets and Indebtedness of Rural Households of the Command Area of Sardar Sarovar (Narmada) Project.	Directorate of Economics & Statistics, Gandhinagar	1983
12.	Wasteland Development Project for Command Area of Narmada Canal (Region 11312)	Gujarat State Rural Development Corporation Ltd., Gandhinagar	1984 (11 and 12.)
13.	Mathematical Modeling of Ground Water for System Narmada Mahi Doab.	Operations Research Group, Vadodara.	1985
14.	Additional Work of Mathematical Modeling of Ground Water System Single Layer Model Narmada Mahi Doab.	Operations Research Group, Vadodara	1985
15.	Rate of Adoptation of Improved Technology in Narmada Command and Rest of Gujarat State (Based on Analysis of Crop cutting Experiments Data)	Operations Research Group, Vadodara	1985
16.	Computer Aided Planning of Conveyance and Delivery Network.	Indian Institute of Management, Ahmedabad.	1986
17.	Land Use and Cropping pattern Survey Zone 4A & 4B.	Department of Geography, M.S. University, Vadodara.	1987

No.	Studies	Name of Agency	Yr. Of Completion
18.	Survey and Investigations Work of Ground Water Resources in Narmada-Mahi Doab.	Gujarat water Resources Development Corporation Ltd., Gandhinagar.	1987
19.	Cropping Pattern and Waste Demand Study in Narmada Command Area.	Operations Research Group, Vadodara.	1987
20.	Inter-Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
21.	Extended Study of Inter Regional Water Allocation and Determination of Branch Canal Capacity.	Operations Research Group, Vadodara.	1989
22.	Growth of Agro Processing includes in Phase of SSP	Gujarat Industrial & Technical Consultancy Organization Ltd., Vadodara.	1990 1990
23.	Consultancy Work for Control Telemetry and Communication Network on Narmada Canal System for SSP.	Gujarat Communication & Electronics Ltd., Gandhinagar.	1991
24.	Techno-Economic Study for Utilising Village Tanks as borrow area for construction of Canal Network.	Operations Research Group, Vadodara.	1992
25.	**Studies on Water Rates Policy**		
	A. Pricing of a Public Utility Survey of Literature.	Department of Economics, South Gujarat University, Surat.	1992
	B. Financial working of Irrigation Projects. A Case of four Projects in Gujarat.	Department of Economics, Sardar Patel University, Vallbh Vidyanagar.	1992
	C. Some Policy Issue for Canal Water Rates in Gujarat.	Department of Economics, Sardar Patel University. Vallbh Vidyanagar.	1992
26.	Mathematical Modelling of Ground Water System for SSP Command Between Rivers Shedhi and Sabarmati.	Consultancy Engineering Service, New Delhi.	1993
27.	Mathematical Modelling of Ground Water System for SSP Command Between Rivers Banas and Sabarmati.	Operations Research Group, Vadodara.	1993
28.	Mathematical Modelling of Ground Water System for SSP Command beyond River Banas upto Rajasthan Border.	Dalal Consultants, Ahmedabad.	1993
29.	Pre-feasibility Level Drainage Study for SSP Command Beyond river Mahi.	Consultancy Engineering Services, New Delhi.	1993
30.	Study on Preparation of a Detailed Integrated Command Area Development Plan for SSP.	M/s. Wamana Consultants Pvt. Ltd., Hyderabad.	1994
31.	Environmental Impact Assessment Studies on Inland and Marine Fisheries relevant to the Command Area of Sardar Sarovar (Narmada) Project.	M.S. University, Vadodara.	Nov. 1994

No.	Studies	Name of Agency	Yr. Of Completion
32.	Environmental Impact Assessment Studies on water related diseases in SSP Command Area including the area down stream of (Narmada) the dam.	Commissionerate of Health, Medical Services & Medical Education, Govt. of Gujarat, Gandhinagar.	Nov. 1994
33.	Study of Flora and Fauna of the Command Area of Sardar Sarovar (Narmada) Project. Lying Between the Narmada & Sabarmati Rivers. (EIA Studies)	Sardar Patel University, Vallabh Vidyanagar.	Nov. 1995.
34.	EIA on Downstream of Sardar Sarovar Dam up to Gulf of Cambay.	H.R. Walingford, U.K.	April 1995
35.	Economic Dimension of the Sardar Sarovar Project.	S.P. Institute of Social & Economic Research, Ahmedabad.	May 1995
36.	Study on Flora and Fauna of the Command Area of Sardar Sarovar Project Lying in Saurashtra and Kachchh Area (EIA Studies).	Saurashtra University, Rajkot.	Jan. 1996.
37.	Review of Ground Water Drainage Study	H.R. Wallingford, U.K.	Feb. 1996.
38.	Agro Pollution Aspect of Command Area	H.R. Wallingford, U.K.	
39.	Environmental Impact Assesment of Black Buck National Park at Velavadar in the command area of SSP.	GEER Foundation, Gandhinagar.	Dec. 1993
40.	Study on Flora and Fauna of the Command Area of SS Project lying Between Sabarmati River and Rajasthan Border (EIA Studies.)	Gujarat University, Ahmedabad	Mar. 1998.
41.	Ecological Study of Wild Ass Sanctuary and Surrounding Area Using Remote Sensing	GEER Foundation, Gandhinagar.	May 1998.
42.	Environmental Impact Assesment of Nal Sarovar Bird sanctuary.	GEER Foundation, Gandhinagar.	Mar. 1998

