

The Damming of the Narmadā River: Progress, Technology and the Sacred



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To all those who supported me through this stressful journey. Without your endurance I would have given up many times. This is for my family.

Abstract

Pressure on the limited amount of available natural resources is growing rapidly and primarily stems from population growth and individual/national aspirations for development. Harnessing more water is seen as the best available way to meet the increasing demands. However, despite often the best intentions and the use of widely accepted tools to assess the likely impacts (such as Environmental Impact Assessment – EIA) water “development projects” are not without costs. In this thesis I will address the global issue of the over-use of natural resources by looking at the specific example of the Narmadā River. The Narmadā is a sacred river in India and as such, has a long culturally significant history. The Narmadā is currently experiencing a large development project being built along its course. This project proposed over 3000 dams, though only a fraction of those have been built.

This thesis employs a case study of the Narmadā River in India to explore the rationale and approaches taken for development, as well as the costs that this development has incurred such as environmental and social impacts. Specific attention has been given to the description of the religious impacts, cultural transformations and impact upon minority indigenous groups; aspects frequently ignored or given little attention. An improved recognition of the religious and cultural significance of freshwater is needed to enable more positive local acceptance of developments such as dams as well as protecting national identity. These components are critical for sustainable development.

I use the terms ‘development’ and ‘sacred’ in this thesis. These are widely interpreted terms and as such mean different things to different people. The definition of ‘development’ I have used is: “the process of converting land to a new purpose by constructing buildings or making use of its resources.”¹ The term ‘sacred’ is also widely interpreted². In terms of this thesis, I will use Mircea Eliade’s definition of sacred. He defines it as a cover-term for that category of ‘objects’ constituted in the mind of the believer as both ‘ultimately real’ and as distinct from the profane world.³ A sacred river is real in a physical sense but also separate from other rivers because of its divine origins.

¹ Pearsall, J., 1998. *The New Oxford Dictionary of English*, p.505.

² Authors who discuss the difficult nature of the term ‘sacred’ are: Studstill, 2000, *Eliade, Phenomenology and the Sacred*; Stirrat, 1984, *Sacred Models* and Bartkowski, Swearingen, 1997, *God Meets Gaia in Austen, Texas*.

³ Studstill, 2000, p. 181.

Introduction

Drinkable water is arguably humanity's most precious resource; it is essential for life on this planet. However, there are many reports concerning water that reveal a frightening image. According to the United Nations Development report released in 2006, over a billion people do not have easy access to potable water and around 2.6 billion people lack sufficient sanitization.⁴ These facts alone signal that humanity is in the midst of a global water crisis. Since the beginning of the twenty-first century, water resources have faced unprecedented challenges – pollution from agriculture and industry; rapidly increasing populations with a corresponding need for clean water; increasing salinity of fresh water sources; and the blockage of the natural flow of rivers from dams. These challenges to water all stem from what has become a universal human desire: development.

The term 'development' has been defined in many different ways and can mean many different things. The Oxford English Dictionary defines development as: "an event constituting a new stage in a changing situation; or, the process of converting land to a new purpose by constructing buildings or making use of its resources."⁵ According to the United Nations⁶, human development is measured by: life expectancy; adult literacy; access to all three levels of education, and people's average income, which is a necessary condition of their freedom of choice. "In a broader sense, the notion of human development incorporates all

⁴ Chamberlain, 2008, *Troubled Water*, p. 2.

⁵ Pearsall, 1998, p. 505.

⁶ <http://www.un.org/en/sections/what-we-do/promote-sustainable-development/index.html>, retrieved on 17 December 2013.

aspects of individuals' well being, from their health status to their economic and political freedom.”⁷ ‘Development’ has become a slogan for an array of basic human needs and aspirations. So-called developing countries usually have a poor agricultural and industrial economy and seek to become more advanced socially and economically.⁸ Population increase must be matched with food production and availability of potable water. Technological advances are a means through which people have been able to increase their food production: this can be achieved through damming rivers to provide irrigation water; the creation of ‘super’ crops, and chemicals such as fertilizers and pest controls. Most of the world’s food is produced in these developing countries, where farmers with only small parcels of land grow cash crops (such as sugar cane) often at the expense of planting enough subsistence foodstuffs to support their families. In the 21st Century, the importance of water as a scarce resource has emerged as never before. The rapid expansion in national and international initiatives for water, including the establishment of the World Water Forum, reflects a growing recognition that managing water is going to be a critical challenge for future economic growth and environmental sustainability.

Humanity depends on water in many ways, one of the most fundamental is for food production through crops and supplying livestock. The volume and distribution of rainfall around the globe is variable and can be either insufficient

⁷ http://www.worldbank.org/depweb/beyond/beyondco/beg_01.pdf, retrieved on 9 January, 2014.

⁸ The fact that so-called developing countries are ‘poor’ or less advanced is not an accidental fact of history. In fact, in many cases it is the legacy of the exploitation and oppression that societies underwent as a result of being colonized by European powers. So-called ‘natural’ situations such as famine have now (in the case of India) been clearly shown to be the result of cruel policies of the British, who diverted food for the sake of profit rather than the nourishment of local populations. The same situation holds true for famine in Africa, such as in Sudan, and is artificially created through war.

during critical stages of crop development or excessive causing damage to the crops. Risk of crop failure from drought is high in semi-arid regions.⁹ One sign of population pressure for food on land is that even sub-productive land, such as semi-arid and arid regions, are being brought under cultivation. In order for these less than ideal lands to become productive, fertilizers, irrigation and super crops (such as genetically modified grains tolerant of drought) are required. However this spread of development can create as many problems as it seemingly solves. Irrigation can result in water logging and salination of the soil, while fertilizers may disrupt the chemical balance and soil ph. Further, reliance on 'super crops' can lead to vulnerability of food supply, should these crops become exposed to emergent pathogens resistant to existing methods of control.

The history of development has not been unregulated. Both national and international institutional measures have been adopted to protect development investments, and including requirements for environmental measures to be given fair consideration (e.g. Environmental Impact Assessments – EIA). The premise is that development should not occur at the expense of the environment. However, numerous studies have shown that despite the assessment/protection measures there have still been serious omissions and deleterious effects such as failed involuntary resettlement programs and the spread of diseases.¹⁰ Often a key contributing cause for the failure of the development scheme has been identified as a lack of support by locally affected peoples. This raises the question, “how could the process be improved?” One aspect is the recognition of the role of local belief systems and their engagement with the development

⁹ Baviskar, A., 2007. *Waterscapes: the cultural politics of a natural resource*, p. 5.

¹⁰ This topic is discussed at length in: Ledec, Quintero, 2003. *Good dams and bad dams: environmental criteria for site selection of hydroelectric projects*.

process. The inclusion of the indigenous population in the planning stage and beyond would help to prevent many of the problems that occur with large-scale development programs.

In the global march towards development, the wealth of the Earth is being appropriated by elites, impoverishing nature as well as the mass of humanity that depends on natural resources for sustenance. The challenge to development has come in the form of political movements of people who are ecologically, economically and culturally marginalized. According to Amita Baviskar (1995) “...the culture of indigenous communities epitomizes a critique of the values underlying development, and that the beliefs and practices of indigenous people constitute an alternative vision of an ecologically sustainable way of living.”¹¹ The Adivasis (tribal population) of the Narmadā Valley are one such group. Their struggle against the development of the Narmadā River will be discussed in chapter five. Other indigenous populations from around the globe face the same struggles as the Adivasis. The development of natural resources negatively impacts on these people’s way of life. Though desacralisation and over use of resources is a pressing global issue, in this thesis it is considered from a particular, local, cultural and social perspective. This thesis is therefore situated in a larger global context of environmental issues and indigenous communities.

Chamberlain, (*Troubled Waters*, 2008), believes that the significance of water in the great historical religions is often buried and neglected. Chamberlain’s work aims to provide meaning and motivation for engagement in the preservation and enhancement of the globe’s sacred waters. He believes that “...religious meanings must be considered in developing approaches to the global

¹¹ Baviskar, 1995, *In the Belly of the River*, p. 230.

water crisis.”¹² Nowhere else in the world does water have greater religious significance than India. All of the main rivers in India are imbued with mythology. The Gaṅgā is the most famous of the sacred rivers in the world and much has been written¹³ on the impact cities and industrial development have had on the pollution levels of the river. Alley, in her book *On the Banks of the Gaṅgā*, (2005) analyzes the human predicaments that result from the accumulation and disposal of waste, by tracing how citizens of India interpret the impact of wastewater flows on a sacred river and on their own cultural practices. This thesis is concerned with the Narmadā River, as she is also one of the most sacred rivers in the world, though less well known than her sister¹⁴, the Gaṅgā.

The Narmadā is currently going through a major development program throughout her valley, which has had many adverse effects on the local population. The development of the Narmadā River has received similar amounts of attention to the pollution of Gaṅgā but only because of the human rights issues involved in the displacement of thousands of people. What is interesting about most of the literature¹⁵ that has already been written about these rivers is that it focuses mostly on the environmental and humanitarian issues that have occurred. The fact that these rivers are sacred¹⁶ and have a rich

¹² Chamberlain, 2008, *Troubled Water*, p. 3.

¹³ Authors such as Alley (2005) and Darian (1978) have discussed at length the pollution levels of the Ganga River and Haberman (2006) discusses the pollution of the Yamuna River.

¹⁴ Most of the rivers in India are seen as female, there are a few male rivers. The assignment of gender to these rivers stem from their perceived sacred nature. They are not just rivers but also deities and so have a gender, name and mythology associated with them. Baviskar (1997) discusses why she believes that most rivers are interpreted as female.

¹⁵ Authors such as Alley (2005), Altinbilek et al. (2012), Bose et al. (2007), Doria (1990) and Dreze et al. (1997) all discuss the environmental and humanitarian consequences of dams but only mention the religious and cultural impacts in passing, if at all.

¹⁶ The term ‘sacred’ is widely interpreted. In this thesis, Mircea Eliade’s definition of sacred is used. He defines it as a cover-term for that category of ‘objects’ constituted in the mind of the believer as both ‘ultimately real’ and as distinct from the profane world. A sacred river is real in a physical sense but also separate from other rivers because of its divine origins. The various interpretations of the term are discussed in Studstill, 2000, *Eliade, Phenomenology and the*

religious and cultural history is typically only mentioned in passing. The desacralisation of natural resources has rapidly increased the rate of abuse and overuse. Chamberlain (2008) believes that:

“...if we are to aid in the efforts to provide clean water and sanitation, to restore the earth’s waters to wholeness, and to learn to live in balance with the world’s waters to prevent pollution and even war, we must listen to the stories captured in people’s religious traditions, their imaginative insights about water and water’s struggle to liberate itself from pollution and mismanagement.”¹⁷

Rarely in analysis and conversations about water are cultural and in particular religious dimensions brought to light. Yet for billions of the globe’s peoples, their fundamental conceptions about the natural world and water are influenced by religious considerations, whether those are feelings of indifference, respect, or even love.¹⁸ The aim of this thesis is to show, using the case of the Narmadā River in India, that a change in how we perceive natural resources is needed. These resources, such as fresh water, need to be viewed as not just exploitable for humanity but as culturally and historically important landmarks. As can be seen in the Hindu tradition, natural resources such as rivers have a rich past steeped in mythology. Rivers have played an important role in Hindu history; every main river of India has at least one deity associated with it. The Narmadā River is mentioned in several of the Hindu sacred texts. This incorporation of natural resources into cultural heritage has ensured their conservation in the past. A return to this perspective would enable them to be conserved for our future generations.

Sacred; Stirrat, 1984, *Sacred Models* and Bartkowski, Swearingen, 1997, *God Meets Gaia in Austen, Texas*.

¹⁷ Chamberlain, 2008, p. 3.

¹⁸ *Ibid*, p. 5.

This thesis will begin with outlining the problems created by the pressures on the limited amount of available freshwater. Harnessing more water is often seen as the best available means to meet the increasing demands. However, water “development projects” are not without costs (financial, environmental and societal). This thesis will use the case study of the Narmadā River in India to explore development, which is the most common answer to increasing demands and the impact that it has. Attention will be given to the religious and cultural transformations and the impacts on minority indigenous groups. The Narmadā River has a long and culturally significant history and references to the Narmadā can be found in many of the epic texts in Indian literature. The Narmadā is culturally significant to all Hindus but is also important to the Adivasis who live in the Narmadā Valley. While the Adivasis do not worship the river as the Hindus do, she is still included in their origin myths. This is no ordinary river; she is seen as a deity, a mother to her devotees, a provider of liberation and a cleanser of sin.

In Chapter One, I will discuss the importance of water and rivers in India. Water is used in many Hindu rituals and every major river of the subcontinent is sacred to Hindus. Each river has its own creation myth and is seen as the physical manifestation of a deity.

In Chapter Two, the history of the sacred nature of the Narmadā River is discussed. Narmadā is a goddess who is linked with several other important deities, such as Śiva, and her creation myths can be found in many of the epic texts.

Chapter Three delves into the history of dams and of the Narmadā Valley Project. Over 3,000 dams, (large, medium and small) are proposed for along the

course of the Narmadā and many of her tributaries. There has been resistance to the project since the nineteen eighties, mostly from the population that lives along the banks of the Narmadā who will be displaced.

In Chapter Four, I report the impacts that this project has had on the sacred nature of the river. For instance, there is a pilgrimage unique to the Narmadā, where devotees must traverse the entire length of the river, from source to delta, on one bank and then back up the other bank. This circumambulation of the river is in jeopardy from the dam projects as the original path will be flooded in many places.¹⁹

Chapter Five identifies the social impacts the dams had on the Valley's inhabitants. The reservoirs of the dams will flood a large amount of land that is inhabited by tribals and lower castes. This means that hundreds of thousands of people will be displaced.

Chapter Six discusses the environmental impacts of the dams. The dams are proposed in order to provide irrigation and drinkable water for drought prone areas in Gujarat. But as already noted, irrigation of arid and semi-arid land can cause more problems than it solves.

Finally, in the conclusion, I discuss alternatives to large dams, for example the sustainable use of water in order to protect a natural resource essential for the survival of humanity.

¹⁹ Neuss, 2012, p. 7.

Chapter 1: The importance of Water and Rivers in Hindu Religion

In Hindu tradition, the land itself is worshipped as sacred. This is clearly demonstrated by Sanskrit terms used to describe the earth. For instance, *Bhū-Devī* means Earth Goddess and *Dharati* means The Bearer. The landscape of India is dotted with specific sacred sites but also India as a whole is seen as sacred. She is worshipped as *Bhārat Mātā* (Mother India) and “...all Indians are called sons or children of India and are expected to protect their mother without regard for personal hardship or sacrifice.”²⁰ According to the first prime minister of India, Nehru, *Bhārat Mātā* is comprised of immense cultural, linguistic, racial, ethnic and geographical diversity, and yet he maintains that the Indian people are nevertheless one nation.²¹ The term *Bhārat Mātā* is a recent political category, one used by politicians to unite the many who live on Indian soil. There is a political conception of India as a nation and as a sacred space, but natural formations covering her are also worshipped prior to and concurrently with the political category of *Bhārat Mātā*. Kinsley states that “...mountains, hills, rivers, caves, and other sites having some geographical or natural peculiarity are often believed to possess sacred power or to be places where one may make contact with the divine.”²²

There are many myths to explain why certain parts of India are seen as sacred. One such myth tells of the death of the goddess Satī in Dakṣa’s (her father)

²⁰ Kinsley, 1986, *Hindu Goddesses*, p. 181.

²¹ Deshpande, 1993, *Imagined Economies*, p. 15.

²² Kinsley, 1986, p. 184.

sacrificial fire. The story goes that Dakṣa was celebrating a great sacrifice but did not invite his daughter Satī or her consort Śiva. Satī went to the sacrifice anyway and died by throwing herself into the sacrificial fire. When Śiva found out, he was inconsolable and carried Satī's body all over the earth in a mad dance of grief. The other gods then became anxious to free Śiva from his infatuation with Satī's dead body and conspired to deprive Śiva of it. Brahmā, Viṣṇu and Śani entered Satī's body and disposed of it gradually, piece by piece. The places in India where the pieces of Satī's dead body dropped became *Piṭhas* (holy seats or places of power). In this way, *Śaktī Piṭhas*²³ are distributed all across India.²⁴ There is no consensus on where each body part of Satī fell, but the most popular belief is that her "...tongue fell at Jvāla Mukhi, breast at Kangrevali Devī, eyes at Naina Devī, arms at Vaiṣṇo Devī, feet at Cintpurni, and forehead at Mansa Devī."²⁵ Different body parts of the goddess are accorded different levels of sacredness. The most sacred body part of the goddess is thought to be her *yonī* (womb) and this is at Kamarupa in Assam. These *Śaktī Piṭhas* are places of pilgrimage, where many Hindus travel to in order to worship the goddess.

It was the pilgrimage from sacred site to sacred site that connected the whole of 'India' long before the nation we know today as India existed. This is also true on a regional level. According to Feldhaus (1995), the ritual carrying of water from the Godāvarī River to local shrines and temples shows the importance of the river to the surrounding region: "the ritual dramatizes that the river serves to unite scattered villages and to make them into a region, a discrete area defined

²³ They are called *Śaktī Piṭhas* as Śaktī or Devī are other names for the goddess Satī, whose body parts created the *piṭhas*. A *piṭha* is a holy place of cosmic power and these *piṭhas* are named after Satī to distinguish them from the others that are scattered over India. The literal translation of *Śaktī Piṭhas* means 'seat of Śaktī'.

²⁴ Erndl, 1993, *Victory to the Mother*, p. 33/34.

²⁵ *Ibid*, p. 35.

by the river that runs through it. By fetching and pouring the river's water onto the gods of their villages throughout the region, the men who carry the water make the region itself imaginatively visible."²⁶ In the Mahābhārata²⁷, a great epic text of India, a pilgrimage that circumnavigates all of the important pilgrimage sites in India is described, uniting India as a country rather than a collection of regions. According to Bhardwaj (1973), the Mahābhārata describes a grand pilgrimage of almost the whole of present India in an approximately clockwise direction. Bhardwaj states that:

"...the preservation of this long itinerary of pilgrimage in epic literature suggests long distance movements of motivated individuals throughout the country since ancient times. The awareness of the extent of the country resulting from the practice of pilgrimages over very long distances may have contributed materially to the recognition of a vast religious space."²⁸

Eck (1980) states that:

"...the whole of India's sacred geography, with its many pilgrimage sites – those inherent in its natural landscape and those sanctified by the deeds of gods and the footsteps of heroes is a living geography. As such it has been central for the shaping of an Indian sense of regional and national unity. The recognition of India as sacred landscape, woven together north and south, east and west, by the paths of pilgrims, has created a powerful sense of India as *Bhārat Mātā*."²⁹

It is this sacred geography of India that has united the different castes and tribes of the land. Ensink (1974) agrees with Eck in his article *Problems of the Study of Pilgrimage in India*.³⁰ He explains that most modern scholars dealing

²⁶ Feldhaus, 1995, *Water and Womanhood*, p. 34.

