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Water as a Productive Resource: Governance for Equity and Poverty Reduction

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Introduction: the broad picture

This paper is a background contribution to the 2006 Human Development Report on Water. It has been developed by a group of contributors, and builds on their practical and theoretical experience in different countries.

The lead author acknowledges the limitations of this first draft, but is keenly awaiting feedback on which to towards a better second draft as soon as possible.

Water, livelihoods and production—global-local challenges

Global challenges of water and production are essentially solved locally. There is no global solution to problems of water availability for production. This report charts some of the local issues involved and makes the case for a local-level view of the global challenge.

What is that challenge? Water is not an abundant resource. Three-quarters of global freshwater is trapped in ice sheets and glaciers; less than 1% flows freely on the surface; and some 20% is stored underground. In most parts of the world, distribution of flows and available sub-surface water is highly uneven. With these figures come concerns about scarcity. The global community is fixated by per capita availability on which it determines simple figures for scarcity.

Commonly, annual per capita availability of less than 1,600 m³ is used to indicate ‘water stress’; below 1,000 m³ water becomes ‘scarce’. However, embedded in these notions are complex assumptions. This amount includes domestic uses and water for food production, when in fact few countries in the world are actually food self-sufficient. Such figures produce broad-brush comparisons, but tell us little about the actual water-food relationship at a national level. They tell us even less about issues of water access. High per capita availability does not mean high per capita access, necessarily. The governance of the resource is therefore crucial: what systems prevent or provide for access? How are rights regimes significant? What role does power play? And how can equity be established in complex environments of entitlements?

According to figures of the UN Food and Agriculture Organisation (FAO), some 800 million people remain chronically malnourished worldwide and the gap between production and market demand for cereals is anticipated to increase to 27 million tonnes by 2020. A report produced for the Second World Water Forum in The Hague (March 2000) by the International Water Management Institute (IWMI) concluded that, by 2025, 33% of the world population, or two billion people (based on UN medium term population growth predictions), would be living in countries or regions with huge water deficits; all countries in the Middle East and North Africa (MENA) by 2025 would be experiencing absolute water scarcity. The report stressed that regions and countries would need to supplement food requirements ‘from other sources’. IWMI views the problem in terms of future water needs and predicts that, by 2025, an additional 22% of primary water, mainly for irrigation, will be needed to meet global food requirements. The International Food Policy Research Institute (IFPRI) is more pessimistic, foreseeing a doubling of food imports over the next 20 years in many countries.

At a household level, per capita availability is relatively meaningless as a concept. The daily struggle to *access* water is a constant drain on resources and assets—including human, physical, social, financial and sometimes political capital. Of the 1.2 billion people who lack access to

water, the externalities and public bads that result are never part of global calculation, though are likely to be substantial. By a simple calculation, if improved access generated a net income gain per person, *per year* of \$4 that would be generating nearly \$5bn, or about half the UK's annual overseas aid budget. Clearly understanding how the household water economy works and the kinds of links to pro-poor growth strategies is crucial to understanding the water-food production links.

One of the more persuasive arguments in recent years is the notion of 'adaptive capacity'. This term, coined by Ohlsson (1999), is applied at a large-scale to states and regions that are water scarce (first order scarcity). If they lack 'adaptive capacity' they are said to be suffering from second order scarcity as well. The idea is that a particular set of social capacities will enable alternatives to be arrived at rather than relying on simple resource availability. Hence, the concept is tied to the broader debates on food production and trade and concepts such as 'virtual water' (see Allan, 1999). The idea of adaptability is not new, but it is useful to keep in mind when looking at issues of governance, poverty and equitable access to water. In many cases in the country studies below, it is precisely the lack of adaptive capacity that matters most when resources fail.

A fugitive resource—temporal and spatial issues

Increasingly the World Bank and others are 'bringing the infrastructure' back in. This means an increasing focus on supply capture and delivery. Justifications range from the need to avoid countries being 'hostage to hydrology' to the need to develop multipurpose projects that provide a suite of benefits to be shared across borders. The notion that water capture and delivery is critical to growth and economic success in many countries, particularly in sub-Saharan Africa, is strong.