5.9 (III) 11. On Going Studies :

1.	Agricultural Research Studies.	Gujarat Agricultural University	1987
2.	Survey and Investigation Work of Ground Water Resources Beyond River Mahi in SSP Command.	Gujarat Water Resources Development Corporation Ltd., Gandhinagar.	1989
3.	Action Research in People Participation	Gujarat Labour Institute, Ahmedabad.	

6. Important events in the SSP conflict

Date	*Event*
1983, March - 1984, August	World Bank project appraisal
1985, March	World Bank project approval, loan agreement signed
1987, December	Resettlement and Rehabilitation package declared by Government of Gujarat
1988, August	Narmada Bachao Andolan formed with "No Dam"-position
1990, December-1991, January	NBA Sangharsh Yatra to Ferkuva, hunger strike. Pro-dam counter-demonstration at Gujarat side of border.
1991, January	World Bank announces an independent review
1991, September	The independent review team starts its work
1992, June	Independent Review Report is published
1993, March	Government of India cancels loan agreement with World Bank
1993-1994	NBA demands full review of project
1994, May	NBA files Public Interest Litigation to Supreme Court
1995, January	Supreme Court orders Five Member Group to prepare a report
1995, May	Supreme Court issues stay order on construction untill it reaches verdict
2000, November	SC reaches its verdict in favour of SSP

Sources: World Bank Completion Report (1994), Nilsen (2005)

7. Official letters to and from the sarpanch of Motugam

Date	To	From	Copy to	Subject
30.03.1992	Deputy Executive Engineer, Water Resource Research sub-Section, Godhra	Superintendent Engineer, Panam Scheme Circle, Godhra		"Sub: Inclusion of Panam Command Area of Udalpur Nadisar Road into lift irrigation of Motugam village, if possible."
02.06.1992	Hon. Shri Chhabildasbhai (Mehta, Chief Minister)	Dinsha Patel (Minister Roads & Buildings, Parliamentary affairs)	Chandabhai Patel, *Sarpanch*	Cover letter for passing on a representation on Panam Reservoir Scheme
13.01.1993	Hon Shri C.D.Patel, Minister, Irrigation (was min in 1994 and maybe 1993)	Patel Shantilal Purushottamdas, MP		Repair of main canal of Panam scheme
25.02.1993	Hon. Minister Water Resources	Urvashidevi (Minister of State, Tourism and Sports)	Chandabhai Patel, *Sarpanch*	Cover letter for passing on a representation from Chandabhai
22.06.1993	Chandabhai, *sarpanch*	Section Officer, Dept of Health and Family Welfare		"Sub: Inclusion of all command areas by increasing capacity of Panam main canal"
04.09.1993	Shri Jashubhai Barad, Minister of State, Water Resources	Rajendra B. Patel, President, Godhra Nagarpalika	Chandabhai Patel, Godhra Nagarpalika	Cover letter for passing on a letter from Chandabhai on the issue of repair of Panam main canal
13.09.1993	Shri Chandabhai Patel, *sarpanch*	Collector Office, Panchmahal, Godhra		"Sub: Repairing work of Panam main canal"
11.10.1993	Chandabhai G Patel, *sarpanch*	Executive Engineer, Panam Scheme Section Godhra	Collector, Panchmahal	"Sub: Repairing of Panam Main Canal. Ref your application dated 2.9.1993, addressed to Hon. Minister of Irrigation, Mr Jashubhai Barad"
14.12.1993	Shri Chandabhai Patel, *sarpanch*	M.A.Sheikh, Section Officer, Dept of Narmada and Water Resources		"Sub: Increasing capacity of the main canal of Panam reservoir"
01.01.1994	Dear friend	Vidyacharan Shukla, Minister of Water Resources and Parliamentary Affairs, India, New Delhi		On command area development programme of irrigation schemes of the last 20 years.