²⁷ Roy's (192-) translation of the Mahābhārata is used in this thesis.

²⁸ Bhardwaj, 1973, *Hindu Places of Pilgrimage in India*, p. 56.

²⁹ Eck, 1980, *India's Tīrthas: 'crossings' in sacred geography*, p. 336.

³⁰ In "Indologica Taurinensia, vol. II", 1974, pp. 57 – 79.

with the subject have realized that pilgrimage is one of the main unifying forces in Hinduism:

“in a subcontinent which is neither linguistically nor racially a unity, seldom was so in a political sense and had no generally recognized hierarchy, the sense of unity must have been strongly supported by travels to distant sanctuaries, by joining people from different regions in reverence for the god of one and the same temple, by seeing devout people from far off places passing through to famous rivers and shrines, by hearing the praises of temples thousands of miles away, in the glory of which even those that stayed at home might feel entitled to a share as coreligionists.”³¹

The tradition of pilgrimage in India has meant that a wider range of people have been able to access more sacred sites. In Hinduism, the act of pilgrimage has far greater rewards than that of mere sacrifice or prayer, and so Hindus are encouraged to visit sacred sites all over the country. While sacrifices can be costly and out of reach for those of a lower income, pilgrimage is accessible to all. In response to a question, the sage Pulastya³² stated that “...pilgrimages were ordained so that ordinary, humble people, who cannot make the immense and costly sacrifices recorded of the royal saints of ancient times, may be able to attain the same spiritual goal.”³³ In the epic texts, such as the *Mahābhārata* and the *Purāṇas*, pilgrimage receives greater rewards and offers escape from the cycle of rebirth, something that cannot be achieved through sacrifice alone. The *Mahābhārata* states:

“...the meritorious visit of holy places even surpasses sacrifices. He who has never kept a fast for three days and nights, has not visited holy sites and has not given gold nor cows is indeed reborn a poor man. He who has performed the

³¹ Ensink, 1974, *Problems of the Study of Pilgrimage in India*, p. 66.

³² Pulastya was a sage in the epic text, *Mahābhārata*.

³³ Geoffrey Maw, “Narmadā Parikrama” in Baviskar, A., 2003. *Waterlines: the penguin book of river writings*, p. 1.

*Agniṣṭoma*³⁴ and similar sacrifices with liberal gifts does not reap such fruit as from the visit of holy places.”³⁵

The pilgrimage circuit of the *Śaktī Piṭhas* and other such important sacred sites encourages the connection of people on a national scale, whereas pilgrimages such as the circumambulation of the Narmadā encourage the connection of people on a regional scale.³⁶ I will discuss the circumambulation of the Narmadā in more detail in the next chapter. The most common pilgrimage sites are known as *tīrthas*, found in their thousands all across India.

In Hinduism, the name *tīrtha* literally means a river crossing or ford.³⁷ *Tīrthas* are places where pilgrims can cross over from the realm of humans to the divine realm. Pilgrimage to these *tīrthas* is one of the oldest and still one of the most prominent features of Indian religious life. The word *tīrtha* is from the Sanskrit verb *tr/tarati*, meaning ‘to cross over’. The noun *tīrtha* means a ford, as well as any watering or bathing place. It can sometimes mean a path or passage more generally. Eck (1980) explains that: “the verbal root *tr* includes subsidiary meanings; to master, to surmount, to fulfill, to be saved – as well as its primary meaning to cross. The noun *taraka*, also derived from *tr*, means a boat or ferry, as well as a pilot or savior. *Tīrtha*, with its many associations, is a word denoting passage. It refers not only to the goal, but also to the way, the journey or the path one travels.”³⁸ In India today the word *tīrtha* is associated primarily with places of pilgrimage, which bring myths to living embodiment in India’s geography. Even the most famous of *tīrthas*, which attract pilgrims from all over

³⁴ A one-day soma sacrifice that culminates in the offering of soma three times in a single day.

³⁵ Ensink, 1974, p. 59. Cited from the Mahābhārata (3. 80. 34-40)

³⁶ Neuss, 2012, Narmadāparikramā- circumambulation of the Narmadā river, p. 79.

³⁷ Eck, 1980, p. 325

³⁸ Ibid, p. 325.

India, number in the hundreds. In addition, there are the countless local and regional *tīrthas* visited regularly by pilgrims from their immediate areas. No place is too small to be counted as a *tīrtha* by its local visitors. It is Eck's (1980) opinion that: "in a sense, each temple is a *tīrtha*, especially consecrated as a crossing place between heaven and earth."³⁹

Tīrthas are, however, found most commonly on the banks of rivers. Crossing the great rivers of India, especially in their season of full flood, has long been a challenge to travellers, who have sought out the fords with their ferries and rafts to make a safe crossing: Eck (1980) comments that: "*saṃsāra*, the ceaseless flow of birth and death and birth again, has been likened to a river, and the far shore became an apt and powerful symbol of the goal of the spiritual traveller as well: the indistinct horizon of sure ground on the far side of the flood, beyond the treacherous currents."⁴⁰ It could also be considered that trying to cross a river in full flood would require faith in a higher power and so a sacrifice or prayer to that higher power before attempting a crossing would be appropriate.

Tīrthas are mentioned in many of the epic texts of Hinduism. For instance, the *Mahābhārata* devotes an entire chapter to *tīrthas* in its book *Vana Parva*. When the *Purāṇas* mention sacred rivers, there is always reference to the *tīrthas* that can be found along their banks. The *Matsya Purāṇa* states that there are sixty million and sixty thousand *tīrthas* on the banks of the Narmadā river alone. Each different *tīrtha* requires a different form of worship and gives different types of rewards. So the specific *tīrtha* that the pilgrim visits will depend on what it is that the pilgrim seeks. For example, the *Skanda Purāṇa* mentions a *tīrtha* on the

³⁹ Eck, 1980, p. 325.

⁴⁰ Ibid, p. 324.

banks of the Narmadā that is good for those who wish to have a son, or obtain wealth.⁴¹

Places of pilgrimage are commonly associated with major deities from the Hindu pantheon, but in some cases it is the natural formation itself that is the object of worship. This is demonstrated by the way in which almost every river flowing across Mother India is worshipped as sacred, and is seen as the physical manifestation of a deity. The deities associated with these rivers bear the same name as the physical rivers which are thought to originate in heaven. This idea is clearly expressed in the *R̥g Veda* which states that an: "...earthly river is an extension or continuation of divine waters that flow from heaven to earth."⁴² These divinities are the rivers in the literal sense as much as they are deities with anthropomorphic characteristics.

It is the sacred nature of these rivers and their water as an approach to the conservation of natural resources that I wish to examine in this thesis. The sanctity and use of water for rituals can be seen in a myriad of Hindu sacred texts. Texts such as the *Vedas*, the *Purāṇas* and the *Māhātmyas* all speak of the ability of water to help bridge the divide between humans and the divine. In the *Puṣkara Māhātmya*, for example, the rediscovery of a lake by a king who suffers from leprosy initiates the building of a pilgrimage site still used today.⁴³ The deity Brahmā formed Puṣkara (the lake) during a great sacrifice that he performed. The place was then forgotten for many years until a king out hunting a boar discovered what remained of the three lakes that were created when

⁴¹ Tagare, 2001, *The Skanda-Purāṇa*, p. 363, "He who takes his holy bath in the Angirasa Tīrtha (northern bank of Narmadā) and worships Śiva, shall be rid of all sins and go to Rudraloka. A man without a son shall obtain a son; a man without wealth shall obtain wealth. Whatever the man may desire, he will obtain it."

⁴² Kinsley, 1986, p. 188.

⁴³ Malik, 1993, *Das Puskara-Māhātmya*, p. 401.

Brahmā dropped a lotus flower onto the earth. The single remaining pond cured the king's leprosy when he drank the water and bathed in it. Realizing the power of the water, the king had the pond dug into a lake and temples set up on the surrounding hills. This site then became known as Puṣkara and is used by devotees to this day. Though a sacred river does not feed this lake, it still has divine origins from the god Brahmā and is considered a *tīrtha*.

Tīrthas on riverbanks heavily outnumber the *tīrthas* found in other geographical parts of India. The ancient texts continuously speak of the use of water in performing rituals, and they also tell of the divine origins of the rivers. In the stories they tell, these epic texts speak of how the rivers came to be, how they fell to earth and of the great Hindu deities associated with them. The *Ṛg Veda* states that the sacred rivers of India were set free to run upon the earth by Indra, who also dug their channels. Elsewhere in the *Ṛg Veda*, the holy rivers are set free when Vṛtra is slain.⁴⁴ Though there are many variations of the creative myths of the sacred rivers, all confirm that the rivers originated in the heavenly realms and were then released onto earth. This strengthens the Hindu belief that these rivers are both sacred and are deities in and of themselves. It is then unsurprising that the majority of the holy cities in India lie on the banks of rivers. Bathing in the river is recommended for pilgrims and as a rule, flights of steps known as *ghats*, have been built leading down to the water at these holy cities. The worship of these rivers appears to be concentrated at certain points along their course: the source of the river is always an important holy site, but also the confluences with other rivers; the bathing places at the cities that lie on their banks; even the outfall of the river into the sea at some places are seen as holy

⁴⁴ Hawley, Wulff, 1996, *Devī; Goddesses of India*, p. 143.

sites. An example from the *Matsya Purāṇa* shows how bathing at the confluences of sacred rivers can bring greater rewards than from bathing in just one of the rivers. For example, if a man bathes at the confluence of the Kaveri and Narmadā rivers, he will receive equal benefits to bathing in both the Yamunā and the Gaṅgā.⁴⁵ Further, Joshi (2007) states that “...the sources of the rivers have been made into places of pilgrimage; complete with temples, tanks, steps and other kinds of architectural arrangements designed to facilitate pilgrims’ visits and to highlight significant features of the place.”⁴⁶

Water in its different forms is often the object of worship throughout the world. Many indigenous traditions believe that water is the birthplace or the creation of all things, of peoples and of the Earth itself. The Karaja of Brazil and the Kogi of Colombia⁴⁷ believe that they were formed in water, though in India it is flowing, ‘living’ water that is the most sacred. The rivers of India are seen as holy, in fact, it is difficult to find a stream of any decent size that is not sacred. There are tanks and wells of water along the river courses that also attract pilgrims, but it is the moving, flowing, or falling water that is believed to have the greatest purification power. Kinsley (1986) observes that “...a mere sprinkling of water over one’s head or a dip in a stream is sufficient to remove most kinds of daily pollution accumulated through normal human intercourse with those in a state less pure than one’s own.”⁴⁸ Most sacred rivers are thought to be able to remove any kind of impurity or sin simply by bathing in the flowing water. Feldhaus’ (1995) definition of sin is “...an evil act performed by a human or a god

⁴⁵ Joshi, 2007, *Matsya MahaPurāṇa*, p. 195.

⁴⁶ Feldhaus, 1995, p. 21.

⁴⁷ Chamberlain, 2008, p. 13.

⁴⁸ Kinsley, 1986, p. 189.

and the fact of having done that act.”⁴⁹ The Sanskrit term is *papa*; though Feldhaus notes that the translation of this word into sin does not have “...all the theological implications this word has in English and are not all applicable in a traditional Indian context.”⁵⁰ The topic of sin must be considered in the more general context of evil. Feldhaus (1987) further notes that “...discussions of Brahmanical ideas about pollution and purity often tell us that pollution can be ‘washed away’ and purity restored by a bath in running water.”⁵¹ Even though the Gaṅgā River may be categorized by environmental science as severely polluted, to the Hindus it can never be polluted nor become impure. Gaṅgā may become unclean but as a goddess, she has the power to absorb worldly impurities and remain pure. It is this belief that allows Hindus to continue to bathe and perform rituals in what we might see as a polluted and unclean river. Water is seen as a purification agent because it dissolves, and removes material filth.⁵² The religious beliefs concerning the heavenly origins of such rivers make the point that the mighty rivers of India are in essence uncontaminated by the impurities of the world, for they begin and mostly flow in the heavenly realms before falling to earth. Once descended to earth, however, these same rivers literally wash away the accumulated impurities of the realms they traverse. The rivers remove sin and impurities by ‘washing them away’. Eliade (1987) points out that:

“...this implies that sin is a substance that adheres to the sinner until the water of the river detaches it and moves it somewhere else.... The substance of sin, like oil or perhaps phosphates, is in this imagery not destroyed. It is not dissolved or

⁴⁹ Feldhaus, 1995, p. 173

⁵⁰ Feldhaus, 1995, p. 173.

⁵¹ Feldhaus, 1987, *Draft for oral presentation*, p. 5.

⁵² Eliade, 1987, *The Encyclopedia of Religion*, p. 356.

broken up by the river's water. Rather, the river, because it's water moves, carries the sin away."⁵³

As a handful of river water sprinkled over a person's head cleanses that person, so the rivers cleanse the entire world. There is evidence of this continuous process of purification in the physical appearance of the river: "from the clarity of a river's swiftly flowing source compared to its broad, sluggish, murky mouth before it enters the sea, rivers may take on increasingly impure appearances the further they travel from their 'source'."⁵⁴ Rivers like the Gaṅgā or the Narmadā are nevertheless held to be equally purifying from source to mouth. Though great removers of pollution and sin, the rivers remain uncontaminated by what they remove, "...staying ever pure, ever potent, ever gracious to all those who come to them for purification."⁵⁵ In this way, sacred rivers in India are often referred to as 'mothers' and no matter how they are treated by their worshippers, they will always clean up after them and forgive them their sins. Feldhaus (1995) states that rivers are often referred to as 'mother' because of their connection with fertility and food: "a river, or a river divinity, though not a mother in the sense of having children of her own, is held to be a mother to her worshippers or to people in general."⁵⁶ Feldhaus (1995) further considers that one reason the rivers are referred to as mother is because they protect people and provide them with food. This connection with food

⁵³ Feldhaus, 1995, p. 179.

⁵⁴ Though most rivers have multiple sources from the many tributaries that make up the one big river, each sacred river in India has one official source, where temples are built and pilgrims travel to, in order to honor the deity that is the river.

⁵⁵ Kinsley, 1986, p. 191.

⁵⁶ Feldhaus, 1995, p. 82.

comes from the fact that rivers provide water, which is needed to make crops grow.⁵⁷

As already noted, water in India is used in thousands of rituals, whether to purify objects, be poured over shrines, or to be kept in jars as talismans. From late July to early August, the millions of pilgrims that go to the Gaṅgā at Hardwar collect Gaṅgā water and transport it to a temple dedicated to Śiva, over 60 miles downstream. At temples along the Yamunā, the temple deities are bathed in Yamunā water and her devotees then drink this as consecrated water.⁵⁸ The water from sacred rivers is the most revered, and the most commonly used in rituals. Each sacred river is known for its individual properties and is linked with a particular deity. The running water of these rivers is often used ritually for purification, or where it is not available, the pouring of water may accomplish the same aim. The Hindu ritual tradition makes it clear that water used in purification must not be standing water, but flowing, living water, such as water from a river and that “...lustration with such water prepares one ritually for worship, or for eating, and removes the impurity associated with childbirth or with death.”⁵⁹ These rivers, as illustrated in many of the epic texts, are also particularly good places for the successful completion of sacrifices and for the effective performance of asceticism (*tapas*), almsgiving (*dāna*), and ancestor rites (*śraddha*, *tarpan*). There are numerous stories within these epic texts that tell of sins annulled at the *tīrthas*, and “... extravagant claims are made about the merit to be gained by visiting these *tīrthas*, by bathing at them, or even just by

⁵⁷ Ibid, p. 84.

⁵⁸ Chapple and Tucker, 2000, p. 349.

⁵⁹ Eliade, 1987, vol. 12, p. 427.

thinking or hearing about them.”⁶⁰ Pilgrims have circumambulated the entire continent of India, visiting hundreds of *tīrthas* along the way. Eck (1980) speaks of a ritual where pilgrims bring water from the Gaṅgā in the north to sprinkle on the *linga*⁶¹ at Rameshvaram in the far south and then return north with sand from Rameshvaram to deposit on the riverbed of the Gaṅgā.⁶² The water of the Gaṅgā is used to purify the shrine in Rameshvaram and the sand is returned as a gift for Gaṅgā.

This chapter has clearly demonstrated the importance of water in Hindu culture. India has a rich history of natural resources being worshiped and used in rituals. This cultural heritage is increasingly at risk as India, and the world, invests in a new mindset. Investment in the view that natural resources are there to be abused and overused by humanity puts the world in danger for future generations. It is not only the natural phenomena themselves that are at risk, but also the cultural heritage of those who depend upon them.

⁶⁰ Feldhaus, 1987, p. 4.

⁶¹ A *linga* is a very complex symbol of Hinduism. It is associated with the deity Śiva. The Hindu scriptures say that a *linga* represents energy and strength. In almost all the temples of Śiva, Śiva is shown in the form of a *linga*.

⁶² Eck, 1980, p. 336.

Chapter 2: The Sacred Narmadā River

All of the sacred rivers of India have creation myths, and these myths place the origins of the rivers in the celestial realms. While this thesis is concerned specifically with the Narmadā River, it is interesting to note that the seven most sacred rivers in India, (the Gaṅgā, the Narmadā, the Sarasvati, the Kāveri, the Yamunā, the Indus and the Godāvāri) all have very similar creation myths and gifts that they bestow on their devotees. Deegan⁶³ (2000) lists the gifts that the Narmadā may bestow on her devotees, including washing away all bad deeds, giving whatever rewards devotees receive from other sacred rivers, enabling devotees who undertake *tapasyā*⁶⁴ on her banks to find a place at Śankara, allowing those who are given to her at death reach Śankara, allowing those who live and die on her north bank to go to where the gods live and allowing those who live and die on her south bank to go to where their ancestors are.⁶⁵ These kinds of rewards are common with most sacred rivers, especially the ability to cleanse a devotee of bad deeds. The Narmadā may be compared to the Gaṅgā River in this way.

The Gaṅgā River is commonly thought of as the most sacred in India and is well known as a purifier of sins. However, a case can be made that the Narmadā River is more sacred than the Gaṅgā. In the *Matsya Mahapurāṇa* (Joshi, 2007), it is stated that the river “...Gaṅgā is sacred at Kanakhala, the river Sarasvati is

⁶³ Deegan's article *The Narmada, Circumambulation of a Sacred Landscape*, is in Chapple and Tucker, 2000.

⁶⁴ *Tapasyā* means deep meditation, effort to achieve self-realization, sometimes involving solitude, renunciation or asceticism. It is derived from the word root *tap*, which depending on the context means "heat" from fire or weather, or blaze, burn, shine, penance, pain, suffering and mortification.