The effect of spatial and temporal variability goes beyond simple changes to food production—though these are considerable. Over the last three decades, meteorological droughts in Southern Africa have been of major significance, both economically *and* politically. In South Africa, the last major drought occurred just prior to the democratisation process and 'policy space' was opened up enabling radical rethinking of water management priorities, including the development of a strategic reserve (Turton, 1999). In Zimbabwe, the drought experience revealed both the vulnerability of a national economy to rainfall variability, but also the importance of local action in mitigating impact.

The 1992 drought affected 40% of Zimbabwe's population and caused GNP to fall by some 12%. Sale of livestock led to the slaughter of 600,000 cattle, which provided last-resort cash income for households where crop production had ceased. Annual maize production dropped from an average of three tonnes in 1991 to less than half a tonne in 1992. Of particular significance were responses by individual households to ensuring water for domestic and productive uses. Individual water points—particularly upgraded family wells—continued to provide supplies right through the drought in many areas, with fewer than 10% of such wells failing, against a national failure rate of 40%. In the Middle East too—already extremely arid—droughts can be 'emblematic events' as well. Feitelson (1998) describes how the Israeli policy process, for example, was largely facilitated by the decreasing importance of agriculture to the economy. By 1980, the sector contributed a mere 3% to GDP. Following the droughts of 1990/91, however, this reduced significance enabled the pricing of water to be used as a demand management instrument.

Africa is a particular focus of climate change concern, because variability is already such a distinct feature. Though central, east and West Africa have some of the largest, most significant

watercourses and natural storage reservoirs in the world, major parts of the northern and southern regions suffer from acute water stress. A total of 14 out of 53 countries in Africa are defined as water scarce, and a further 11 will face water stress by 2025 (Shiklomanov and Rodda 2003). Even within a region such as southern Africa, water resources are highly unevenly distributed in both time and space. Rainfall patterns are dominated by the influence of the Indian Ocean, and most water is received during a five- to seven-month wet season.

In a country such as South Africa there are particular regional extremes with a marked north-south trend in annual rainfall combined with an easterly shift from the wet Indian Ocean coastline (where there is 800mm annual precipitation—some 80% falling between October and March) to almost nothing in the Namib Desert in the west (Calow, et al, 1996, 10). As a result the river systems of southern Africa are heavily seasonal in flow, affecting issues of abstraction, quality and management arrangement within river basin catchment.

How do households respond to variability? At the local level, the provision of ‘small water’ to households from groundwater is estimated to provide some 60% of the rural and urban water supply for communities in southern Africa. In an arid country such as Botswana, 80% of animals and humans rely on this resource alone (Chenje, M. and Johnson, P. (eds) 1996; 41). Groundwater is frequently accessible from shallow, hand-dug wells and other small tube wells, which, in time of drought, can provide a ‘last resort’ supply—even if other natural assets have been reduced to a bare minimum in order to cope with drought shocks (for instance the sale of livestock). In southern Africa, as in South Asia and other regions of the world, the variability of this resource is being affected by significant over-pumping. Combined with the relative paucity of data on the resource itself this has major implications for long-term management and the capacity of users to guarantee supplies to meet present and future production needs.

One of the chief problems of groundwater development is the uncontrolled abstraction from deep wells, caused mainly by the rapid development of irrigation from tubewells. Rapid aquifer drawdown reduces available shallow groundwater, particularly at a local level (Calow, et al, 1996). At a time when there is extreme lack of availability access to the resource may fail. This, rather than depletion, may be a major cause of ‘groundwater droughts’. A report on the 1992 drought experience in southern Africa states that, "the failure of wells and boreholes during drought is a function of both increased demand on low-yielding sources and reduced recharge to the aquifer". The report suggests that "Identifying hydro-geological zones that have low permeability, wells and boreholes that are low-yielding and areas of high demand might therefore help to identify areas which are vulnerable to groundwater drought" (Calow, et al, 1996, 4).

This argument is that even though there may be variability in rainfall and water availability (a ‘meteorological drought’), the impact can be multiplied considerably by factors leading to a ‘social drought’, including failures in management structures, the breakdown of systems of supply (including various forms of pumping technology) and the increasing competition and control over access by more powerful groups. Waterkeyn notes that the well-deepening initiative taken by families in Zimbabwe in 1992 as the water table sank, combined with careful rationing of water use (such as giving up vegetable plots), and was a key local reaction to variability. At the same time more than 75% of communal sources failed, and were only rehabilitated when assistance was made available by outside agencies (Waterkeyn, 1998).