Date	To	From	Copy to	Subject
01.01.1994		Executive Engineer, Panam irrigation Department, Godhra	Superintendent Engineer, Panam Scheme Circle, Godhra; Executive Engineer, Panam Scheme Dept; dy Ex. Eng Pa, attached herewith 80 copies of the announcement. Requested to distribute to all *Sarpanch*/Talati-cum-sec/V.S.A.committee members of the Panam command area for sarge scale publicity. Get receipts thereof. (And others for large scale publicity)	"Important announcement for horticulturists of Panam Reservoir Scheme, Dist. Panchmahals"
31.01.1994	Shantibhai P. Patel (Purushottamdas)	M.A.Sheikh, Section Officer, Dept of Narmada and Water Resources	Shri Chandabhai Patel	"Sub: Complaint about the Panam irrigation scheme"
28.04.1994	Hon Shri Chimanbhai Patel, The Chief Minister, Gujarat	Shantilal Purushottamdas ,MP		"Sub: People's representation of 27.4.1992 on the administration of Panam Reservoir Scheme"
26.07.1994	Superintendent Engineer, Panam Yojna Circle	Executive Engineer, Panam irrigation Section Godhra	The Collector, Panchmahals AND Chandabhai Patel, *sarpanch*	"Sub: Operation of Panam canals closed because of the Narmada canal and Increasing the capacity of Panam main canal to 980 cusecs. Ref: Your letter no ppc/pb 37330 b/1417 dated 08.4.1994 along with the application of Shri Chandabhai G. Patel of Motugam village dated 08.4.1994"
26.10.1994	Shri Chudasama, Minister of Agriculture, Gov of Gujarat	Farmers of Motugam village	The Collector Panchmahals; C.K.Raolji, MLA Godhra; Executive Engineer, GEB, Godhra	"Sub: Irregularity of electricity"
16.11.1994	Chandabhai Patel, *Sarpanch*	M.A. Sheikh, Section Officer Narmada and Water Resources Dept.	Superintendent Engineer Panam Yojna Circle Godhra, wiht the original application. You are kindly requested to answer directly to the	"Sub: Panam Irrigation Scheme"

Date	To	From	Copy to	Subject
			applicant.	
31.05.1995	Chandabhai Patel, *Sarpanch*	Parsottam Rupala, Minister Water Resources and Water Supply	The Secretary Narmada and Water Resource Dept.	Re: request for increase flow capacity of Panam scheme “Enclosed herewith the representation of Shri Chandabhai G. patel. You are kindly requested to take necessary actions immediately. And the information on the same to this office”
05.09.1995	Superintendent Engineer, Panam Yojna Circle	Executive Engineer, Panam Irrigation Section, Godhra	Chandabhai G. Patel Motugam, with ref to his letter of 24.4.1995	"Sub: Sending application of Panam horticulturists. MLA Shri Prabhatsinh Chauhan"
07.02.1996	Chandabhai Patel, *Sarpanch*	Parsottam Rupala, Minister Water Resources and Water Supply		Re request for increased capacity in panam scheme
20.04.1996	*Sarpanch* Chandabhai Patel	Section Officer Department of Narmada and Water Resources		"Sub: Increasing capacity of the Panam scheme through renovation"
07.07.1996	Superintendent Engineer, the Executive Engineer and the Deputy Executive Engineer, Panam Irrigation Section, Godhra AND The Collector, Panchmahals, Godhra	The villagers of Ratanpur (Kantdi)	Chief Police Officer of District, Shri C.K.Raulji (MLA, Godhra), President District Panchayat Godhra	"Sub: Hunger strike for repairing work of L branch of 25/2 distributory of Ratanpur (Kantdi) village"
09.01.1997	Chandabhai Patel, *Sarpanch*	Executive Engineer, Panam Yojna Circle Godhra	Superintendent Engineer, Panam Yojna Circle Godhra	"Sub: Taking new pledge to make this Water Resource Day celebrations more effective and fruitful and farmer oriented. Ref: Your presentation dated 20.1.1996"
31.12.1997	Deputy Executive Engineer, Panam Irrigation Sub-Section No 2, veganpur	Executive Engineer, Panam irrigation Department, Godhra	Chandabhai G Patel, with reference to your telephone message of 29.12.1997	"Sub: Gate Repairing of 12/L minor of 25/R dist."