⁶⁵ Chapple and Tucker, 2000, p. 395.

sacred at Kuruksetra but the sacred Narmadā is supreme everywhere, in the forest as well as in villages.”⁶⁶ It further states that the water of the Sarasvati will purify one in the course of three days, those of the Yamunā in seven days, the Gaṅgā purifies instantaneously but the Narmadā purifies on sight.⁶⁷ One myth reported by Goldsmith and Hildyard (1984) describes how Gaṅgā goes to the Narmadā every year as a coal black cow, washes off her sins in the pure water of the Narmadā and then returns to her home as a pure white cow.⁶⁸ Here, it is Narmadā who is the great purifier of sins and since Gaṅgā must travel to her to be cleansed of the sins she has accumulated from her devotees.

Another example of this can be seen in the *Skanda Purāṇa* when Śrī Markandeya recites the tale of Indra attempting to become cleansed of the sin of Brahmānacide. This tale reports “...Indra eschewed all happiness and emaciated his body through austerities. The king of *Devas*⁶⁹ (Indra) visited various *tīrthas* and shrines. He took holy baths separately in various *tīrthas*, in Gaṅgā, Yamunā and Sarasvati, in all the oceans, rivers, natural lakes and ponds. But the sin did not leave him despite his association with *Devas*.”⁷⁰ It was not until he performed austerities at *tīrthas* on the banks of Narmadā that his sin was finally cleansed. This story shows that the Narmadā is a more powerful cleanser of sin than any other source of water. Another example of the Narmadā’s superiority in cleansing sins can again be found in the *Skanda Purāṇa*. This story relates to the Moon-god (Candra) and his sin of not attending to his wives. As a result of his own karma, Candra contracted consumption disease. He had to abandon

⁶⁶ Joshi, 2007, p. 181.

⁶⁷ Ibid, p. 181.

⁶⁸ Goldsmith, Hildyard, 1984 *The Social and Environmental Effects of Large Dams*, p. 227.

⁶⁹ Devas is the Sanskrit word for deity. Devi is the words’ feminine counterpart.

⁷⁰ Tagare, 2001, *The Skanda-Purāṇa, part XV*, p. 367.

ruling the *Devas* and descend to the world of mortals. He wandered over many *tīrthas* and holy shrines and ultimately reached the Narmadā. He observed fasts, holy *Vratas*,⁷¹ restraints and performed *Dāna*⁷² rites. These pious activities continued for twelve years, and only after this did he become free of his sins and cleansed of the consumption.⁷³ Again, it is only once sinners have reached the Narmadā (after trying all other *tīrthas*), that they become cleansed of their sin. These stories illustrate the sanctity of the Narmadā and how even other deities look to her for purification. Also according to the *Skanda Purāṇa*, Narmadā is the only river to survive the end of cycles: the seas and all the rivers get destroyed in every *Kalpa*(cycle). But even after seven *Kalpas*, Narmadā has not perished. Narmadā is the only river that stays throughout time filled with water and who is eulogized by groups of sages. Gaṅgā and other rivers become destroyed at the end of every *Kalpa*.⁷⁴ The Narmadā alone has survived the past cycles.

As with most deities of the Hindu pantheon, the Narmadā River has several variations of a creation myth. In one version, the Narmadā was reborn through the sweat of a sage doing *tapasyā*. Another creation legend has it that two teardrops fell from the eyes of Brahmā and became the rivers Narmadā and

⁷¹ A *vrata* may consist of one or more of several actions. Such actions may include complete or partial fasting on certain specific days; a pilgrimage to a particular place or places; a visit, *darshan* and *puja* at a particular temple or temples; recitation of mantras and prayers; performing *puja* and *havans*. Doing *vratas* assists the person to achieve and fulfill his or her desires as performing *vratas* are supposed to bring the divine grace and blessing. Sometimes, close relatives or family *purohīts* may be entrusted with the obligation of performing the *vrata* on behalf of another person. The object of performing *vrata* is as varied as the human desire, and may include gaining back lost health and wealth, begetting offspring, divine help and assistance during difficult period in one's life.

⁷² *Dāna* is generosity or giving, a form of alms. In Hinduism, it is the practice of cultivating generosity. Ultimately, the practice culminates in one of the perfections (*pāramitā*): the perfection of giving - *dāna-pāramitā*. This can be characterized by unattached and unconditional generosity, giving and letting go. *Dāna* as a formal religious act is directed specifically to a monastic or spiritually developed person.

⁷³ Tagare, 2001, *The Skanda Purāṇa, part XIV*, p. 71.

⁷⁴ *Ibid.* p. 10.

Sone. In another version found in the *Skanda Purāṇa*, the Narmadā was created when Śiva meditated for the sake of the welfare of the earth. The *Skanda Purāṇa* states that:

*The Lord of self-control (Rudra), the immanent soul of all loving beings, climbed the Mountain Rksasaila and performed a severe penance. He was invisible to all living beings. As that Lord was performing penance, perspiration issued forth from his body. The drops of sweat originating from Rudra flooded the mountain. The highly meritorious, excellent river (Narmada) was born of it.*⁷⁵

According to the *Skanda Purāṇa* however, Narmadā was created from Śiva's sweat, not Rudra, and so she has long been associated with Śiva. According to the *Matsya Purāṇa*, Lord Śiva becomes pleased with those who bathe in the Narmadā and he is enshrined on a hill to the west, close to her banks. If libations are offered at this shrine, the devotee will receive sixty years in heaven and seven generations of his family will go to heaven.⁷⁶ Along the Narmadā's entire course, Śiva worship in various forms has long dominated. In fact, every stone found on the bed of the river is said to be a 'Śiva-linga'.⁷⁷ In the *Skanda Purāṇa*, at most of the *tīrthas* along the banks of the Narmadā, a devotee must worship Mahādeva (Śiva) as well as bathe in the pure waters of the river in order to obtain the gifts they seek.

The *Skanda Purāṇa* also recounts the many births of Narmadā in the *Kalpas* she survived. One myth explains such a birth and how Narmadā was named:

...Rudra sported about with Uma in the vast expanse of sea-like water. A splendid girl was born out of the sweat of Uma due to her delight. When Sarva's chest

⁷⁵ Tagare, 2001, *part XIV*, p. 15.

⁷⁶ Joshi, 2007, p. 181.

⁷⁷ Goldsmith, Hildyard, 1984, p. 227.

pressed against the breasts of Uma, a great girl of lotus-like eyes issued forth from the sweat... That lady whirled around the worlds of Devas, Asuras and human beings. Unrivalled in beauty of form as she was, she maddened the three worlds. On seeing her, the leaders of the Devas and Daityas were enchanted. They wondered: "How is she to be obtained?" They searched for that girl here and there. She fascinated the entire universe through her seductive and graceful charms and coquettish manners. She moved about in her divine form like a lightening streak in the middle of clouds. The most excellent one among all maidens, she shone in her luster. Then all the Suras, Daityas and Dānavas who were enamored of that girl and overcome with lust requested Rudra for that girl to be given to them. Then Mahadeva said: "Of the two, Devas and Dānavas, he who will prove superior in strength and splendor will attain this girl, not otherwise."

Then all the Devas and Asuras approached the girl saying, 'I shall seize her, I shall seize her.' Even as all were watching her, the girl vanished. Then they saw her stationed a yojana away. All of them then rushed to the place where she was seen. Then they saw her stationed three or four yojanas away... They saw her sometimes ahead and sometimes behind in different directions and intermediate quarters. The beautiful lady appeared in one direction and many directions. Thus they were forced to wander about by her for a period of a thousand divine years. But that girl born of Mahadeva's limbs was not obtained by them. Thereupon the Lord laughed boisterously along with Uma.

...Then the Pinaka-bearing Lord himself gave her a name: "Since you humored them by means of your pranks and gambols, O beautiful girl, you will become the excellent river Narmadā (Narma, humor + da, giver)." The Lord resumed his form and joked. This river of cool water and auspicious features was called Narmadā by him.⁷⁸

There is one further myth in the *Skanda Purāṇa* of how the Narmadā came to be on earth in one of the later *Kalpas*. The Sage Markandeya recounts a tale of how some sages had requested King Puruva to bring down the river Narmadā to earth. Describing the holiness of Narmadā, the sages told the king that the holy Narmadā is capable of liberating the whole world from its sin, so he should find a means of making Narmadā descend to earth. King Purava performed austere penance to please Śiva and when Śiva appeared before him, he expressed his wish for Narmadā to descend. Śiva instructed Narmadā to descend down to

⁷⁸ Tagare, 2001, *part XIV*, p. 19-20.

earth but she told him that she needed a base for that to happen. Śiva then instructed Pṛyank (the son of Vindhya mountain) to hold Narmadā while she descended down to earth. Pṛyank agreed to this and so Narmadā came to the earth. Initially, the whole world was flooded with the waters of Narmadā but at the request of the other gods, she minimized her size. Narmadā blessed Purava and instructed him to perform the rituals of *tarpan* in the name of his ancestors so that they became liberated from their sins, which Purava did and thus liberated all of his ancestors.

The river Narmadā appears often in the *Rāmāyaṇa*, the *Mahābhārata* and the *Purāṇas*. The Narmadā is mentioned in 23 verses of the *Rāmāyaṇa*, and 15 verses in the *Mahābhārata*⁷⁹, two of the most well known epic texts in India. The Narmadā is identified with the Sarasvati and Gaṅgā rivers, and as such, has gone under many names. In the *Skanda Purāṇa*, she is known as Reva. Other names connect her to different deities, such as ‘Jata Sankari’ which links her to Śiva, or ‘Mahesvari Gaṅgā’ which links her to the Gaṅgā. However, Chapple and Tucker (2000) notes that “...the most expressive names for Narmadā are those that describe human attributes or point to her sacristy.”⁸⁰ In the *Skanda Purāṇa*, a list of these names is given, including: *Trikuti*, she who descends from mount Trikuta; *Mahati*, she of speedily flowing current; *Sona*, that in which drops from Śiva’s trident fell; *Surasa*, a river of excellent *rasa* (water); *Kṛpa*, a bestower of freedom from Saṃsāra; *Mandakini*, a slow flowing river; *Reva*, reverberating all the quarters with sound while flowing; *Maharnava*, she who broke away from the ocean; *Vipapa*, remover of sins; *Vipasa*, remover of the bond of Saṃsāra;

⁷⁹ Neuss, 2012, *Narmadaparikrama*, p. 21.

⁸⁰ Chapple and Tucker, 2000, p. 395.

Vimala, with clean, splendid waters; *Karabha*, of lustrous hands (waves); *Ranjana*, delighter of the world; and *Vayu-vahini*, carrier to heaven of every resident on her banks.⁸¹

These names are linked with the gifts granted to Narmadā for her own asceticism in the first *Kalpa* she survived. The *Skanda Purāṇa* recites the story of her being granted these gifts:

Formerly, in the first Krtayuga, she (Narmadā) assumed the form of a woman and propitiated Rudra for ten thousand years. Thereupon Sankara, the great Lord, was pleased. Accompanied by Uma, he spoke to her: 'O highly fortunate lady, speak out whatever there is on your mind.'

The River said:

By your grace, O Lord of Devas, let me be imperishable at the advent of Pralaya when all mobile and immobile beings are destroyed. When the rivers, oceans and mountains have perished, O Lord of Devas, let me be holy and imperishable, with your favor. Devout persons who have taken baths in me should be rid of their sins, even if they have committed major and minor sins. Jahnavi (Gaṅgā) destroys great sins in the northern region. I should become so in the southern region. Then only I shall be worshipped by gods... A man who devoutly takes his holy bath in me should acquire that merit which is usually obtained by taking holy bath in all the Tīrthas of the earth. O Lord, may the sin of Brahmāna-slaughter and others like that which have remained accumulated be destroyed by taking the holy plunge for the period of a month. My desire is that, due to the holy dip in me, O Sankara, one shall get all those benefits that accrue from the study of all the Vedas and performance of the Yajnas. From my water, O Sankara, let there be that benefit which usually arises from all sorts of Dānas and fasts and the holy plunge in all the Tīrthas. Those who adore Mahesvara on my banks should repair unto your Loka, O Śiva... I desire that you do stay always on my banks along with Uma and other deities. Let every living being that dies in my waters go to Amaravati, whether they have done excellent Karmas or ignoble Karmas, whether they are mentally calm with full control over the sense organs or not. O Lord of the chiefs of Devas, if you are please and if you consider it proper, let me be well known as the destroyer of great sins.⁸²

⁸¹ Tagare, 2001, part XIV, p. 21.

⁸² Tagare, 2001, part XIV, p. 15/16.

The water from the Narmadā is used in several key rituals. There are *tīrthas* all along her banks, created by sages or Brahmāns that perform particular functions, such as purifying sin or blessing devotees with children. Each of these *tīrthas* have their own specific rituals that must be performed in order to receive the maximum benefit. The *Skanda Purāṇa* is full of examples of certain *tīrthas* that require specific rituals. At the *Śukla-tīrtha*, on the Narmadā, if one bathes the statue of Lord Śiva in clarified butter on the fourteenth day of the dark fortnight during the month of Kārttika and observes a fast for the night, then they will go to the domain of Śiva along with their ancestors of twenty one generations.⁸³ The one commonality amongst all *tīrthas* mentioned, is that they are known to cleanse sin. If the rituals are performed correctly, then the devotee will have their sins washed clean, even the most terrible of sins such as feticide or the killing of a Brahmān. Different *tīrthas* are best known for purifying certain sins or granting certain boons, such as the *tīrtha* at Manmatheshvara that gives devotees who take their holy baths there a son “... truthful and steadfast in his Vratas.”⁸⁴ At the *tīrtha* Mantreshvara, one who bathes in the river there “...gets pleasure with the gods and remains in heaven for 5000 years in every desired form.”⁸⁵

The most famous of rituals associated with the Narmadā is the *Narmadāparikramā*, or circumambulation of the river. This circumambulation of both banks amounts to more than 2600km. There are strict rules to be followed for those who wish to complete the *Narmadāparikramā*. Neuss (2012) outlines these rules as follows:

⁸³ Joshi, 2007, p. 207

⁸⁴ Tagare, 2001, *part XV*, p. 333.

⁸⁵ *Ibid*, p. 334.

“... the *Narmadāparikramā* has to be undertaken in the most humble manner. The pilgrim should walk barefoot and carry only the most indispensable articles with him, i.e. his essential requirements for clothes, a water pot and a blanket. The pilgrim should beg for food and be content with whatever he is offered by the people living on the riverbanks. He may eat only what is cooked by himself or his hosts. He must always walk with his right shoulder pointing to the Narmadā, the obligatory manner for any kind of circumambulation in Hindu ritual, which must follow a clockwise course. Finally, he may never cross the Narmadā except at the confluence with the sea, where this is unavoidable. If he has crossed a tributary once, he may never turn back and cross it in the opposite direction.”⁸⁶

The *Narmadāpancāṅga* is the oldest known text in Sanskrit which outlines the ‘proper’ performance of the *Narmadāparikramā*. According to the *Narmadāpancāṅga*, pilgrims must start at Amarkantak (the source) and before setting off: they must first bathe in the *udgamkund* (the tank in which the Narmadā is said to rise) reciting the *snāna mantra*. Next, they should perform the rites pertaining to their *varṇaśramadharmā*⁸⁷, followed by sipping the water and the recital of a second mantra. This second mantra is the vow the pilgrim must take, expressing the true and pure motivation for the *Narmadāparikramā*. This is followed with offerings to the gods, consisting of food from the six *rasas*⁸⁸, *mohanbhog*⁸⁹, and two coconuts. One coconut must be thrown into the water of the source tank of the Narmadā, and the other is kept for the time being. The Narmadā *āarti* must then be sung, the second coconut distributed and the pilgrim organizes food for Brahmāns, *sadhus* and unmarried maidens. The unmarried maidens are symbolic of Narmadā. Finally, the pilgrim must visit the

⁸⁶ Neuss, 2012, p. 80.

⁸⁷ *Varṇaśramadharmā* refers to the caste system and the four broad ranks into which traditional Hindu society is divided. *Varṇaśramadharmā* is the rank or caste to which a person belongs.

⁸⁸ A *rasa* (‘juice’ or ‘essence’) denotes an essential mental state and is the dominant emotional theme of a work of art or the primary feeling that is evoked in the person that views, reads or hears such a work.

⁸⁹ Mohanbhog is cooked as an offering to Sri Krishna – or Mohan– and made on festival days. It is a semolina pudding.

shrines of Amarantha and Narmadā Mai. Only after the completion of the actions may the pilgrim set off on his journey.⁹⁰ The journey consists of stopping at every *tīrtha*⁹¹ along the banks of the Narmadā and completing the appropriate ritual at each one. The pilgrim must travel down the south bank of the river, cross at the confluence of the sea, and return up the northern bank, finishing where they had started. At two thousand, six hundred kilometers, it is no surprise that this circumambulation takes around 3 years to complete. Neuss (2012) notes that nowadays, “...politicians and corporate tycoons undertake the *Narmadāparikramā*, but they use cars or even helicopters and only halt at the most prominent *tīrthas*. Others only visit those *tīrthas* that are considered to be the most powerful in fulfilling particular desires. There are even a number of travel agencies who organize guided tours with buses.”⁹² However, pilgrims will not receive the full benefit of the *Narmadāparikramā* if they do not follow the traditional rules. It is the visiting of the thousands of *tīrthas* that turns this pilgrimage from ordinary to an extraordinary one. The traditional rules of the *Narmadāparikramā* can be found in the *Narmadāpancāṅga*. Neuss (2012) reports these rules in his book as follows:

- *While bathing at any tīrthas the pilgrim must dive completely under water, because his entire forehead must be touched by it. This is because among all the limbs of the body, the forehead is considered to be the most important. The pilgrim must always observe this while bathing.*

- *Every day, the pilgrim must look upon the Narmadā. He must not deviate from the banks of the Narmadā for any selfish motive. If leaving the banks is unavoidable, tradition states that one must not deviate more than five miles on the south bank and seven miles on the north.*

⁹⁰ Neuss, 2012, p. 85/86.

⁹¹ According to the *Skanda Purāṇa*, there are over 600 million, 60 thousand *tīrthas* along the banks of the Narmadā.

⁹² Neuss, 2012, p. 80.

- *If a pilgrim crosses a tributary of the Narmadā at a confluence, he must not turn back to cross it in the opposite direction.*
- *During the rainy season, the pilgrim must interrupt his pilgrimage and stay in one place.*
- *The austerities observed when the pilgrim was on the move must also be observed during the interruption of the pilgrimage for the rainy season.*
- *The tīrthas situated on the pilgrimage are enumerated according to ancient tradition. Therefore the visit of all of these tīrthas is obligatory. If bathing at tīrthas is avoided during the pilgrimage, the purpose and fruit of the pilgrimage will be negated.⁹³*

Oral tradition states that the sage Markandeya was the first to complete a circumambulation of the Narmadā. This could be because it is Markandeya who recites the *Revakhanda* to the Pandava brothers in the *Skanda Purāṇa*. Here, Markandeya tells of the thousands of *tīrthas* that can be found on the banks of the Narmadā. He states how the *tīrthas* originated, what rituals to perform at each and the benefits one may receive for completing the rituals. Though he does not actually describe the circumambulation of the Narmadā, or at least does not refer to it as such, Markandeya does give a broad outline of what has become known as the *Narmadāparikramā*. Interestingly there appears to be no written evidence that the *Narmadāparikramā* is an ancient tradition. In fact the earliest mention of this circumambulation was in the 19th Century by Russell Williams.⁹⁴ Williams remarked that at the beginning of the 20th Century, around 300 pilgrims set out on this circumambulation annually. This number has been steadily increasing with the industrial revolution and greater public transport allowing more pilgrims to reach the Narmadā more easily. Though this pilgrimage may be seen as recent, the number of pilgrims that travel the *Narmadāparikramā* has increased dramatically in the last hundred years.