In many regions there is growing competition for groundwater by sectors and between individuals. In South Asia and parts of Africa (what might be termed ‘vertical competition’ for access) challenges local institutions of management, frequently established at the user level. Other forms of conflict concern ‘horizontal access’ (i.e. along water courses). Given this range of

management challenges in Africa and elsewhere, occasioned by low levels of infrastructure investment, weak institutional environments and complex linkages between poverty and changing resource access, the challenges of overcoming intra-regional inequalities in use and withdrawals and the complexity of 'social' scarcity are immense. Ensuring that water is available for productive uses becomes a highly politicised process.

Water for production: key asset for the poor in different countries

Sri Lanka

Traditions to Reforms, Core issues in Transformation^a

Irrigation has formed the basis for human settlement and development in Sri Lanka for centuries. It is centred on the operation and maintenance of small (minor) tanks (reservoirs). Irrigation management provided for self sufficiency in rice production and the many small tanks (< 80ha) and fewer major tanks (> 80 ha) catered for irrigation needs without much competition from other water use sectors.

Minor tanks supplemented highly variable monsoon rains and provided water for a more limited crop during dry period. These schemes represented a third (460,000acres) of the irrigated area and were constructed by the proprietors, managed by the community through a system of customary laws and practices. Major tanks on the other hand stored water from larger catchments and were adequate to cultivate two crops of paddy.

The small tank system in Sri Lanka, approximately 15,000^b in number is distributed mainly in the dry zone. These tanks have provided adequate water security for the communities supplying enough irrigation water for a *maha* (wet season) paddy crop, as well as water for environment, cattle and domestic needs. Early rulers (kings and chieftains) recognized the benefit of these tanks and managed them through a system of *Rajakariya* (ancient custom of compulsory labour). Adherence to these systems over many generations resulted in the birth of customs and traditions, some of which were at odds with colonial administration under the British. The compulsory personal labour obligation (*rajakariya*), for instance, whilst helping to guarantee the maintenance of small tanks over hundreds of years, was abolished by the British who claimed that it amounted to a form of slavery. Without any substitute for *rajakariya*, maintenance was no longer enforced and many minor tanks fell into disrepair. Further neglect by the post-Independence State, continued to deny the rights of communities' access to water for livelihoods and for cattle at a time when communities were not empowered to demand their rights. Although in the 19th century, some British renovation works of major tanks had taken place, these were essentially to improve rice production in order to offset heavy expenditure on food imports.

After independence, issue of food self sufficiency became a central concern. The initial strategy for increase food production came through new land with irrigation facilities and development of the Mahaweli scheme became a national example^c. Though operation and maintenance of minor irrigation remained satisfactory, productivity of these schemes was low. From an early stage, it

^a Case study provided by Rajindra Ariyabandu.

^b Panabokke, C.R. Shakhivadivel R. and Weerasinghe A.D. (2002). Small tanks in Sri Lanka: Evolution, Present status and issues

^c Mahaweli basin covers an area of over 10,325sq. km. Total extent of land developed for agriculture is around 326,000 ha of which 126,438 are irrigable land. Total number of settler families are 130,000. Mahaweli is the first large scale multi purpose project which provided 35% -50% of the total annual energy demand of the country during 1995 -2000.

was realised that unless productivity of smallholder land units could be increased, widespread subsistence and poverty would be inevitable. Increased productivity could only come from increased cropping intensity through better water management, timely input delivery and improved seed varieties.

The Government made enacted legislation and issued ordinances to improve input delivery, but this was stymied by centralized input delivery control between a number of agencies that failed to achieve anything like the desired coordination. The implementation of special projects for input coordination and even the *kanna* meetings (seasonal cultivation meeting) failed to provide the necessary inputs on time, which failed to provide the necessary production improvements. A particular problem in these initiatives was the inadequate farmer participation and institutionalization of efforts.

By 1980, the irrigated area in the country had expanded to more than 500,000 ha, largely through new irrigation facilities provided through state investments. However, expansion failed to prompt the anticipated production and economic development of rural areas, especially in the dry zone settlements where the poor were mainly concentrated. Though rehabilitation was necessary for irrigation system improvement, sustainability of improvements was required to boost system performance. This could only be achieved by improving the institutional development and increasing the participation of farmers in decision making.