Date	To	From	Copy to	Subject
21.11.1998	Chandabhai G. Patel, *Sarpanch*	Personal Secretary, Deputy Minister, Secretariat of Forest and Environment	Personal Secretary, Hon. Minisited, Small and Medium Irrigation , Secretariat, "Requested to take actions on the attached letter an let it be known to this office and the applicant."	"Sub: To make the irrigation scheme of Panchmahal district effective, fruitful and farmer-oriented"
23.12.1998	Shri Jaynarayanbhai Vyas, Minister, Narmada and Large Irrigation Schemes	Prabhatsinh Chauhan, Minister of State, Forests and Environment, Gov of Gujarat	District Development Officer, Panchmahal Godhra, AND *Sarpanch*, Motugam village Panchayat	Cover letter for the original representation for lift irrigation in Motugam, asks Jaynarayan Vyas to instruct the start of the work.
17.08.1999	Shri Chandabhai Patel	N.M.Patel, Office of the Superintendent Engineer, Panam Yojna Circle Godhra	Shri S.N.Khajanchi, Under Secretary, Narmada and Water Resources and Water Supply Dept; The Executive Engineer, Panam Irrigation section, for immediate required and actions and the field staff to ensure regular water flow up to Motugam	"Sub: Making irrigation schemes of Panchmahal district more useful and fruitful and farmer oriented. Ref: Your representation of 16.11.1998 addressed to the Hon. Minister of irrigation"
16.04.2003	Deputy Executive Engineer, Gujarat Electricity Board	Deputy Executive Engineer, Minor Irrigation Section, Godhra		"Sub: Electricity connection for Shri Rajkripa Piyat Cooperative Society, Motugam. Ref: Your letter dated 06.03.2003 no 584"
07.01.2004	Chandabhai Patel, president of BJP Godhra *taluka*	Mahendrasinh Chauhan, Personal Secretary of Prabhatsinh Chauhan, Minister for Cow protection etc		"Sub: For receiving water from Narmada Canal by lift irrigation. Ref. Your representation here on 7.12.2003"
15.01.2004	Prabhatsinh Chauhan, Minister of State, Cow Protection, Holy Places, Pilgrim Place Development	S.J.Desai, Manager (Canals) SSNNL		answer to request for lift irrigation from NMC (I think this is the *baknari*)
13.11.2004	President of Panchmahal District BJP	Chandabhai Patel, President of Godhra *taluka* BJP (on BJP Godhra letterhead)	Shri Harishbhai Bhatt, MLA, Godhra	"Sub: Giving 24 hours electricity supplu to Shri Raj *Piyat mandali* of Motugam village"

Date	To	From	Copy to	Subject
13.11.2004	President of Panchmahal District BJP	Chandabhai Patel, President of Godhra *taluka* BJP (on BJP Godhra letterhead)	mr Harish Bhatt, MLA, Godhra	"Sub: Making check dams on the large rivers and deepening of ponds in Godhra *taluka* under the Sujalam Sufalam Scheme."
13.11.2004	President of Panchmahal District BJP	Chandabhai Patel, President of Godhra *taluka* BJP (on BJP Godhra letterhead)	Shri Harish Bhatt, MLA, Godhra	"Sub: Inclusion of non-irrigated lands of the farmers of Godhra *taluka* in the Narmada command areas"
13.11.2004	President of Panchmahal District BJP	Chandabhai Patel, President of Godhra *taluka* BJP (on BJP Godhra letterhead)		The many applications of Godhra BJP, in all 11.
31.12.2004	Prabhatsinh Chauhan, Minister of State, Cow Protection, Holy Places, Pilgrim Place Development	Narottambhai Patel, Minister, Water Supply and Water Resources	Secretary, Dept of Water Resources, - requested to do the needful and solving the problem.	"Sub: Inclusion of non-irrigated lands of Godhra *taluka* in the Narmada command areas"
10.01.2005	Chandabhai Patel, president of BJP Godhra *taluka*	G.B.Rana, Personal Secretary of Prabhatsinh Chauhan, Minsiter of State, Cow Protection, Holy places and Pilgrim place Development, Gov of Gujarat		"Sub: Inclusion of non-irrigated lands of Godhra *taluka* in the Narmada command areas"
20.01.2005	The President, Agricultural Produce Marketing Committee, Godhra; member, Irrigation Advisory Committee, Godhra	P.B.Chaudhry, Executive Engineer, Panam Irrigation Scheme and chairman of Irrigation advisory committee, Godhra		"Sub: Review note of the second meeting of the Panam command Irrigation Advisory Committee held at Circuit House Godhra on 20.1.2005"
	Hon. President Panchmahal District BJP	Chandabhai Patel, president of BJP Godhra *taluka*		"Sub: Construction of quality check dams under Sardar Sahbhagi Yojna according to the real needs by eradication of corruption."
	Hon. President Panchmahal District BJP	Chandabhai Patel, president of BJP Godhra *taluka*	mr Harish Bhatt, MLA, Godhra	"Sub: Completion of lift irrigation scheme of Motugam and *NN* villages"

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