⁹³ Neuss, 2012, p. 86/87.

⁹⁴ Ibid, p. 82.

Unfortunately, the traditional path of the pilgrimage is now in danger from the building of dams along the Narmadā's course. With the traditional path disrupted, it will be interesting to note if the numbers of pilgrims continues to increase. In order to discuss the impact of 'development' on this traditional pilgrimage, I must first progress from traditional narrative and ritual meanings of rivers to a discussion of the contemporary issues of modernization and development, and the ensuing outcomes.

Chapter 3: The Narmadā Valley Project

Rivers are much more than just water flowing from mountains to the sea. All land surrounding a river is a part of the watershed that contributes to the river. Rivers carry not just water, but sediments, dissolved minerals and nutrient-rich detritus from plants and animals.⁹⁵ They are an important aspect of the hydrologic cycle⁹⁶, collecting surface drainage and discharging it into the ocean. Estuaries, where fresh water meets seawater, can be some of the most fertile places for animal and plant growth in the world. These estuaries are important ecological habitats with some of the widest varieties of life forms.⁹⁷ Around 80% of the world's fish catch comes from estuaries and many of these fisheries are dependent on the volume and timing of the nutrient deposits from rivers. The alteration of estuarine flows by dams and diversions, together with over fishing, are major causes of the decline in many sea fisheries. Estuarine mangrove forests are valuable nurseries for fish and shrimp as they provide cover, and food when they shed leaves, flowers, fruit and twigs. McCully (1996) observes that "...the 80% reduction in the discharge through the Indus delta because of dams and barrages in Pakistan and India has killed off almost all of the delta's

⁹⁵ McCully, 1996, *Silenced Rivers*, p. 3.

⁹⁶ The hydrologic cycle is considered as beginning with the evaporation of water from the surface of the ocean. As moist warm air rises, it cools and the water vapor condenses to form clouds. Clouds travel around the globe until return to the surface as precipitation. Once the water reaches the ground, one of two processes may occur; 1) some of the water may evaporate back into the atmosphere or 2) the water may penetrate the surface and become surface or groundwater. Ground and surface water either seeps its way into the oceans, rivers, and streams, or is released back into the atmosphere through transpiration. The balance of water that remains on the earth's surface is runoff, which empties into lakes, rivers and streams and is carried back to the oceans, where the cycle begins again.

([http://ww2010.atmos.uiuc.edu/\(Gh\)/guides/mtr/hyd/smry.rxml](http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hyd/smry.rxml), retrieved 16 November, 2013)

⁹⁷ McCully, 1996, p. 45.

mangrove forests. This has had a severely negative impact on the amount of fish being caught in the area.”⁹⁸

A river is composed of changing beds, banks and ground waters. And as McCully (1996) notes “...even the meadows, forests, marshes and backwaters of floodplains can be seen as part of rivers – and rivers as part of them.”⁹⁹ Rivers have played a key role in the progress of humanity and are vital to the world’s ecosystem.¹⁰⁰ The wide variety of plants and animals sustained by rivers provided hunter-gatherer societies with food, plants for medicines, dyes, fibers, wood and with water for drinking and washing.¹⁰¹ In addition to these benefits, with the emergence of agriculture farmers have abstracted water from rivers for irrigation of crops; this in turn has helped to supply the needs of settlements. The success of these societies would not have been possible without the fertility and abundance provided by rivers. Pastoral societies have grazed their herds on the perennial vegetation found on the banks of rivers during dry seasons and droughts, allowing them to flourish in otherwise harsh conditions.¹⁰² Rivers also serve as access routes for commerce, exploration and conquest, whilst towns and cities have used them for the drainage of their waste. The importance of rivers to societies is demonstrated by the traditions and beliefs of their cultures, and this is especially true in India, where, as has been stated in chapter one, there is

⁹⁸ McCully, 1996, p. 46.

⁹⁹ Ibid, p. 8.

¹⁰⁰ Most early civilizations arose on the banks of rivers; the Egyptians along the Nile, Persians along the Euphrates and the Indians along the Indus. One of the oldest human remains found on the subcontinent of India was found along the banks of the river Narmadā, demonstrating that people have lived there for thousands of years. Paranjpye, 1990. Pp 4 - 5.

¹⁰¹ McCully, 1996, p. 8.

¹⁰² Civilizations such as the Egyptians would have been lost without the perennial vegetation growing along the banks of the Nile. Surrounded by desert, it was the yearly flooding of the river that brought with it nutrients and moisture, that allowed the Egyptians to not only survive but flourish. These civilizations did not just use these rivers as a resource but the rivers were tied into a larger sacred cosmic context that was constructed through narrative and ritual, connecting humans to their surrounding environment.

no river of significant size that has not been deified and worshipped. As already noted, rivers in India are referred to as mothers, and like mothers, are expected to nurture and clean the mess created by their children or, in this case, devotees.

Though rivers have always supported humanity naturally, within the last two centuries, humans have sought to manipulate and control rivers in order to receive 'increased' benefits. Although damming has been a part of human history for many thousands of years, it was not until the industrial revolution that dams evolved into the mega-structures of today. According to McCully (1996), the first dam builders may have been farmers in the Zagros Mountains on the eastern edge of Mesopotamia around eight thousand years ago, and "...six thousand years ago, the Sumerians were crisscrossing the plains along the lower Tigris and Euphrates with small dams and irrigation canals."¹⁰³ The ancient civilizations of Babylonia, Egypt, Ceylon and Cambodia were all famous for their irrigation works: and Goldsmith and Hildyard (1984) note that "...the surviving bunds and tanks that remain at some of the ancient capitals such as Anuradhapura in Sri Lanka, or Angkor Wat in Cambodia, attest to the extraordinary engineering skills of the civilizations that constructed them."¹⁰⁴ Since these ancient civilizations, almost every nation has had some form of dams and irrigation systems. In the nineteenth century, during a newly industrial Britain, dams assumed an increasing commercial importance. Since then, the construction of dams has exploded across the globe. As the number of dams constructed increases, so have their size and geographical distribution. The first 'giant' dam is recognized as the Hoover dam in the United States of America. The

¹⁰³ McCully, 1996, p. 12.

¹⁰⁴ Goldsmith, Hildyard, 1984, *Vol. 1: Overview*, p. 1.

Hoover dam was built in 1931, was 85 meters higher than any other dam in the world at that time, and remained so for at least two decades. But the Hoover dam was just the beginning.

By 1990, the world's rivers were controlled by more than 40,000 large dams, all but 5,000 of them built after 1950.¹⁰⁵ That means that an estimated 35,000 dams worldwide were built in just 40 years.¹⁰⁶ With funding available from such institutes as the World Bank and other international aid agencies, the pace of dam construction has accelerated dramatically since the Second World War.¹⁰⁷ India has been no exception to this global phenomenon, and "...up until 1980, about 15% of independent India's total national expenditure had been spent on the construction of more than a thousand large dams and their associated infrastructures."¹⁰⁸ These big dams are seen as potent symbols of both patriotic pride and the conquest of nature by human ingenuity.¹⁰⁹ For most of the 20th century, dams symbolized progress as the providers of electricity and water, controllers of floods, reclaimers of deserts for agriculture, guarantors of national independence and are the largest structures built by humanity.¹¹⁰ By supplying hydro-electricity and by providing water for irrigation, dams help boost food production, a key challenge to developing countries. Lured on by the promise of cheap energy, Third World governments embark on massive hydro-electricity schemes to exploit to the very limit the capability of their rivers.¹¹¹

¹⁰⁵ McCully, 1996, p. 3.

¹⁰⁶ These statistics from McCully (1996) were taken in the 1990s, the numbers have only increased since then.

¹⁰⁷ Goldsmith, Hildyard, 1984, *Vol. 1*, p. 2.

¹⁰⁸ McCully, 1996, p. 18.

¹⁰⁹ *Ibid.* p. 15.

¹¹⁰ *Ibid.* p. 15.

¹¹¹ Goldsmith, Hildyard, 1984, *Vol. 1*, p. 6.

In 1954, the Prime Minister of India, Pandit Jawaharlal Nehru, strongly believed that it was through industrialization that India would become one of the great economies of the world. Nehru attempted to combine ancient traditions with modern development by stating in his speech at the opening of the Nangal Canal in Punjab, that he believed it was these giant industrial works, such as dams, that are the new temples and mosques. He states: "...what place can be greater than this, this Bhakra Nangal, where thousands and lakhs¹¹² of men have worked, have shed their blood and sweat and laid down their lives as well?"¹¹³ Nehru was strongly in favour of the development of India's economy through the application of the Western Capitalist template, despite awareness of the problems that large-scale industrialization had created for the West. Arguments over social inequalities and exploitation driven by the Western model could not supplant the essentially patriotic flavor of economic development in India. As Deshpande (1993) states: "Nehru tried to install the task of nation building with religious responsibility by identifying industrial works, such as the Bhakra Nangal dam, as new religious sites. He believed that national construction projects should be invested with the faith, piety and fervor that were previously reserved for religious works."¹¹⁴ Nehru's vision attempted to combine the modern development of India with her traditional culture. Unfortunately, this perspective failed either to build a strong Indian or nurture India's cultural identity. Indeed, by attempting to establish a western version of modern development in India, Nehru in fact undermined the cultural heritage of the

¹¹² One lakh is equal to one hundred thousand.

¹¹³ Deshpande, 1993, *Imagined Economies*, p. 24.

¹¹⁴ Nehru's political vision for India is discussed at length in Deshpande's (1993) *Imagined Economies*, pp. 20 - 27.

country. Exactly what Gandhi feared;¹¹⁵ his vision for India was in stark contrast to that of Nehru. Instead, Gandhi believed in developing local economies and supporting India from the bottom up. Deshpande (1993) discusses at length Gandhi's notion of a just and humane economy, where commodity relations are minimized if not eliminated altogether. This view directly contradicted Nehru's desire for a strong and powerful economy built along Western lines. However, it should be noted that Gandhi's objection to modern industry and technology was based on a deeply principled stand. Gandhi objected to western capitalism because it is based on exchange relations, which was to him the root of most social evils. He would have preferred to abolish exchange value altogether and live by the principles of use value instead.¹¹⁶

That said, Nehru's vision of Western development for India as applied led to the construction of hundreds of large dams with little to no understanding of the environmental or cultural consequences. Time and again dams and other large-scale water projects were approved on the basis of the most cursory ecological appraisals. In some cases, the appropriate studies had only been undertaken after building work had already begun.¹¹⁷ One example of a badly researched project in India is the Indira Gandhi Canal in Rajasthan. This canal system stretches over several thousand kilometers of the Thar Desert. These canals were supposed to bring water to the desert and local villages but residents of the area say that water has not flowed through the canals since their opening. The government had overestimated the amount of available water and so in years of

¹¹⁵ Gandhi and Nehru's opposing political views are discussed at length in Deshpande's (1993) *Imagined Economies*, pp. 20 – 27.

¹¹⁶ Deshpande, 1993, p. 23.

¹¹⁷ Goldsmith, Hildyard, 1984, *Vol. 1*, p. 239.

drought, there is not enough excess water to flow through the canals.¹¹⁸ Where there has been enough water to increase crop production in semi-arid land, the excessive irrigation and intensive agriculture has caused environmental degradation. Problems of waterlogging have been created by excessive irrigation, seepage from the canals and the poor drainage of the soil. This has also produced a rise in the water table, increased salinity and submergence of the land. Some of the once fertile land has been turned into wastelands by the cultivation of water intensive cash crops, such as wheat and rice. The land in these areas cannot take the volumes of water that are now being given to it. Waterbury (1979) states that "...policy-making groups and external creditors sometimes prefer an incomplete picture, as then the unanticipated can be written off as incomplete information and poorly defined responsibilities."¹¹⁹

Leaders of newly independent countries, such as India, looked at the huge dams of the USA and the then USSR and saw monuments to progress and prosperity. Huge dams were seen as providers of electrical power, water and food.¹²⁰ Leaders believed that these dams would bring vast income to their countries, despite the millions it took to build a single dam. In India, even the sacred rivers were not safe from this attitude. The simultaneous attainment of financial, environmental and social sustainability of urban services is an important requirement of development. While huge investments have been made towards the improvement of urban infrastructure and services in India, within urban infrastructure the supply of water and its disposal after use has become one of the most problematic aspects of planning and management.

¹¹⁸ <http://waterresources.rajasthan.gov.in/4ignp.htm>, retrieved 26 October, 2013.

¹¹⁹ Waterbury, 1979, *The Hydropolitics of the Nile Valley*, p. 39.

¹²⁰ McCully, 1996, p. 1.

Water must be brought from distant sources, and the wastewater requires treatment before being discharged into water bodies or rivers, while “...in dryland areas, which are physically water scarce and constitute some 70 per cent of the country, the problem becomes even more acute as the costs associated with setting up and running Water Supply and Sanitation (WSS) services go up exponentially.”¹²¹ The Indian government’s solution to this increasing water crisis is to dam rivers and transport water from an abundant water area to another, more drought prone one. Plans to dam the Narmadā River were first conceived in 1946, but construction did not go ahead until over thirty years later. In 1960, the Indian Central Water and Power Commission prepared a project report for the proposed Narmadā dam project. This first project report envisioned a barrage with a top reservoir level of 49 meters to provide seasonal irrigation to a limited area. This plan had no provisions for storage so when storage facilities were built further up the Narmadā; it was proposed that the barrage be raised to a reservoir level of 97 meters. This would enable it to generate power and to extend irrigation from the previously proposed amount. The damming of the Narmadā has been controversial from its very beginning. The reason that construction took over 30 years to start was that the provincial governments of the three neighboring states (Madhya Pradesh, Gujarat and Maharashtra) could not agree on the distribution of irrigation, the level of one of the proposed dams or the sharing of the water. Maharashtra and Gujarat were originally both part of the Bombay state but separated in 1960 into the two states that currently exist. Once separated from Gujarat, Maharashtra no longer

¹²¹ http://sandrp.in/watersupply/Indore_WSS_critique_Rahul_Banerjee_Dec2012.pdf, retrieved 8 April 2013.

supported the proposed dams and reservoirs, since they would not gain any irrigation or drinking water from them. Madhya Pradesh also stopped supporting the proposed dams. After much discussion, and the intervention of the Narmadā Water Disputes Tribunal the project was finally agreed upon by all three states. However, as noted by Paranjpye (1990), "...it was the Narmadā Water Disputes Tribunal that allocated shares of the water and in the opinion of the tribunal, the larger the area that can usefully be commanded by the waters of Narmadā in a state, the larger would be its share in the water of the river."¹²² Understandably this opinion prompted the three states to each propose bigger and more numerous water projects, in the hope that the Water Tribunal would award them a greater share of the water.

The Narmadā dam complex is one of the largest single river valley projects in the world. The entire project consists of thirty major dams, ten on the main river and twenty on tributaries; 5 of these are "...hydroelectric schemes, 6 multipurpose and nineteen are for irrigation. In addition, 135 medium and 3,000 minor irrigation schemes were planned for the area."¹²³ The expected benefits of this project are around 50,000 sq. km of irrigated land and "an installed power capacity of 2,700 MW with an output of 800 MW at 100 per cent load factor"¹²⁴, the ability to check floods, the generation of fisheries in the huge reservoirs, the creation of employment opportunities for hundreds of thousands of people, the supply of water for domestic and industrial use, and the promotion of tourism to the area.¹²⁵ Those involved in the building of large water complexes often believe that they are improving the lot of mankind and that

¹²² Paranjpye, 1990, *High Dams on the Narmadā*, p. 34.

¹²³ Goldsmith, Hildyard, 1984, *Vol. 2: Case Studies*, p. 226.

¹²⁴ *Ibid*, p. 227.

¹²⁵ *Ibid*, p. 227.

these water resource projects have many positive environmental effects. For instance, when water management practices regulate peak flows and augment low flows of rivers and streams, they can decrease erosion, prevent flooding and can eliminate the waste of water flowing into the sea. The key emotional and political justification for the building of the Narmadā Dam Project is that it is expected to be a permanent solution to the drought problem in Gujarat. Interestingly, this justification as reported only emerged after protests to the building of the dams had begun. It is also expected that the dam building will create an agricultural and industrial 'revolution' and herald in an era of prosperity for the valley. The planners of this project predict that it will provide drinking water to 8,215 villages and 135 urban centers in 12 districts of Gujarat, where the population is in desperate need of water security. The Narmadā Dam Project is also planned to supply irrigation to 1.8 million hectares of land spread over 12 districts in Gujarat and 75,000 hectares in Rajasthan. This irrigation is to occur through a network of 75,000 kilometers of canals, including a main canal of 460 kilometers in length and 35 branch canals of various lengths.

The decade between 1986 to 1996 was termed the 'construction phase', with the qualification that, "...while construction work on the dam and canals indeed gathered momentum during this period, work on the dams was suspended in early 1995 by order of the Supreme Court of India and was only partially resumed in 1998."¹²⁶ Amongst the 30 large dams planned for the Narmadā, the Sardar Sarovar Dam is the largest. This dam is in Navagam in Gujarat and was to be built to a proposed height of 138m, and has emerged as the focal point of both the dam-builders' plans and the opposition's objections. The Indian Government

¹²⁶ Dwivedi, 2006, *Conflict and Collective Action; the Sardar Sarovar Project in India*, p. 142.

claims that the multi-purpose Sardar Sarovar Project (SSP) will irrigate more than 1.8 million hectares (mostly in Gujarat, some in Rajasthan) and quench the thirst of the drought prone areas of Kutch and Saurashtra in Gujarat. In addition, the dam will be used to generate 1450 megawatts of energy.¹²⁷ The Sardar Sarovar Dam is currently 122m high, under the maximum proposed height of 138m but far above the 88m that the opposition requested. The Sardar Sarovar dam was completed in 2006. However, controversy has recently emerged over the desire of the Gujarat Government to raise the height of the dam from the current height of 121.92m to the full-proposed height of 138.68m. According to the South Asian Network for Dams, Rivers, and People website,¹²⁸ and from information obtained under the Right to Information Act from the Sardar Sarovar Narmadā Nigam Limited, (the Gujarat government organization in charge of the Sardar Sarovar project) "...Gujarat passed 19.91 BCM (Billion Cubic Meters) of water through its Canal Head Power House (CHPH) and River Bed Power House (RBPH) during the calendar year of 2007. Out of this amount of water available to Gujarat at SSP, Gujarat could use only 1.285 BCM of water. This means that Gujarat could not use 93.55% of the water that was available from the SSP in 2007."¹²⁹ Raising the height of the dam will increase the amount of land submerged and the number of people displaced. If Gujarat cannot use all of the water available to them at the lower height, what might be the point of raising the height further?