Initial institutional efforts were part of donor-supported irrigation projects. The Tank Irrigation Rehabilitation Project (TIRP) funded by the World Bank was the first such project attempting to increase productivity through irrigation rehabilitation and system improvement. However, efforts to involve farmers in committees for project planning and implementation were based on an inadequate understanding of farmer needs and constraints leading to unsatisfactory results. Subsequently, the World Bank-supported Village Irrigation Rehabilitation project (VIRP), which rehabilitated 1,200 minor schemes, adopted an institutional mechanism for farmer participation, creating an informal tank committee system consisting of farmer representatives and government officers who were expected to work with the Agricultural Planning Team (APT) to formulate and implement water management plans for rehabilitation projects. These committees were only a forum for farmer participation, however, and proved ineffective in improving productivity or the livelihoods of farmers^d.

These efforts indicated the significance in mainstreaming farmer participation within decision-making processes; in effect mirroring the situation that had existed prior to British colonial control when minor tanks had been managed by the users with minimum support from the state. Two challenges faced the government: to improve productivity of the land and water based and to empower farmers to be equal partners in development, bringing the poor and marginalized farming communities into the process of development.

Two models were followed: Firstly, implemented by the Agrarian Research and Training Institution (ARTI), a semi-government body, the concept of an 'outside catalyst' in the form of trained Institutional Organizers (IOs) to organize farmers and promote participation; second a model introduced by a senior Irrigation officer introduce an NGO as catalyst. Both emphasized the importance of an institutional structure under which farmers were organized at different levels of the irrigation scheme and were able to voice concerns and exercise rights to water and other inputs to improve productivity and livelihoods. The IO model was later accepted as policy in participatory irrigation development and management and significantly changed the power

^d Irrigation Management Policy Support Activity (IMPSA), Completion Report. 1992.

relationships between the irrigation authority and farmers. The success of these experiences focused the government on policy initiatives that would change future management of major irrigation leading to improved O&M to ensure more reliable, adequate and equitable water distribution and delivery, better coordination of critical inputs to provide higher production in agriculture and increased farmer participation in management decision making through more viable institutions^e.

In 1983, the Ministry of Lands and Land Development (MLLD) instituted a programme for Integrated Management of Major Irrigation Schemes (INMAS), across 35 irrigation schemes over 2,000 acres in size. This initiated the concept of introducing a Project Manager for each scheme for input coordination, improved water management and establishment of viable farmer organizations. INMAS was managed by the newly-established Irrigation Management Division (IMD) at MLLD, staffed by a multidisciplinary team. INMAS received policy guidance from a high level Central Coordination Committee established to oversee the implementation and was implemented through a series of committees, established to offer farmers a role in decision making. The project level committee which oversees activities consists of field staff of all agencies involved in agriculture production and farmer representatives from farmer organizations. This forum helped to determine the seasonal agricultural programme, distribution of irrigation water and operation and maintenance and later supported the decision taken at the *kanna* meetings^f.

These developments encouraged the formulation of the Participatory Irrigation Management Policy, though its exact nature was confused through being scattered between different pieces of legislation. In 1984, the government introduced collection of “irrigation service fees” to improve financing of operation and maintenance in order to promote system sustainability^g. Whilst collection of fees (Rs 100/acre) was successful at the beginning, it soon tailed off through lack of proper procedure, unfulfilled farmer requests and political unrest in the country^h. In 1998, the Government adopted a formal “Participatory Irrigation Management Policy” under which operation and maintenance of field and distributary canals in major irrigation became the responsibility of farmer organizations. In turn farmers were exempted from paying irrigation service fees and Government retained responsibility for operation and maintenance of head-works and the main system. This policy had attempted to achieve the dual goal of improved productivity through farmer management and less financial pressure on the government through increased cost sharing with water users.