For the purpose of this thesis as identified in Chapter One, I will focus primarily

¹²⁷ Baviskar, 1997, p. 200.

¹²⁸ SANDRP is the website for the South Asian Network for Dams, Rivers, and People. www.sandrp.in.

¹²⁹ http://sandrp.in/dams/Guj_used_6.45_percent_water_May2008.pdf, retrieved 21 February, 2013.

on the Sardar Sarovar Dam, as it has generated the majority of resistance. Further, there remains a dearth of information on the other major dams in the Narmadā Valley. The other dams, such as the Narmadā Sagar,¹³⁰ the Tawa,¹³¹ the Maheshwar,¹³² the Barna¹³³ and the Ukai¹³⁴ dams are typically mentioned in

¹³⁰ The second biggest proposed dam in the Narmadā basin is the Narmadā Sagar dam, also known as the Indira Sagar project. This project in Madhya Pradesh envisages construction of a storage reservoir of a live storage capacity of 9750MCM to enable hydropower generation, annual irrigation of 1.69 lakh hectares in Khargone, Khandwa and Barwani and water supply of 74 MCM for industrial and domestic need of the region. The regulated discharge from the dam will enable power generation and irrigation at the Omkareshwar and Maheshwar projects downstream and will also provide water to the Sardar Sarovar Project as directed by the Narmadā Water Disputes Tribunal. The dam and riverbed powerhouse were completed by 2012.

¹³¹ The Tawa Dam is on the Tawa River, a left-bank tributary of the Narmadā. It was the first major work to be undertaken in the Narmadā basin. The dam was constructed in 1974 near the village of Ranipur in the Hoshangabad district. The main purpose of this earthen and masonry dam is irrigation for the Hoshangabad district. The reservoir created by this dam has a gross storage of 0.231 million-hectare meters (mhm) and a live storage of 0.205mhm. This project proposed to provide irrigation for 247,000 ha with the following intensities to irrigate 333,000 ha of cropped land. Phase one of the project was completed in 1975 and created irrigation for 22,000ha, with phase two completed in 1979. Phase three was completed in 1981 and was designed to irrigate 332,000 ha of cropped land. ([http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Indira_Sagar_\(Narmada_Sagar_Project\)_JI00836](http://india-wris.nrsc.gov.in/wrpinfo/index.php?title=Indira_Sagar_(Narmada_Sagar_Project)_JI00836), retrieved 18 March, 2014)

¹³² Maheshwar is one of the planned large dams of the Narmadā Valley Project and is slated to provide 400 Megawatts in energy. The project has been planned since 1978 and was originally under the auspices of the Narmadā Valley Development Authority. In 1989 the responsibility for Maheshwar was conferred on the Madhya Pradesh Electricity Board (MPEB). Subsequently in 1993, the concession for the Maheshwar Project was awarded to S. Kumars, a textile magnate. In 1994, the project received a conditional environmental clearance from the Central Ministry of Environment and Forests (MoEF). Maheshwar is the first privately financed hydroelectric dam in India and is expected to displace around 35,000 people. The Maheshwar dam is to be built in the Nimad region of Madhya Pradesh, two kilometers upstream from the town of Mandleshwar. 61 villages will be affected by the project, 21 of these villages will be totally or partially submerged, while in the remaining 40 villages only agricultural land will be submerged. The agricultural soils of the area are extremely fertile and irrigated agriculture forms the mainstay of the economy in the project region. 90% of the agricultural land is irrigated, mostly through lift irrigation from the river, allowing farmers of the region to grow up to 3 crops a year. For rural India, the project area is extremely prosperous. Aside from meeting the villagers own needs, agricultural production from this area supplies regional markets. Their way of life is both economically and ecologically sustainable and has brought a high degree of prosperity to their communities. The villages have access to electricity, many of the families own telephones and televisions; some even have tractors, motorcycles and other vehicles. In addition, there is a relatively highly developed infrastructure (schools, health station, community halls etc.). As a consequence, there is almost no migration to urban areas from the project region.

(http://sandrp.in/hydropower/copy_of_hydropower/Maheshwar_rally240308, retrieved 18 March, 2014)

¹³³ The Barna dam is located near the village Bari of Tehsil Bareli in the Raisen district of Madhya Pradesh. The dam is located on the Barna River, which is a right bank tributary of the Narmadā. Construction of the dam was completed in 1978. The total catchment area of the dam is 1.176 sq. km and the gross storage capacity is 539.00 MCM. The dam is 432m long and 47.7m high at the deepest section. The main canal is 38km long and irrigates 60,290 ha. The Barna dam is used solely for irrigation. (<http://sandrp.in/hydropower/>, retrieved 18 March, 2014)

passing.

3.1 Resistance to the dams

As the years have passed from the time the Narmadā Valley Project was conceived, resistance to the dams has only grown. The first stirrings of protest against the Narmadā Valley Project and more specifically the Sardar Sarovar Dam, started in 1978 in Nimar, Madhya Pradesh, soon after the Narmadā Water Disputes Tribunal announced the water allocations. The leading Congress politician of this area, Arjun Singh, mobilized people in Nimar around the issue of displacement in what came to be known as the Nimar Bachao Andolan (Movement to Save Nimar). Baviskar (1997) states that

¹³⁴ The Ukai dam was built on the river Tāpī in northern Gujarat, another tributary to the Narmadā. It is an earthen and masonry dam with a height of 69m. The Ukai reserve extends up to a distance of 112kms and spreads over an area of 614 sq. km. The reservoir has a storage capacity of about 8.5 lakh ha of water. It is another irrigation project with emphasis on cash crops, food processing industries and increased production of food grains for the poor and middle classes. There is also a project to transfer the surplus water of Par, Auranga, Ambica, Purna and Tāpī river basins to the Narmadā canal command, after providing enroute irrigation, so that the water saved in the Sardar Sarovar dam, as a result of this transfer, can be taken further northwards to benefit the Saurashtra and Kutch regions. The diverted water will irrigate 0.304 M Ha annually comprising of 0.052 M Ha enroute and 0.252 M Ha in the Narmadā command area. The 224.53 km Tāpī -Narmadā portion of the link starts from the Ukai dam reservoir and crosses the Narmadā River and after connecting with the Miyagam branch it terminates at the Vadodara branch of the Narmadā main canal. The canal capacity at off take from Ukai reservoir is 196 cumecs and after meeting enroute target area requirements, the canal capacity at the tail end will be 75 cumecs. There are 60 aqueducts, 32 cross regulators, 20 head regulators, 96 drainage siphons, 4 canal siphons & 106 road-railway bridges along the main-feeder canals. There is three building phases proposed at this time, in phase 1, the link canal originating from the Ukai Reservoir and terminating at the Vadodara branch canal will be constructed to allow transfer of 1554 MCM of available “surplus water” from Tāpī at Ukai to Narmadā command. In phase 2, it is proposed to extend the canal past the Vadodara branch of the Narmadā canal and add the Chikkar, Dabdar and Kelwan reservoirs and one weir downstream of Chikkar and build a canal from the Chikkar weir to the Ukai reservoir. With the construction of the three reservoirs and main canal of 73.54 km, it is claimed that 683 MCM of additional water would become available. There will be three feeder canals of total length 30.27 km connecting the Chikkar, Dabdar and Kelwan reservoirs to the main canal. In phase 3, it is proposed to take up the remaining works. The entire link canal falls in the territory of Gujarat. However out of the seven reservoirs, four reservoirs, Jheri, Mohankavchali, Paikhed and Chasmandva, will submerge territory and property of Maharashtra also. Among these, the Jheri reservoir is completely in Maharashtra whereas three other reservoirs submerge areas in both states of Gujarat and Maharashtra. (http://sandrp.in/riverlinking/Par_Tāpī_Narm_1206.pdf, retrieved 18 March, 2014.)

“...although this campaign was chiefly supported by merchants and farmers in Nimar, and worked within the established structures of party politics, the attendance to its rallies is said to have been much larger than anything seen today.”¹³⁵ However, it emerged that Arjun Singh was simply using the movement to further his own career. After he won the state elections, he abandoned the Nimar Bachao Andolan and after this the movement collapsed. With the arrival of Medha Patkar to the area in 1985, however, the people of the Narmadā valley once again began to organize a resistance against large dams and the displacement they cause. The people of the Narmadā valley were joined by other activists and so became the Narmadā Bachao Andolan (Save The Narmadā Movement). Baviskar (1997) has observed that “...while the Narmadā Valley Project is a massive scheme that must be resisted as a whole, it was not possible to locally oppose every one of the proposed dams along the river. The Narmadā Bachao Andolan concentrated its efforts on the two largest of the proposed dams, the Sardar Sarovar and Narmadā Sagar dams. Initially, the NBA did not challenge the overall validity of these dams, but started with the intention of organizing people to agitate for adequate resettlement packages. However, when it became apparent that it was simply impossible for the government to properly resettle all of the project-affected people, and moreover, that the project was questionable on other grounds too, the NBA changed its position to total rejection of the project.”¹³⁶

This resistance group campaigned effectively to persuade the World Bank¹³⁷ to retract its funding, one of the first to do so. Pressure from the NBA also forced

¹³⁵ Baviskar, 1997, p. 202.

¹³⁶ Ibid, p. 203.

¹³⁷ Ibid, p. 154

the Japanese Overseas Economic Cooperation Fund to withdraw its commitment to provide a loan for the project. The resistance group has also raised awareness and brought the Narmadā Dams to the world stage, gathering support from all over the globe. As Baviskar (1997) states: "...the opponents of the Narmadā dams do not see their actions against the dams as merely a rejection of one specific development project or as an opposition to development per se but as a movement for an alternative, more sustainable form of development."¹³⁸ Alternatives to large dam projects will be discussed in the Conclusion.

There are two main issues that are at the center of the resistance to the building of dams on the Narmadā River. These issues are the environmental effects the dams have on the surrounding areas (discussed in chapter 6) and the impact the dams have on the people living along the river (discussed in chapter 5). The Narmadā River dams have come under scrutiny during a decade marked by the rapid spread of worldwide ecological awareness, in the course of which standards of acceptable environmental impact have changed and continue to evolve. Simultaneously, there has been growing concerns about the rights of indigenous people. By indigenous people, it is meant the tribal population (Adivasi) that live in the Narmadā Valley. These tribes: the Bhils, Bhilalas, Mankars and Naikdas, are in a lower socio-economic group and derive their livelihoods primarily from the river and surrounding forest. Another group who are deeply affected by the dams are the lower Hindu castes, the Adivasis are not seen as part of the Hindu caste system.¹³⁹ The Adivasis do not see the river as

¹³⁸ Baviskar, 1997, p. 202.

¹³⁹ "Castes are stratified on the basis of the ideology of purity and pollution, different degrees of which are associated with different occupations. Upper-caste Hindus generally lump Adivasis with untouchables and will not accept food from their hands. For Hindus, the notion of caste as a station in life is legitimized by the philosophy of karma, which, through the transmigration of the

sacred in the same way Hindus do: “...while the Hindus on the banks of the Narmadā have elaborate ritual calendars of worshipping the river, singing her praises, taking purifying baths in her water, asking boons of the goddess, etc., Adivasis seem casual in their attitude towards the river.”¹⁴⁰ They refer to her as Narmadā Mata (Mother Narmadā), but very little ritual or worship surrounds her. However, as Baviskar (1997) states: “...all natural phenomena is imbued with spiritual life, so that the hills, trees, stones and crops actively intervene in people’s daily lives. The world is also populated by the spirits of the tribe’s ancestors, who watch benevolently over their progeny’s shoulders.”¹⁴¹ Through this overall belief in the sacredness of the environment surrounding the Adivasis, the river is sacred, but she is not worshipped as a goddess. The creation myth, the *gayana*, sings of the Narmadā and links her to the origin of the world. The *gayana*, more than any other part of their religion, sets the Adivasis apart from the Hindus, to whom the myth is entirely unfamiliar: “...though the *gayana* links the Narmadā to the origin of the world, nowhere else in Adivasis culture is she deified in a way that matches her apotheosis by Hindus.”¹⁴²

The emergent ecological and human rights awareness, and changing standards, have led to increasing criticism of large-scale development projects, such as the Narmadā River project. As Fisher (1995) states: “...large dams everywhere have become a target of those concerned with the ecological and social effects of large infrastructure projects, particularly those in relatively

soul and the cycle of rebirth, holds out the hope of a higher status in the next life.” Baviskar, 1997, p. 95.

¹⁴⁰ Baviskar, 1997, p. 91.

¹⁴¹ Ibid, p. 90.

¹⁴² Ibid, p. 91.

remote areas inhabited by indigenous people.”¹⁴³ Examples of these can be seen all around the globe. In the case of the Amazon, indigenous claims clearly predate the growth of environmental consciousness. These claims emphasize control of land and natural resources, access to manufactured goods and to certain services provided by state agencies, such as health care. The Kayapo of Central Brazil are an example of an indigenous population that has enjoyed success against large-scale development projects. Their population is around 4,000, inhabiting 14 independent villages. The Kayapo have traditionally combined horticulture with hunting, fishing, and foraging to provide their subsistence. These 14 villages have resulted from fissions occurring as the Kayapo moved westward from their ancestral village between the Araguaia and Tocantins Rivers. However, they have always lived in and around the Amazonian rain forest. The land used by the Kayapo has been almost completely demarcated as reserves. These reserves are located in the drainage of the middle reaches of the Xingu River, a southern tributary of the Amazon River. The Kayapo cultural traditions flourish only in harmony with the tropical rainforest. With the Amazon under threat of destruction, the Kayapo and international environmental groups have convergent interests in agitating for changed policies and safeguards against ecological devastation. In February 1989, they organized a large multi-tribal protest against the building of Kararao and Babaquara hydroelectric facilities near the town of Altamira in Para. In a series of unprecedented events, Kayapo leaders appeared on North American and European television talk shows, spoke at numerous conferences and appeared in a concert with the rock star Sting. The Kayapo were attempting to conserve their life in small villages with subsistence

¹⁴³ Fisher, 1995, *Toward Sustainable Development*, p. 9.

and ritual activities that require a base in land and natural resources while maintaining their links to Brazilian agencies that furnish medical supplies, manufactured goods and other services that the Kayapo need or desire. The protests against the Kararao and Babaquara dams were highly successful and the World Bank denied the Brazilian power sector the loan needed to build the dams. The image of indignant natives appeared to lend greater weight to the indigenous protest. The public's fancy was given over to traditionally garbed natives reproving western society for its misdeeds. It was the image of the Kayapo as guardians of the forest and upholders of the ecology that was picked up by the international media and broadcast throughout the world. The Kayapo are one of the main indigenous activists against the implementation of large-scale development in the Amazon, particularly the proposal to build seven dams along the Xingu River. The effects of such a project would be a tragedy for indigenous peoples living along the waterway.¹⁴⁴

This new political and cultural assertiveness of tribal peoples is a worldwide phenomenon and clearly constitutes, to that extent, a response to developments in the world political and economic system that transcends the Amazon region. Recent indigenous political assertiveness in all parts of the Amazon has been marked by several common features: reassertion and redefinition of ethnic identity accompanied by the revaluation and more or less creative reinvention of indigenous culture; an alliance with the environmentalist movement; and the

¹⁴⁴ Fisher, 1994. *Megadevelopment, Environmentalism, and Resistance: the institutional context of Kayapo indigenous politics in Central Brazil*, pp. 220 – 230.

prominent supportive role of local and foreign non-governmental organizations (NGO's).¹⁴⁵

Another indigenous population that has enjoyed success in protecting their cultural rights to land is the San of South Africa. The San gained a victory against the government in 1999, when approximately 65,000 hectares of traditional territory in and around the Kalahari Gemsbok National Park in South Africa was returned to them. This land claim victory was significant, both because it signaled the presence of a hospitable political climate for restitution claims and because it illustrated the ability of the San to assert their rights as indigenous people. The San are hunters and gatherers by tradition and there are some ninety thousand living in Southern Africa. Only a handful of this ninety thousand continue to live on their traditional territories, which have been dramatically diminished over the past centuries. Traditional hunting and gathering is no longer a viable subsistence strategy and most San live in conditions of marginalization and poverty on the periphery of the global capitalist and state systems. The San are widely recognized as the most impoverished, disempowered, and stigmatized ethnic group in southern Africa. To address this systemic and widespread discrimination, the San have begun to mobilize under a regional pan-San organization – the Working Group of Indigenous Minorities in Southern Africa. This organization networks with regional human rights and development NGO's and facilitates San participation in international indigenous peoples' rights forum. This regional and international networking enables the San to articulate their collective goals: securing land rights and control over

¹⁴⁵ Turner, 1995. *An indigenous people's struggle for socially equitable and ecologically sustainable production: the Kayapo revolt against extractivism*, pp. 98 - 121.

natural resources, gaining government recognition of their community leaders, protecting their interests and empowering themselves through self directed development projects. The San are only now beginning to struggle for rights and to renegotiate their relationship with the state as indigenous people.¹⁴⁶

Traditional forms of irrigation, discussed by Goldsmith and Hildyard (1984), as practiced by the Qanats of Iran¹⁴⁷ and the Sonjo¹⁴⁸ and Chagga¹⁴⁹ of Tanzania, have been sustained over many centuries. These traditional methods of irrigation are sustainable for a number of reasons but the main reason is the size. They operate on a very small scale in comparison to most modern irrigation schemes. Those who operate them do not draw off more water than is guaranteed by the natural rate at which their water supplies replenish. And so “...to this end, traditional societies such as the Qanats, Sonja and Chagga have sought to prevent any increase in the demand for water. In arid lands, such restraint is clearly axiomatic if water supplies are not to be overtaxed and if the long-term availability of water is to be assured.”¹⁵⁰ That simple axiom, according to Goldsmith and Hildyard, is one which modern industrial society- with its emphasis on growth- has preferred to ignore.

The reason I discuss cases of other indigenous people struggling against forms of development is to show the global nature of the issue and to demonstrate that it is not limited to the Narmadā Valley. The Narmadā Valley is an important example of what happens to resources, such as rivers, when they are altered in the name of development without discussion and input of those who live in the

¹⁴⁶ Sylvain, *“Land, Water, and Truth”: San identity and global indigenism.*

¹⁴⁷ Goldsmith and Hildyard, 1984, *Vol. 1*, pp. 285 – 290.

¹⁴⁸ *Ibid*, pp. 291 – 296.

¹⁴⁹ *Ibid*, pp. 297 – 301.

¹⁵⁰ *Ibid*, p. 304.

affected area. Indigenous people are seen to live sustainably within their environment and a large part of this is because they respect their resources. All indigenous communities that live amongst the vagaries of weather, pestilence and prices, attempt to petition the powers of nature - rain and earth- with prayer. The Adivasis of the Narmadā Valley are no different. The Narmadā River is not just a goddess, she is also a highly prized resource that sustains the lives of thousands. The next chapter looks at the impacts the Narmadā Valley Project has had on the divine and sacred nature of the Narmadā.

Chapter 4: Dam and Deity: The impact of progress on the Narmadā River.

There is a strong contrast between the two predominant views of the Narmadā River. One view of the river is as a sacred goddess who has flowed through many cycles of the earth, and the other is of an untapped resource that may be harnessed to supply water to drought prone areas. The visions of the relationship between humans and nature in these two perspectives are also dramatically different. These two views seem irreconcilable and unable to compromise. On the one hand, the river needs to be protected and cared for, as she has protected and cared for those who live in her area and on the other, she should be exploited and controlled for the good of the people in the area. This second perception of development defines and responds to two aspects of nature.¹⁵¹ Nature is seen as threatening and dangerous – in need of containment while, simultaneously, it is viewed as a stockroom of resources.¹⁵² For development planners, both aspects present problems requiring technical solutions. According to Fisher,¹⁵³ the diversion of the Narmadā waters to drought-prone areas of Gujarat is promoted as an appropriate technical response to both of these aspects of nature, diverting the ‘wasted’ water of the Narmadā to prevent continued disasters caused by drought. He states that:

¹⁵¹ There is extensive literature on the distinction and debate between ‘nature’ and ‘culture’. See for example: Greenwood and Stini, (1977) *Nature, Culture and Human History*, or Braun and Castree, (1998) *Remaking Reality: Nature at the Millennium*.

¹⁵² This is a mainly European/western view that has infected countries that traditionally viewed nature as something to be respected.

¹⁵³ “Sacred Rivers, Sacred Dams: competing visions of social justice and sustainable development along the Narmadā”, by William Fisher, in Chapple and Tucker, 2000, pp. 401 - 421.

“...from this perspective, it is less the river that is sacred than the dam... Hailed as the ‘lifeline of Gujarat’, the dam and its complex canal system became an embodiment of Nehru’s modernist vision. This emergence of the dam as an icon of modernization has the unfortunate consequence of presenting the dam as an end rather than a means of development. Development then becomes about status rather than the upliftment of the people... The devotees of this temple of modernization have demonstrated a commitment to their shrine that will not permit them to step back to reconsider its efficiency despite continued protest. The focus remains fixed on completing the dam and refusing to consider the possibility of other creative solutions to the initial problem.”¹⁵⁴

It is at the very least, unfortunate that dam advocates fail to consider that this is a sacred river with a deep past and a meaningful connection with Hindus. This river is not just important to those who live along her banks but to the broader community of India.

The essence of a divine river is in the *flow* of the water. The movement of the water helps to dissolve sin and cleanse devotees. For worshippers who see the Narmadā as a divine force, dams represent a human interference that can only bring destruction and inhibit the perceived holiness of the river. In the *Skanda Purāṇa*, it is said that those who live in the lands where the Narmadā flows continuously are blessed, they are the ‘excellent’ ones.¹⁵⁵ With the river now dammed and unable to flow continuously, are the people living in the area still blessed, are they still the excellent ones? It would appear that though the dams have interfered with the Narmadā’s ability to flow, they have not had a great impact on her perceived sacredness. Pilgrims continue to travel to her banks to be cleansed of sin and to beseech the goddess for help. Also, “...a number of edifices, which have come up along with the dams, have been adorned by the authorities with large polished slabs of black stone into which the *Narmadā*-

¹⁵⁴ Chapple and Tucker, 2000, pp. 409 - 10.

¹⁵⁵ Tagare, 2001, *part XIV*, p. 648.

*Māhātmya*¹⁵⁶ is engraved.”¹⁵⁷ And so concurrent with the modern development of the river, her myth and history are still maintained. The original path of the *Narmadāparikramā* has been interrupted by the reservoirs of the dams. There are also many villages along the riverbanks that have been submerged, their shrines and sanctuaries along with them. According to the Sardar Sarovar official website,¹⁵⁸ the temples of Hamfeshwar and Shoolpaneshwer have been relocated to higher elevations. As part of the pilgrimage, the devotee must stop at each village along the path to worship at the shrine kept there; these villages also served as rest stops for the pilgrims. The submergence of these villages has caused an interruption to the original path of the *Narmadāparikramā*. The devotees on the pilgrimage are no longer able to complete the original pilgrimage and cannot visit all of the *tīrthas* to fulfill their duties to the goddess. Although the original path has been interrupted, the pilgrimage still takes place. Devotees have found ways around the reservoirs to still complete the *Narmadāparikramā*. The alteration of the pathway has had little effect on the perception of the pilgrims, who now worship the stagnant waters of the reservoirs just like the flowing waters of the original river before.¹⁵⁹ As Neuss (2012) states:

“...the new stretches of the *parikramapatha* (the path pilgrims must follow) has necessitated the establishment of many new holy places, temples, pilgrim lodges etc. to maintain the infrastructure for the pilgrims. On the vast new stretches along the banks of the reservoirs, new temples, monasteries and other religious establishments are presently being founded to accommodate the needs of ever increasing numbers of pilgrims. The government of Madhya Pradesh recently

¹⁵⁶ The *Narmadā-Māhātmya* is the story of the goddess Narmadā, found in the sacred Hindu text, the *Skanda Purāṇa*.

¹⁵⁷ Neuss, 2012, p. 13.

¹⁵⁸ <http://www.sardarsarovardam.org/Client/ContentPage.aspx> retrieved 1 July, 2013.

¹⁵⁹ Neuss, 2012, p. 16.

even announced plans to build a motorable road all around the Narmadā to make a full circumambulation by cars possible.”¹⁶⁰

This pilgrimage has progressed with the development of the area, adapting to the changes made to its traditional route. Neuss (2012) further believes that:

“...we are able to witness how a religious rite, claimed to be of ancient origin and rooted in tradition, is transformed to fit into a modern transnational economy-orientated world order. It seems very promising to document this whole process: to analyze how the complete loss or ‘transplantation’ of old temples to new locations are religiously explained and how, at the same time, recently established *tirthas* strive to integrate themselves into a popular rite which is canonized in traditional Sanskrit texts; to investigate by which means new establishments gain religious acceptance and how new myths are created or old ones reinterpreted and made compliant with the traditional mythological framework of the *Narmadāparikramā*.”¹⁶¹

The *Narmadāparikramā* is an important pilgrimage for devotees of Narmadā and also Śiva, one of the most worshipped deities in the Hindu pantheon. The importance of this pilgrimage has meant that it has changed with the times, in order to continue in a different world to the one described in the *Skanda Purāṇa*. The development of the area has allowed the *Narmadāparikramā* to become accessible to a wider range of pilgrims. With modern transport, it takes less time for people to travel from one end of India to another. If pilgrims cannot afford the time to walk the entire route around the river, helicopters can now be hired to take them to the main shrines and sanctuaries. It is this phenomenon of “...a religious rite, claimed to be of ancient origin¹⁶² and rooted in tradition, transforming to fit into a modern transnational economy-orientated world order that is something that needs to be documented on a greater scale.”¹⁶³ This

¹⁶⁰ Ibid, p. 17.

¹⁶¹ Neuss, 2012, p. 17.

¹⁶² Despite no evidence that the *Narmadāparikramā* is older than 300 years, it is still considered an ancient tradition.

¹⁶³ Neuss, 2012, p. 17.

phenomenon can show humanity the way to include cultural heritage in a new world order instead of simply extinguishing it.

Apart from culturally significant forest and agricultural land, several sites of significance will be submerged along the Narmadā. While the more famous pilgrimage spots have been spared, such as Amarkantak (the 'source'), hundreds of less well-known sites will be submerged. These include those temples that are present in each village or groups of villages to be submerged, several well-frequented bathing *ghats*¹⁶⁴, and other small sites of historical interest. While such places are not of national importance, locally they play a crucial role in the life of the peasant or tribe. The submergence of these locally important sites impacts on the links people have to the area. The Surpaneshwar temple in Gujarat, for example, is the most important pilgrimage place for villagers from several kilometers around and will be submerged by the Sardar Sarovar Dam. The same dam will also destroy the Śiva temple at Rajghat near Barwani in Madhya Pradesh, and a temple in Brahmāngaon, also in Madhya Pradesh. Though there is a plan in place to move some of the more important sacred sites, this cannot replace the original site. It is not just the building of a shrine or temple that makes a place sacred, but the area it is in and the history of that location. It is the worn pathways made from thousands of feet that bring a sense of devotion and the knowledge that many others have walked the same route before. This kind of feeling cannot be simply moved from one spot to another, though over time, many will forget that those temples and shrines had not always been there. There is a similar pilgrimage to Pandharpur in Maharashtra,

¹⁶⁴ The term *ghat* refers to a series of steps leading down to a body of water, particularly a holy river.

in which large processions of devotees travel long distances on foot. This is in order to retrace the pathways or footprints of important medieval poet-saints who traveled that particular route hundreds of years before.¹⁶⁵

It is difficult to maintain a balance between the development of, and respect for, a sacred landscape. Those who wish to develop the Narmadā River should take the emotional connection people have with the river into consideration. To those who live along her banks, she is not just a river but also a way of life. There must be a balance between tradition¹⁶⁶, sustainability and development. This tension between tradition and modern development is ever increasing as the advocates of development fail to take religion, as a perspective that still values the sacredness of life and the world, into the equation. Tradition is never static. It is always changing and adapting and this is why traditions are able to continue on over such long periods of time. It is an unfortunate tension between the environment that sustains human life, and the increase in population and need for food. The environment of the Narmadā Valley is not merely a stockroom of resources, but a living landscape where the natural and the supernatural are intricately intertwined. Spiritual power, which resides within trees, rocks, or hills, is perceived as intervening actively in people's lives. Virtually all of those who live in the valley emphasize their ties to ancestral land, to the river, to the goddess Narmadā, and to the local spiritual world. The gods of these people

¹⁶⁵ Information on this pilgrimage was found on the website <http://www.newsonair.com/PANDHARPUR-WARI.asp>.

¹⁶⁶ The term 'tradition' is defined as the transmission of customs or beliefs from generation to generation. When I use the term tradition, I am referring to beliefs and practices that have been maintained over an extended period of time. New traditions can easily be created but a respect for what has become 'traditional' over many years because it works, is key in creating a balance between traditional societies and modern development.

cannot move from the river, so how can the people be expected to move without their gods?

Another example of development posing a threat to the spiritual connection people have with their environment can be seen in Orissa, India. Here, the low, flat-topped mountains contain some of the largest deposits of the best quality bauxite in the world. These mountains have been the home of the Dongria Kond tribe for centuries. The mountains watched over the Kond and the Kond watched over the mountains and worshipped them as living deities. These mountains were sold for the precious bauxite that they contain. For the Kond, it was as though their god had been sold. They were not the ones to sell it and they are not the ones who received any of the benefits from the sale.¹⁶⁷ In April, 2013, the Supreme Court applied the Forest Rights Act, saying that it was up to the local communities to decide whether the project should go forward through public consultations and votes in each of the surrounding villages. After 8 villages voted against bauxite mining almost unanimously in July in the presence of judicial officers, it seems as if the 10 year long struggle against bauxite mining has finally been won.

As I stated earlier, the Adivasis do not see the river as sacred in the same way as Hindus. Though they refer to the river as Narmadā Mātā (Mother Narmadā), very little ritual or worship surrounds her. Rather, through the overall belief in the sacredness of the environment surrounding them, the river is also seen as sacred. The changes to the entire area caused by the development of the river impact on the tribal way of life. They continued to live in a traditional manner,

¹⁶⁷ Padel and Das, 2010, *Out of this Earth: East India Adivasis and the Aluminium Cartel*.

gathering food from the forests and river and living sustainably in their environment. As the development of the valley progressed, the area left available to them shrank drastically. Villages that once lived on the banks of the river are now having to live high in the surrounding hills, or have been relocated to a different province altogether. This has meant a loss of connection with the spiritual life that was imbued in the surrounding environment. It also raises the question of what happens to the tribes' ancestors; do their spirits move also, or are they tied to the area in which they once lived?¹⁶⁸

The interruption of the *Narmadāparikramā* has impacted on all who live in the Narmadā Valley, not just those who worship the river. For example, the Adivasis living along the banks of the Narmadā have built economic and social relationships with the pilgrims who pass through their villages.¹⁶⁹ The change of route and the people's displacement has therefore deprived both men and women of their economic, social, cultural and spiritual relationships with the river. The displacement also disrupts family ties, as married women would often visit their familial home, something that will be made impossible, as extended families are not often kept together when rehomed. The important issue of displacement is discussed further in the next chapter.

¹⁶⁸ Baviskar, 1997, discusses the plight of the Adivasis and their connection to nature and the sacred in her book *In the Belly of the River*, pp. 160 – 257.

¹⁶⁹ Chapple and Tucker, 2000, p. 425.

Chapter 5: The Societal Impacts of Dams

As discussed in chapter 3, it is hoped that the building of the Narmadā dam complex will bring an underdeveloped region into the 21st century. The Narmadā valley is mostly populated with lower castes, such as the Dalit, and non-Hindu tribes such as the Bhils, Gonds, Korcu and Kols, who are thought of as the indigenous population. It is hoped that the building of dams along the Narmadā will not only solve drought problems in Gujarat but also bring much needed paid work and modern amenities to the people of the area. The dams will lead to a dramatic increase in availability of drinking and irrigation water. The acute water scarcity has been a crippling problem and emotionally charged issue in Gujarat; it is then no wonder, that Gujarat is the greatest supporter of the Narmadā dam projects. Gujarat has been an avid supporter of the dams since the planning began. It is also the state that will receive the most benefits of the dams, even though Maharashtra and Madhya Pradesh are also in great need. Large parts of drought prone western India have been in need of water development for decades. Here, at present, agriculture is a gamble and “...even potable drinking water is not available to large segments of the population. Power, too, has always been in short supply: the region’s energy requirements are predominantly met by thermal power generation mostly based on coal.”¹⁷⁰ Fisher (1995, pp. 71-88) cites Patel’s opinion that the damming of the Narmadā will only lead to positive development for the population of the affected area. He believes that the local population will then have access to drinkable water, cheap

¹⁷⁰ Fisher, 1995, p. 73.

power and irrigation to increase their agriculture. He also states that with recent changes in the resettlement and rehabilitation policies of Madhya Pradesh and Maharashtra, the three states' policies have come much closer together. Project-affected people are much more prepared to accept these liberal policies, undoubtedly the most generous so far in India, and Patel believes that the pace of rehabilitation has picked up. No major difficulties are foreseen in the satisfactory resettlement and rehabilitation of all project-affected families. Thus, all three states, under guidance and instruction from the Narmadā Control Authority, itself under administrative control of the central government, have been going ahead according to a well-prepared rehabilitation program that matches the dam's construction schedule. Finally, and most importantly, it has been accepted as a principle that unless all the conditions laid down by the Tribunal regarding compensation, allotment of land and residential plot, and so forth are offered on time, dam construction should not proceed if it will affect any family that has not yet been offered adequate compensation.¹⁷¹

Authorities state that the building of the huge dam complex is for the good of the local people that live in this area. The locals are told that this development process is all for them, even though thousands are having to be relocated and none were consulted before building began. The Narmadā Valley dams "...will end up ousting tribals from their forests, effectively destroying their irreplaceable contribution to Indian culture. They will end up homeless and destitute in cities."¹⁷² In the 1990s, studies on development-induced

¹⁷¹ Fisher, 1995, pp. 71-88.

¹⁷² Aitken, 1992, *Seven Sacred Rivers*, p. 37.

displacement generated conclusive evidence of the adverse impact on affected communities in particular:

“...displacement is known to cause disruption of production systems and kinship groups, the loss of assets and jobs, the disruption of local labor markets and ties between producers and consumers, the dismantling of social and food security, credit and labor exchange networks, and the deterioration of public health among displaced communities. In India, estimates indicate that over 20 million people have been displaced in development projects.”¹⁷³

But it is the Adivasis who have been affected the most by the Narmadā dams. Their ongoing struggle is a living example of the resistance of ‘indigenous’ cultural communities to development. The reservoirs of the dams along the Narmadā will submerge an area of forested hills, displacing the tribes who live in this environment. Their fight against displacement appeared to be intrinsically an environmental movement, for they imbue their environment with spiritual life and are seen to use it sustainably. The tribal religion is closely connected with the geography of the area and so a shift in geographical location could de-contextualize their myths and gods, especially for the younger generation. Moreover, there is bound to be strong pressure from the surrounding Hindu and Hinduized communities to adopt Hindu ways.¹⁷⁴ For the proponents of the dams, this is not seen as an issue. In fact, they strongly believe that the displacement of the tribes from their lands in the hills and forests and their assimilation into the ‘mainstream’ culture is not only inevitable but it is also desirable, for it will increase the people’s wellbeing. The former Chief Minister of Gujarat, Amarsinh Chaudhary¹⁷⁵ stated that the tribals have a relationship

¹⁷³ Dwivedi, 2006, pp. 149 - 50.

¹⁷⁴ Dreze, 1997, p. 160.

¹⁷⁵ Amarsinh Chaudhary was Chief Minister of Gujarat from 1985 – 1989.

with the forest and land in the Narmadā Valley because they have had no other means or choice. If they came out of the forests they would gain much more as “...their land holdings are very small and so they have had to rely on foraging in the surrounding forests. If they got good land, they could farm better types of grain and their entire habits would change.”¹⁷⁶

While the dam is both a part and a symbol of development, the movement against the dam seems to embody cultural resistance and an alternative to development. This alternative extended to the very mode of political action in which tribes engage – decentralized grassroots mobilization, which challenged the authority of the state to act ‘on behalf’ of the people. The *Narmadā Bachao Andolan* represented the marginalized uncorrupted ‘alternative political culture’ of the tribes.

Those who are being forcibly relocated are not the only ones impacted by the building of these dams. Those who rely on the river for an income, such as fishermen, will find it harder to earn the same kind of income that they had previously. The damming of the river will also negatively impact farmers who rely on the flooding of the river every year to irrigate and fertilize their land. The provision of abundant water for the few through costly irrigation schemes results in an induced scarcity for the many. In Maharashtra, people living in the catchment area of a large dam are prohibited by law from using more than 15% of the total available water.¹⁷⁷ Not only is water directly diverted to a privileged minority, the opportunity cost of this investment is embodied in the number of small, decentralized schemes to provide protective irrigation to dry land farmers

¹⁷⁶ Dreze, 1997, p. 107.