Irrigation Investments

Since the early 1990s farmer participation in irrigation management has become a key component in irrigation rehabilitation due both to the increased emphasis on participatory irrigation management and an overall decline in irrigation investments. Farmer Organizations (FOs) were expected to enter into agreement to share operation and maintenance costs with state irrigation agencies. Investments in Irrigation peaked between the 1980s and 1990s particularly with the development of the Mahaweli multipurpose project in mid 1980s. Since then local and foreign

^e Ibid (1992)

^f Meeting of proprietors and government agency staff dealing with agriculture and irrigation in the district. The meeting is chaired by the District Secretary. All decisions pertaining to agriculture production in a scheme is decided at this meeting prior to every season

^g IIMI/HARTI (1997). Monitoring and Evaluation of Participatory Irrigation System Management Policy

^h Ibid (1997)

investments have declined and by the 1990s had become just one seventh of the 1983 figureⁱ. One major reason for the decline in investments during the 1990s was the war in the north and east with the Government budget increasingly spent on the war conflict. For instant construction of Mahaweli ‘System A’ and the Madura Oya Right Bank project were discontinued due the war. The heavy decline in new irrigation investment was partially offset by a marginal increase in rehabilitation such that by the mid 1990s government investments in rehabilitation had increased to about 50% of public investment in irrigation. With increases in public investment in rehabilitation and near constant investment in operation and maintenance, improvements in irrigation system performance and agriculture productivity depended heavily on effective participation of farmers in irrigation system management.

The Participatory Irrigation Management Policy of 1998 clearly defined the responsibilities with respect to “joint management”^j and “irrigation management turn over”. Farmer organizations (FOs) in major irrigation systems were expected to take over operation and maintenance of field and distributary canals while in minor irrigation the total system was to be taken over by farmer organizations after rehabilitation. The turnover of systems to FOs had mixed results^k in major irrigation systems, it empowered FOs as local irrigation institutions. Enhanced through a series of committees, training and capacity building, legislative support improved the ‘social capital’ of farmers and FOs. An countrywide survey conducted by IWMI/HARTI in 1997 revealed that 43% of FOs under the INMAS scheme had taken over irrigation systems for joint management while progress in minor schemes had not been as encouraging.

Reaching the poor

In spite of government efforts to maintain equity in water distribution in irrigation schemes, inequitable water distribution and input delivery were evident in many schemes. This was more prominent in minor irrigation schemes and in tail-end areas of the major irrigation schemes. Inequitable input delivery, particularly of water was due to structural inadequacies in the irrigation system, inadequate operation and maintenance, lack of investment and political interference. While major irrigation schemes are generally better managed by the Irrigation Department and its proprietors, minor irrigation, due to location and sheer number, are left to water users to manage with minimal support from the Department of Agrarian Services. Minor tanks therefore, have been subject to faster deterioration and neglect.

Coupled with increasing fragmentation of land due to land scarcity^l, this situation has decreased the average holding size from 1.98 acres in 1982 to 1.16 acres by 2002^m. 50%-60% minor

ⁱ Kikuchi, M, Barker, R, Weligamage P, and Samad M. 2002, Irrigation sector in Sri Lanka, Recent Investment trends and the Development Path Ahead. Research Report #62, IWMI Colombo

^j Where major irrigation systems were managed jointly by the irrigation agency and FOs. However, both institutions have demarcated their own area of responsibility. Government continues to allocate O&M funds on a pro rata basis to FOs but it is usually inadequate for complete operation and maintenance. Hence FOs are expected to actively contribute labour and cash.

^k Irrigation agency benefited in terms of reduce cost for O&M, less demand on labour, improved administration due to fewer complaints. Farmers, had ownership of the canal system, better distribution of water and less head-tail water conflicts. However, investments for system improvement did not show a significant difference as there was no greater deterioration in non -turned over canals. Implying, turn over alone can't prevent irrigation system deterioration.

^l At present per capita arable land is about 0.15 ha while in 1870, per capita arable land was 2.7ha. with a population of approximately 2.7 million.

^m Institute of Policy Studies, 2005. Sri Lanka, State of the Economy 2005

irrigation schemesⁿ located in the dry zone cultivates less than 15 acres of land. A majority of small holders are located under minor^o irrigation and rain-fed cultivation areas, remotely located with minimal infrastructure facilities. Most land under minor irrigation cultivates only one wet season crop, with dry season cultivation not possible due to lack of water. Often the wet season paddy crop is damaged because of lack of water for the last two water rotations, thus availability of water even in the wet season becomes a crucial factor under minor irrigation systems. These uncertainties cause income from agriculture under minor schemes to be limited to about 15% of the total household income^p. The major share of income comes from wages and salaries (40%), non agriculture income (16%) and other income sources (29%).