¹⁷⁷ Baviskar, 1997, p. 32.

which never materialize because of lack of funds. Considering that 75% of India's arable land depends only on rainwater, the emphasis on irrigated agriculture has concentrated funds on a privileged minority and so "...the earth's impoverishment has meant that communities who depend on the natural base for sustenance have been deprived of their resources. This alienation cannot be adequately described in terms of the loss of a material livelihood alone; it is most profoundly a wider loss of cultural autonomy, knowledge and power. In the name of development, people have been pushed off land; their forests and water taken over by the state and the market, so that they have been deprived of everything except their labor power."¹⁷⁸

Most of the protests over the building of the Narmadā Valley project related to the large number of people who were to be displaced by rising water levels and reservoirs, it is estimated that around 150,000 people will have to be relocated. The Government of India does not have an explicit national policy on resettlement and rehabilitation. It is the responsibility of the relevant project authorities and local governments. What the displaced people receive therefore differs dramatically from one project to the next and often depends on the displaced people's political power and organizational abilities. In the case of the Narmadā Valley, most of those to be displaced belong to tribal communities and low castes. Originally, only money was offered to those who had to move based on the Land Acquisition Act of 1894. An amendment in 1984 meant that alternative land could also be offered but this was not legally binding.¹⁷⁹ Neither the original Act of 1894 nor the amendment in 1984 made any kind of provision

¹⁷⁸ Baviskar, 1997, p. 31,

¹⁷⁹ Dreze, 1997, p. 2.

for those who did not legally own land. The tribal population of the Narmadā Valley legally own very little land, and farm government-owned forest. This meant that under the Land Acquisition Act they were entitled to little or no compensation. There has also been “...some controversy over what constitutes an adequate resettlement package. Cash compensation alone can be highly problematic as those who receive it are unlikely to be used to having large sums of cash. The cash compensation is usually much below the replacement value of land and so they are unable to buy land of comparable quality elsewhere or it is hard to find.”¹⁸⁰ Dreze (1997) believes that land-for-land compensation is better than money as people’s livelihoods are protected and their agricultural skills would be productively used. However, land is a very limited resource in India and so the only land available in adequate quantities for compensation purposes is often of an inferior and unproductive quality.¹⁸¹ Singh (1997) believes that an alternative to cash or land compensation is employment-based compensation, wage employment in the public sector. In some cases, this strategy has succeeded in protecting the livelihoods of displaced people as well as integrating them in a new environment. Unfortunately there exists the problem of inadequate employment opportunities; the number of people to be displaced is often much larger than the number of posts that can reasonably be created for them.¹⁸²

As already noted, the resettlement packages differ between states, and most of the ousted will be forced to resettle in Gujarat as the other governments do not have the spare land to offer. Neither does Gujarat really. The land being offered

¹⁸⁰ Dreze, 1997, p. 3.

¹⁸¹ Ibid, p. 4.

¹⁸² Ibid, p. 4.

should be of equal value and productivity as most of the ousted rely on farming for the majority of food, but this is not the case. The resettlement packages that are offered to the Narmadā Valley ousted are some of the best offered in the world and yet these are still far from fair. The land given in the resettlement packages is not as productive as the land originally owned, nor is it likely to have the same kind of resources near it, such as a forest (on which the tribes rely heavily) or a river. According to the Sardar Sarovar Narmadā Nigam Limited website¹⁸³, 11,032 Project Affected Families (PAFs) have been resettled in Gujarat. Each of the PAFs is provided with a minimum of two hectares of land, a resettlement grant, a house-plot and Rs.45000 for the construction of his house besides cash compensation for the land and/or house going under submergence. Community benefits of school, approach roads, wells for drinking water, primary health center, etc. are also provided. The PAFs resettled in Gujarat are extended the benefits of all the schemes being implemented by the State Government for their social and economic development. The PAFs originally from Gujarat have all been provided land and other benefits, with almost half of the PAFs resettled in 110 Resettlement and Rehabilitation sites in Gujarat. The PAFs of Madhya Pradesh who are willing to resettle in Gujarat are given written offers to resettle in Gujarat with choices of land. Thereafter special efforts are made to bring them to Gujarat for land selection. The government of Gujarat has created a Land Bank for Madhya Pradesh PAFs to facilitate the land selection and land allotment process and most of the remaining PAFs from Madhya Pradesh are resettled in 108 Resettlement and Rehabilitation sites in Gujarat. 747 PAFs of Maharashtra have been resettled in 18 Resettlement and

¹⁸³ The official Government of Gujarat website for the Sardar Sarovar dam project.

Rehabilitation sites in Gujarat.¹⁸⁴

Dams increase the exposure to water-borne diseases;¹⁸⁵ further, construction of large reservoirs can elevate the sub-soil water in the vicinity, with consequent changes in levels of calcium and trace metals. This changes the nature of fluorosis, a crippling bone disease in areas where it is already prevalent.¹⁸⁶ Storage reservoirs generally become covered with a shallow weed, providing breeding grounds for disease carrying mosquitoes. Malaria caused by such mosquitoes occurs:

“...commonly among construction laborers and the local population unless special precautions are taken. Filariasis and Encephalitis may also appear and become endemic in these areas. More than 50% of all illness in India is related to water borne diseases, such as typhoid, jaundice, cholera, diarrhea and dysentery. Over 70% of all water in India is being polluted and the storage of polluted water in reservoirs aggravates the problem of diseases.”¹⁸⁷

Adequate planning of medical and health facilities, both preventative and curative, must be included in plans of development. Further, the quality of water, both ground and surface, must be constantly monitored from this perspective.¹⁸⁸

The communities that may benefit from the damming of the Narmadā, are those who will receive irrigation in arid areas. However, this kind of large-scale irrigation can cause its own problems, as I shall explain in the next chapter.

¹⁸⁴ All data on PAFs was found on: <http://www.sardarsarovardam.org/> retrieved 8 February, 2014.

¹⁸⁵ McCully, 1996, p. 39.

¹⁸⁶ Ibid, p. 39.

¹⁸⁷ Doria, 1990. *Environmental Impact of the Narmadā Sagar Project*, p. 29.

¹⁸⁸ Ibid, pp. 166-7.

Chapter 6: The Ecological Impacts of Dams

Along with benefits to humanity, dams can be beneficial to river ecosystems. The assured irrigation that comes from damming enhances food production and improves agriculture. Renewable and pollution free hydropower is environmentally preferable to thermal power generation, which is a formidable source of pollution. Power is a basic requirement for industrial production, agriculture and domestic use. Doria (1990) believes that clean sources of energy which are perennial in nature, deserve to be encouraged. According to Doria, water is the best resource to exploit for power on a commercial scale and to fulfill human power requirements.¹⁸⁹ The impounding of river water, which is then released at a controlled rate, can act as a buffer against floods and help save some of the population from their devastating effects. A more reliable water supply is ensured for industrial and domestic use and pisciculture is increased by the development of fisheries in the reservoirs.¹⁹⁰ The large volume of water being stored means that pollution and wastes become diluted, improving water quality for domestic uses. The availability of irrigation means that farmers no longer have to rely on the monsoons, which have had a 60% rate of failure to occur over the last twenty years.¹⁹¹ Access to year round irrigation means that more cropping cycles can be grown during the year, increasing food production.

¹⁸⁹ Doria, 1990, p. 23.

¹⁹⁰ The negative impact of reservoir fisheries is discussed on page 81.

¹⁹¹ Doria, 1990, p. 90.

Environment has been defined as “the sum total of all conditions and influences that affect the development and life of organisms.”¹⁹² Doria (1990) believes that the impending global crisis posed by environmental degradation and ecological disruption has generated deep concern for the conservation and proper care of the environment in which we live.¹⁹³

As every river is different in terms of its flow patterns, the landscapes it runs through and the species it supports, so the design and operating pattern of every dam should also be unique to cater for the different effects it will have on the river system. While the great majority of the world’s largest dams have been completed within the last six decades, some of the environmental effects of a dam may not be realized for hundreds of years after construction. And so “...a dam can thus be regarded as a huge, long term and largely irreversible environmental experiment without control.”¹⁹⁴

One of the main purposes of the Narmadā Dam Project is to provide irrigation and drinking water to drought prone areas of Gujarat. On paper, this seems a commendable idea, however there are numerous environmental problems that occur when large-scale irrigation is implemented in addition to those presented by the dam itself. Waterlogging and the resulting salinization of fertile land are two of the most common problems caused by excessive irrigation. Land in a canal-irrigated area is generally flat and poorly drained; as such it is liable to become waterlogged. Further, there are the “..unlined canals and distributaries

¹⁹² Doria, 1990, p. 17.

¹⁹³ Ibid, p. 17.

¹⁹⁴ McCully, 1996, p. 31.

that contribute to the seepage of water, which elevates the ground-water to affect the root zone of crops and vegetation.”¹⁹⁵

For example, the Tawa dam on the Narmadā has caused excessive waterlogging in the Hashangabad district.¹⁹⁶ As early as 1978, the Tawa dam had caused a massive waterlogging problem in the land it was designed to irrigate. The entire canal system had not been properly lined and so instead of the estimated 30% seepage of water, the canal was in fact losing at least 60%. In certain areas, this problem of seepage caused waterlogging so severe that village roads became drains for the excess water. Also, productive agricultural land had to be turned into drains in order to prevent the ruin of the rest of the land.¹⁹⁷ The originally estimated seepage rate has been overtaken as the black cotton soil of the area runs a large risk of becoming waterlogged. The Tawa project was designed to irrigate around 45,000ha of maize and jowa and 90,000ha of rice paddy. Rice was a new crop to the area but with the drainage problems that were already occurring, increasing irrigation for the cultivation of rice could endanger other crops from the resultant higher water table and waterlogging. According to Paranjpye (1990) the main causes for the waterlogging that occurred in this area are as follows:

The topography of the land was flat and so the land shaping, land leveling and flattening of the area increased the infiltration rate.

The effluent drains had not been properly connected by a slope to the main river and have not been maintained, resulting in the reduction of the drain’s carrying capacity.

¹⁹⁵ Doria, 1990, p. 27.

¹⁹⁶ Paranjpye, 1990. *High Dams on the Narmadā*, pp. 99 - 102.

¹⁹⁷ *Ibid.* p. 100.

There was an increase in the ground water level due to seepage from the canal and infiltration from irrigation in the fields.

There was excessive watering from irrigation by cultivators above the requirements of the crops due to lack of education on this different agricultural process.

Finally the ground water was not being utilized, resulting in a higher ground water level and a lower drainage capacity of the soil.

Paranjpye (1990) also states that since irrigation from the Tawa dam began in 1974, around 293ha have become waterlogged in the command areas of the canal.¹⁹⁸ Though this number does not seem very large, when a project is implemented to increase the agricultural potential of a district, any loss of fertile land is unacceptable.

The Barna dam has had similar problems to the Tawa dam. Four villages in the command area of the dam have reported destruction of fertile land due to waterlogging.¹⁹⁹ The seepage loss from the canals in this area is estimated to be around 50% and the agricultural production of the area seems to declining. Where dry farming methods had in the past given farmers a tenfold return on the sown seed, under irrigated conditions the return is only sevenfold. The ground water level has also risen, from historical levels of 70-80 feet below ground level to 20 feet below ground.²⁰⁰

Another environmental effect of dams, which goes hand in hand with waterlogging, is the salinization of soil. Irrigation water, whether from rivers or groundwater, may contain dissolved salts and minerals leached from rocks and

¹⁹⁸ Paranjpye, 1990, p. 101.

¹⁹⁹ Ibid, p. 103.

²⁰⁰ Ibid, p. 104.

soils. When this water reaches crops, the roots absorb water but leave in the soil most of the toxic salts. Compounding irrigated agriculture's salt problem is that soils in arid and semi-arid areas tend to have naturally high salt levels.²⁰¹ Farmers then apply more water to wash the salts from the root zone and to prevent the salinity from reaching levels where it would stunt plant growth. But in attempting to flush out the salts, the farmers increase the salinity of the ground water below and without good drainage, the water table rises. Eventually, when the water table has risen to within a meter or two of the soil surface, the saline groundwater is drawn upwards in a capillary action. When it reaches the surface, the water evaporates and leaves behind its salt content as a crust of deadly white crystals, destroying the fertility of the soil.²⁰²

A further issue linked to salinization and waterlogging is alkalinity, which occurs when irrigation waters or soils have a high salt content. The salt is absorbed by clay particles in some soils, which then swell, rendering the soil impermeable to water and oxygen. Doria (1990) states that heavily alkaline soils impede plant uptake of essential micronutrients and ultimately the soil becomes barren. Salinization does not only affect those whose land becomes barren. Saline wastewater that drains back into the river progressively reduces downstream water quality for other irrigators, water users and wildlife. Since dissolved salts as pollutants can be expensive to remove, a feasible method of tackling the problem is to manage the flow of water through regulated releases. This will reduce chances of salt accumulation in particular places.²⁰³

²⁰¹ McCully, 1996, p. 168.

²⁰² Ibid, p. 169.

²⁰³ Doria, 1990, p. 161.

Also linked to irrigated agriculture is the intensive use of fertilizers. This can negatively impact on stream water quality during floods through surface runoff and during non-monsoon periods, through leaching and seepage. High inputs of nitrogen and phosphorus to a watercourse generally cause eutrophication²⁰⁴ in reservoirs down stream, typically resulting in mass growth of algae, and impairment of water quality.²⁰⁵

Dam reservoirs flood large areas of land. It is estimated that worldwide, around 400,000 square kilometers have been submerged.²⁰⁶ It is not just the quantity of land lost that is important but also the quality. As already noted, river, estuary, and floodplain habitats are some of the world's most diverse ecosystems. The flora and fauna that are specifically adapted to niches along rivers are often unable to survive along the edges of a reservoir. Also, dams are often built in remote areas which are the last refuges of wildlife already displaced by 'development'. These reservoirs also can cut off the migratory routes across valleys and along rivers. This can isolate populations of endangered animals and lead to inbreeding because of a smaller genetic pool.²⁰⁷ As yet no concluding study has been undertaken on the number of species that have become extinct due to their last habitat becoming flooded by reservoirs. Flooding will eradicate species evolved to live in the bottom of the valley, along riverbanks. Further, the vegetation that is initially flooded rots, facilitating algae growth in the reservoir and often blocks the dam's gates.

²⁰⁴ Eutrophication is excessive richness of nutrients, mostly from fertilizers, in a lake or other body of water, frequently due to run-off from the land, which causes a dense growth of plant life.

²⁰⁵ Doria, 1990, p. 161.

²⁰⁶ McCully, 1996, p. 32.

²⁰⁷ Ibid, p. 32.

Dams severely reduce natural flooding of the river, which isolates the river from its floodplains and reduces the amount of minerals and silt required to maintain river ecosystems. That said, as McCully (1996, p. 33) states, environmental effects of dams can benefit some species of marine life. However, they are often introduced species, not natives of the original ecosystem. For example, reservoirs are the perfect habitat for lake dwelling fish, fish that would not normally be found in a river. The warm water released from a reservoir can increase the abundance of species that fail to thrive in cool water. But because dams alter the conditions to which local species have adapted, the overall impact of a dam will reduce species diversity.²⁰⁸ The number of fish species that thrive in the uniform habitat of a reservoir is only a tiny fraction of those that have evolved in the diverse niches of a river. Because few areas have economically valuable fish adapted to the still waters of an artificial lake, fishery departments across the world have introduced only a handful of species into reservoirs, species that can be reared in hatcheries and support reservoir fisheries.²⁰⁹ These introduced species compete with native fish that persist in the reservoirs and also spread up and downstream of the dams. The Sardar Sarovar Dam is likely to eradicate the Narmadā *hilsa* fishery, one of the most productive left in India. Although the *hilsa* is not thought to migrate as far upstream as the Sardar Sarovar dam, the drastic reduction in the flow of the Narmadā due to diversions for irrigation would make its spawning migration impossible. McCully (1996) believes that the giant fresh-water prawn, another commercially important migratory species found in the Narmadā, will suffer a similar fate.²¹⁰ The Ukai

²⁰⁸ McCully, 1996, p. 33.

²⁰⁹ Ibid, p. 34

²¹⁰ Ibid, p. 49.

Dam (in western India) has already affected the other important hilsa fishery, in the estuary of the Tāpī River, just south of the Narmadā. The backers of the Sardar Sarovar dam claim they will mitigate the loss of the hilsa fishery by stocking the reservoir and ponds in the estuary with hatchery-bred fish, but fishery “...scientists have not been able to breed *hilsa* artificially yet. In fact the rearing of hilsa currently depends on obtaining spawn from wild adults, which would in all probability be eliminated by the desiccation of the river.”²¹¹

With the building of dams, previously inaccessible areas of forest become easier to access for logging. Rapid deforestation in the catchment area lead to increased soil erosion, landslides and flash floods, which have imperiled river valley projects. The water catchment area is cleared of vegetation, which leads to heavy erosion. As Doria (1990) states, “...heavy siltation and sedimentation deposits caused by the erosion of topsoil, diminishes the life expectancy of the dams, reservoirs and irrigation tanks. Large-scale deforestation for dams can lead to a subtle imbalance in the ecosystem. Forests have then been cut down to make room for those who must be rehabilitated, causing more destruction and loss of livelihood for those who survive in the forest.”²¹² Adivasi use the forest not only for firewood and a source for foraging, but also to grow crops. As they own little land in their villages, they must look to other areas to grow enough food to survive on. The forest is seen as public space and so they cut down a section, grow crops there for several years and then once the fertility of the soil drops, move on to another section of forest, allowing the forest to regenerate in the previous area. Unfortunately, with the restriction of forests due to

²¹¹ McCully, 1996, p. 51.

²¹² Doria, 1990, p. 26.

submergence and forestry, the Adivasis can no longer move from one plot of forest to another. They must continue to farm the plots of land they have already cleared, despite the ever-decreasing level of fertility.

As already noted, the damming of a river prevents precious silt and minerals from reaching further down stream. Dams and reservoirs trap most of the sediment, especially the heavy gravels, which in turn starves the river further downstream of its normal sediment load. McCully (1996) states that "...large reservoirs and dams without low-level outlets will typically trap more than 90%, and sometimes 100% of incoming sediment. Clear water below a dam is said to be 'hungry'; it will seek to recapture its sediment load by eroding the bed and banks of the river."²¹³ The sediment picked up by the 'hungry' river may be deposited further downstream, and erosion of the riverbed below the dam will result in raised riverbed levels downstream. McCully (1996) further notes that over time, all of the easily erodible material on the riverbed below the dam will be removed, and the bed will become 'armored' with rocks. Armored riverbeds below a dam do not have the gravels needed for the spawning of fish or for the habitat of benthic invertebrates. These benthic creatures are an important food source for fish and waterfowl. Riverbeds immediately below dams, are typically eroded by several meters within the first decade of the dam being built. This deepening of the riverbed also lowers the groundwater table along a river, causing a drop in the level of water in wells on the floodplains and threatening to dry out local vegetation. In a place like India, where most villages rely on wells for all their water needs, the lowering of the water table can be a life-threatening event. In the long run, the major impact on the downstream river channel will

²¹³ McCully, 1996, p. 33.

often be to make it deeper and narrower, turning wide-braided rivers with gravel bars, beaches and multiple channels into relatively straight single channels. Reduced channel capacity is especially likely where undammed tributaries wash their sediments into a regulated river, which no longer has the regular flood flows to dislodge the build up. Reducing a braided river into a single channel will also greatly diminish the diversity of plants and animals it can support. This in turn means that farmers who previously relied on the flooding of the river every year to fertilize their land now have to rely on industrial fertilizer which can decrease the fertility of the land through repetitive use.

This trapment of silt also diminishes the life span of the dam. The silt caught in the reservoirs limits the use of the turbines and there is a great economic cost to remove silt from reservoirs. The shortened life span of dams means that the public does not receive as many benefits for as long as they were promised and so the social cost of dams become even higher. The prime reason has been that the silt loads are calculated on collected data 50-60 years old, when there was very little catchment area destruction. Raising the dam height and increasing dead storage so as to guarantee the live storage for generation of power and irrigation can only ever be a short-term solution. Ultimately when the dam is silted there will be no control over irrigation and floods. Doria (1990) states that the result of this siltation is the reduced active life of the reservoir by 66-75% of the design life. The only positive approach to the problem is intensive soil conservation treatment of the catchment areas. Doria (1990) also believes that the drastic reduction in the life span of reservoirs built at huge public cost but

not envisioned in the planning stage, is indeed something that is unpardonable and must be accounted for.²¹⁴

West-flowing rivers like Narmadā and Tāpī do not form extensive deltas generated by the East-flowing rivers. Nonetheless, sediments from a huge river like Narmadā play an important part in the stability of Narmadā delta, its villages and ecosystems. A study by Gupta et al (2012) assessed daily water discharge and suspended sediment load data measured by CWC at two gauging stations, one upstream of the Sardar Sarovar dam (Rajghāt), and another downstream of the dam (Garudeshwar). Historical sediment discharge of Narmadā was calculated at 61 million tons, while the current sediment discharge (average of last ten years of the study) was found to be 3.23 million tons, indicating a reduction of 95% sediment discharge.²¹⁵ The presence of dams reduces 70–90% of coarse and approximately 50% of medium-sized particles on their way downstream, depositing them in the reservoir. Comparative studies of average suspended sediment loads at various locations on the Narmadā River for more than two decades, report an overall reduction in suspended sediment load in the river, specifically a 96% reduction in suspended silt flux in Sabarmati, 41% reduction in Tāpī and 68% in Mahi.²¹⁶

Patel was actively involved in the planning of the development of the lower Narmadā Valley, including the Sardar Sarovar Dam, the river-water disputes, attempts to reach an amicable settlement on the size and scope of the project, and the distribution of costs and benefits. He was also the chairman of the

²¹⁴ Doria, 1990, p. 133.

²¹⁵ Gupta et al, 2012, *The role of mega dams in reducing sediment fluxes: A case study of large Asian rivers*, Journal of Hydrology

²¹⁶ http://sandrp.in/Shrinking_and_sinking_delta_major_role_of_Dams_May_2014.pdf, retrieved June, 2014.

Sardar Sarovar Narmadā Nigam Ltd in 1990. In Fisher's *Toward Sustainable Development*,²¹⁷ Patel discusses the measures proposed by the planners of the Sardar Sarovar Dam to overcome the environmental problems caused by the project. To begin with, he suggests that the current Irrigation Act be amended drastically, so that each farmer in the proposed irrigation areas will be entitled to Narmadā water in proportion to the area of his or her landholding and quality of soil. He also suggests that "...automated regulation and water control in the canal distribution system with the help of computers and a well-designed communication system should be planned in order to sense and assess the water requirements of crops at various points during the seasons."²¹⁸

There has been a simultaneous implementation of an elaborate surface drainage network along with the canal distribution network for the dam, both designed to prevent salinity and waterlogging from occurring on a significant scale. The entire canal distribution system was lined with concrete or bricks in cement to prevent excessive seepage, along with the ground water tables and water quality being monitored on a regular basis. These measures are all intended to ensure that, at least in the area to be irrigated annually, there will be enough water available to bring crops to maturity. In addition to these measures, the government of Gujarat has offered attractive subsidies for the use of drip irrigation and sprinklers. This is hoped to help increase the irrigable area within the command area and the possibility of multiple cropping. Patel believes that a harmonious and rational combination of all the solutions proposed above will lead to optimum agricultural production. Water and land management by

²¹⁷ Chapter 3 of *Towards Sustainable Development*, pp. 71 – 88.

²¹⁸ Fisher, 1995, p. 85.

farmers, coupled with the support of necessary inputs will play a crucial role in the realization of the dam's proposed benefits.²¹⁹

The religious significance of the Narmadā has already been described. On certain days of the year, bathing in the Narmada is considered auspicious. On such days, thousands of people bathe in small stretches of the river in the span of a few hours, thus causing a shock organic pollution load. Four of the prominent bathing places on the river are at Jabalpur, Hoshangabad, Omkareshwar and Maheshwar. But it is considered that "...the pollution caused can, however, be mitigated and handled by better management and if necessary, by extra releases of water from the storage reservoirs."²²⁰ This has not been a problem in the past due to smaller population and greater water flow.

When a natural resource such as the Narmadā River is seen as sacred, it is not just the river that is viewed in this light. As discussed in Chapter Two, all along the banks of the Narmadā, the mountains where she originates and the surrounding forests are considered sacred or have numerous sacred spots in them. Therefore, dams do not only affect the flow of the river, but the whole watershed area. The destruction and submergence of great tracts of land caused by the building of dams along the river have further reaching impacts than might first be assumed. Pilgrimage has been identified as a great act of linkage; the circumambulation of the Narmadā links the entire Narmadā valley, and rituals of taking jars of water from the river across the land to other parts of India link the valley with the land beyond. In particular, the submergence of land and forests impact on the Adivasis, restricting their ability to provide for themselves and

²¹⁹ Fisher, 1995, p. 86.

²²⁰ Doria, 1990, p. 146.

their families. Deforestation decreases the soil's ability to retain water and increases the erosion of soil, which pollutes the waterways. The waterlogging and salinity of farmland caused by excessive irrigation puts even more pressure on the already limited resource of fertile land. The constriction of flow of water down the river negatively affects both fisheries and those who depend upon them. Thus, in order to understand the true social and cultural effects that dams and development have on societies, one needs to understand the full impact that development has on the catchment ecosystems.

Conclusion

This thesis began with an outline of key problems created by human population pressures on limited amounts of available freshwater worldwide and noting that this is increasing rapidly from continued population growth and individual/national aspirations for the perceived material benefits of development. Providing more water is seen as the best available means to meet the increasing demands. However, often in spite of the best intentions and the use of widely accepted tools to assess the likely impacts (such as Environmental Impact Assessment – EIA) water “development projects” cannot come without financial, environmental and societal costs. This thesis has employed as a case study the Narmadā River in India, in order to identify and analyze the rationale and approaches taken for development, as well as the costs that this development has incurred. Specific attention has been given to the analysis of the religious and cultural transformations and the impacts on minority indigenous groups; these aspects are frequently ignored or given little attention by other authors. The Narmadā River is one of the most sacred rivers in India and as such has a long and culturally significant history. References to the Narmadā can be found in many of the epic texts in Indian literature in Sanskrit, such as the Skanda, Vayu and Agni Purāṇas, but also in vernacular languages and oral traditions. The Narmadā is culturally significant to all Hindus but is also important to the Adivasis who live in the Narmadā Valley. While the Adivasis do not worship the river as the Hindus do, she is still included in their origin myths.

This is no ordinary river; she is seen as a deity, a mother to her devotees, a provider of liberation and a cleanser of sin.

In the 1940s, plans were proposed to develop this sacred river. Although over 3000 dams were originally proposed, only a handful of these have been completed. The construction of these dams was rigorously protested against by the people who live in the Narmadā Valley, and by national and global environmental groups. Protests continue till this day for the thousands of people that have been and will be displaced. The agents of the development program have refused to adequately include any of the people who lived in the valley in any of the planning stages.

The environmental effects that the dams have had on the Narmadā Valley have been disastrous. Deforestation has led to topsoil degeneration and desertification. Reservoirs have adversely affected fisheries as well as changing seismicity for the area. Mass irrigation in surrounding water-short catchments has led to water logging and salinity of soil. The detrimental effects of damming in general were discussed at length in chapter 6 and the Narmadā Valley is no exception.

The first conclusion that is drawn in this thesis is that the current governance and development approaches in India are clearly failing to achieve their stated goals of Sustainable Development. There are clear signs for a turbulent future if current practice and processes are left unaltered. The continuous protests against large-scale 'development' projects reflect a growing global disillusionment with the shortfalls in supposed benefits and perverse outcomes, such as species extinction, wider environmental degradation and compromise of societal wellbeing. For example, Baviskar (1997) discusses at length the protests

that the tribal populations of the Narmadā Valley have conducted over several decades against the development projects.

Following from the first conclusion above, that the status quo needs to change, the second conclusion drawn in this thesis concerns how this change should be approached. A reform involving those affected and addressing their concerns with effective, understandable information is suggested as a first, urgently necessary step. Somehow, “the ways of the past” have been forgotten as we move along the path to “the ways of the future”. An important signal of inadequacy in the current system is the growing incidence and severity of water conflicts—between states, between cities and farmers, between industry and villagers, between farmers and the environment, and within irrigated areas. The state has generally responded by proposing new supply schemes (a new dam, a desalination plant, or a rainwater harvesting scheme) that will ‘solve the supply problem’. What is becoming increasingly apparent is that in the growing number of areas where water is already scarce, it is a no gain game. These schemes increasingly solve one person’s problem at the expense of someone else ‘downstream’. The public water sector needs to form partnerships with affected communities for the participatory management of rivers. Any such partnership will have to recognize the river’s spiritual and religious importance, as these have been present for millennia and underpin virtually all aspects of societal life in the valley.

The inclusion of indigenous populations is a must in any future development scheme. Indigenous people know their environment, they have lived there for many generations with knowledge of the environment and what is needed in order to not only survive but also thrive. They know which areas flood the most;

the soil types and what grows best, along with which cultivation methods work. If the Adivasis and other locals had been included in the discussion on how to develop the Narmadā Valley, problems with waterlogging and salinity need not have occurred. These large-scale development programs need to be transparent in their planning stages. Those who live in the proposed development zones need to be informed about and included in, the planning process. For centuries, the Adivasis have managed live in harmony with their natural environment within its earning capacity. They have preserved life-sustaining resources of land, air, water, and wildlife. Instead of interfering with and thus destroying the tribal way of life in the name of development, we could learn from their techniques of proven efficiency in preservation and restoration of the natural habitats. The principles underlying their techniques could be observed, assessed and incorporated in environmental science and frequently are key in this area. The tribes of indigenous populations had a perception and knowledge of the natural environment and they knew how to preserve it for the benefit of future generations. The land was sacred and air precious to them and beasts were treated with reverence. For they believed that what ever befalls the earth befalls humanity too and “...if the natural environment is degraded, human existence is bound to deteriorate.”²²¹ The cosmologies of most indigenous traditions embrace an environmental ethic of sustainability, reverence, and respect for water and nature in general. In addition, indigenous traditions have lived in a close relationship with nature. But “...most importantly, indigenous cultures have rituals of reciprocity and respect for nature that enable them to leave a relatively small environmental impact. Indigenous traditions can provide

²²¹ Doria, 1990, p. 174.

important moral wisdom for our approaches to water in the twenty-first century.”²²²

Along with the inclusion of indigenous people in the planning of development, the re-sanctification of nature is also paramount if we hope to curb the destruction of our natural resources. Rekindling the sense of the “...sanctity of water is one way to facilitate the escalation of debate on water cooperation to higher levels and thus impact the capacity to reach cooperation and to manage conflict.”²²³ There has been little written about the effect that development projects such as dams have had on the sacred nature of rivers. It is imperative that the sanctity of these places be taken into consideration when planning large-scale development. These areas are not just homes being destroyed but a way of life and a system of beliefs. For the small tribal communities that live in remote locations, it is all they know and their entire world revolves around these specific locations and environmental formations. To be removed from these areas and to watch them being destroyed in the name of progress and development can devastate their sense of identity. The transformation of a traditional pilgrimage, such as the circumambulation of the Narmada, seeped in history to fit into a modern transnational economy-orientated world order is something that needs to be documented on a greater scale. It is this phenomenon of adaptation that can lead humanity back to including their cultural heritage in a new world order, instead of simply extinguishing it. This is the key difference between the re-sanctification of nature and ‘Sustainable Development’. While Sustainable Development may answer the need for reform on the use of resources, it does

²²² Chamberlain, 2008, p. 159.

²²³ Priscoli, J. D., 2012. *Reflections on the nexus of politics, ethics, religion and contemporary water resources decisions*, p. 33.

not help the indigenous populations with their loss of culture, nor does it help the need for the sacred in modern subjects. Although, in the case of the Narmadā River, there is a plan in place to move some of the more important sacred sites, they cannot replace the original site. It is not just the physical building of a shrine or temple that makes a place sacred, but the area it is in and the history of that location. It is the worn pathways made from thousands of feet that bring a sense of devotion and the knowledge that many others have walked the same route before. This kind of feeling cannot be simply moved from one spot to another. There is a loss of heritage when original sacred sites are also lost.

The development of a new water 'ethos' and a new water ethic lies in part in restoring water to a central place in the world's religions and in our spiritual consciousness. In relation to our fundamental interchange with the water world in which we dwell, such a spiritual awareness can provide the meaning and motivation to work for changes that purify our waters and our consciousness. A new heedfulness would recall and recast the ancient respect for and intimacy with water – whether as divine in itself; as an essential manifestation of the divine in the world; as a basic part of the created; or as an aesthetic mode of appreciation, value, and respect for the entire natural world so dependent on water. If there is no water, there is no nature to appreciate. Such a new consciousness demands a break with the tenacious hold of technological, large-scale approaches to water issues and a breakthrough to more communitarian, people-based, local movements based on valuing, respecting, even revering the water of earth. For most traditional societies, "...water has a profound meaning, whether as divine in itself or as a manifestation of the divine. In such a context abuse of water in any form is an abuse of the divine. This character of water is

rooted in texts, stories and rituals, such as in the case of the Narmadā, in which water is believed to purify inner stains just as it cleanses outer stains.”²²⁴

In this thesis, I have demonstrated the increasing tension and its origins between ‘modern’ development and traditional culture. In the case of the Narmadā River, ‘modern’ development means one of the largest water projects in the world. But to those who live along her banks, this river is not just any river. She is the center of their universe; she is their mother and provider. I have shown that the damming of her has caused not only ecological harm to the area, but cultural harm as well. The reservoirs caused by the dams have flooded many shrines and temples, as well as obscuring the original pathway of the *Narmadāparikramā*. This eternal river, which has flowed through many *kalpas*, is now being completely changed. Even her flow, which is important to her sacredness, has been altered. The traditional view of the river as a deity is being lost within the ‘modern’ view on resources. The abuse of resources will only increase if we continue to view the world as a pantry full of resources for humanity to consume at will. A return to more traditional thought patterns concerning the environment will help slow the thoughtless consumption and perhaps conserve resources for future generations. One thing is certain, we cannot continue down the path we are on today. Resources such as potable water are fast losing the ability to keep up with demand. ‘Modern’ development has enabled the human population to increase exponentially but it has also put incredible strain on the resources humans rely on the most to survive. Damming rivers has been the answer to the increasing need for water. However, as I have reported particularly in Chapters Five and Six, dams have resulted in more

²²⁴ Chamberlain, 2008, p. 171.

problems than they were intended to solve. Religion and the sanctity of natural phenomenon have played a large part in the development of humanity. It is the respect and care that comes from this sacredness that we must return to in order to continue to survive on this planet. After all, there is a reason why these traditional societies have survived for so long.

So where to from here? I have suggested that a change in attitude towards resources needs to occur. Other scholars have suggested alternatives to large development programs as well. Chamberlain (2008) states that there must be a necessary and critical shift from water supply to water management, greater emphasis upon local participation, democratic decision making processes, increased involvement of women, and an emphasis upon whole water ecosystems as 'socio-eco-hydrological systems'.²²⁵ He believes that there is now a demand for low-cost, practical technologies centered on communities of people participating in transparent decision-making and management for sustainability. Goldsmith proposes small-scale water collection programs, such as cloud seeding²²⁶, dew collecting²²⁷ and fog harvesting²²⁸. A return to more traditional methods of water use is also called for. For example, rainwater harvesting in India fell out of use during the British colonization but it is now being revived throughout the country.²²⁹

²²⁵ Chamberlain, 2008, p. 178.

²²⁶ Cloud seeding is a process of stimulating clouds to produce rain. Chamberlain, 2008, p. 181.

²²⁷ In the Negev Desert, fog-drip irrigation is used for small-scale agriculture. In England dewponds are being revived. The ponds are dug on a hilltop with a waterproof lining so the water cannot escape. Chamberlain, 2008, p. 181.

²²⁸ Fog harvesting involves large plastic sheets of mesh that are erected to capture moisture from fog. The tiny droplets accumulate on the mesh to form large drops that run into a trough. Such a device provides 4,000 gallons of water a day for the small town of Chungungo in Chile. Chamberlain, 2008, p. 181.

²²⁹ Chamberlain (2008) gives examples of villages around India that have successfully reintroduced rainwater harvesting. Pp. 182 – 183.

Postel (2003) believes that the key to the global water crisis is sound water management and she suggests several features of management principles in a new water ethos. She states that "...first, humans must adapt more fully into nature's cycles and rhythms, such as restoring free-flowing rivers and adjusting to droughts rather than attempting to control the flow. Second, by reducing population and consumption, we can reduce the pressure on freshwater systems. In addition we must increase water productivity by utilizing drip irrigation, planting water tolerant crops and replacing water-thirsty ones, shifting from animal to vegetable protein in diets, and challenging the privatizations of water in the name of the common good. Finally, in water decisions managers must act as water stewards, not owners, and fully utilize a precautionary principle."²³⁰ This ethic of stewardship ultimately is about respecting the beauty and mystery of the natural world we did not create and cannot fully understand.²³¹

²³⁰ Postel and Richter, 2003. *Rivers for Life*, pp. 202 – 204

²³¹ Edward Goldsmith and Nicholas Hildyard (1984), in their book *The Social and Environmental Effects of Large Dams, vol. 1*, believe that a return to traditional forms of irrigation will help. One of the most striking features of traditional irrigation systems are that they operate on a very small scale. By contrast, most modern irrigation schemes cover large areas of land and are geared towards maximum production. In that respect, it is hardly surprising that their ecological and cultural impact is greater than that of traditional systems. For this reason alone, Goldsmith and Hildyard believe that dams should be as small as possible. They discuss traditional forms of irrigation as a solution at length in chapters 25 and 26.

Other scholars are discussing the topic of large-scale development projects and the problems they occur at length. However, most of these concentrate on the environmental and societal effects the projects. It is rare that the cultural and religious impacts are mentioned more than in passing. It was the aim of this thesis to show that there is a need for the religious and cultural aspects of natural resources to be discussed when planning on development.

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