State intervention in minor irrigation schemes are limited to maintenance carried out by Department of Agrarian Services. Due to nature, size and high land fragmentation state has not given adequate priority to development of minor irrigation schemes as opposed to major irrigation. Investing in major irrigation has political advantages too. Being settlement schemes with high state ownership of land, governments of the day has the freedom to allocate lands to people of their choice.. Returns to investments too are high for major irrigation as opposed to minor irrigation. However, successive governments in Sri Lanka have supported poor in minor irrigation schemes through welfare oriented programmes, low interest loans and subsidies

In order to address this situation and improve farmer income, the Government introduced in 1986 conjunctive use of water through 'open dug wells', commonly known as the "Agro-Well programme". Purpose of the agro well programme was to resolve the problem of water shortages during the 'dry' season and supplement irrigation during 'wet season'.^q Lack of irrigation resulted in low farmer income, under employment and discontentment among farmers. The programme offered a subsidy for the provision of agro-wells and was implemented by the Agricultural Development Authority (ADA) under the ministry of Agriculture. The Government subsidy was Rs.15,000^r (1990 prices), or approximately a third of the total cost of a standard agro well. Studies conducted in early 1990s indicated that farmer contributions to agro-well construction in cash, material and labour varied from 16-78%^s. High farmer contribution was attributed to staggered construction due to non availability of readily disposable cash and progressive deepening of wells depending on water demand for crops.^t Most wells were constructed in minor tank command areas in order to capture seepage. These wells provided poor farmers in the dry zone, especially under minor tanks, an assured supply of water during the dry season, which allowed for increased cropping intensity and productivity. Some studies^u indicate that all beneficiaries of agro-wells cultivated dry season cash crops (including Chillies and Onions), when previously land had been left fallow. Those who had cultivated with Sesame and Blackgram prior to the programme diversified to chillies and onions with high returns to

ⁿ Country has approximately 15,000 minor tank with largest concentration in the dry zone. Research suggests that of the total 15,000 minor tanks, approximately, 7,600 are operating and 7,700 are abandoned

^o Minor Irrigation cultivates less than 80 ha while major irrigation cultivate more than 80 ha.

^p Ibid, 2005

^q In Anuradhapura district alone (largest concentration of agro wells) cultivable land extent under irrigation has declined by 43% during the period from 1978 -1988, decline under minor irrigation during the same period is 47%. Main reason for decline is attributed to lack of irrigation water

^r Considered to be 50% of the total cost, determined by ADA on total grants available from State. Later it was found that the subsidy was far below 50% of actual cost of construction. This followed the policy of the government in transferring ownership to farmers through beneficiary contributions.

^s Ariyabandu R. de S and Somaratne W.G. 1994. Impact assessment of the Anuradhapura Agro well programme, ARTI

^t In response to this situation ADA recommended an increase in subsidy to cover 60%-65% of total Government only increased the subsidy by Rs5000 in 1992

^u ibid

investment; increase income due to crop diversification has been between 3-10 times. The secure water supply through agro wells has increased labour output per farmers by almost 100% (family and hired labour). Hence, labour productivity has increased in terms of cash income and idle labour has decreased. The success of the agro-well programme is evident in its expansion. The programme started in 1986 with a target of 11,000 wells by 1995, had grown to 25,000 wells by 2000. Surveys conducted in year 2000 indicated that almost 50% of agro wells were privately owned, built without any subsidy either from State or other sources. This is an indication of success of the programme. Though farming with an agro well is limited to less than 1.5 acres during the dry season, returns to investments in high due to availability of water year round.

Water Pump Rental markets

Large scale diffusion of groundwater use for agriculture took place at the same time in other South Asian countries like India and Bangladesh. A feature of ground water diffusion in India and Bangladesh was the evolution of water markets, through which water was sold to farmers who did not own agro-wells and pumps. In Sri Lanka, in spite of the rapid growth in agro wells there was no evidence of developing water markets. This can be attributed to the low capacity of wells and pumps used in Sri Lanka, usually irrigating an area of just 0.2-0.8 ha of land in the dry season. Once a pumping cycle is over there is hardly any water left for sale. However, there is an established pump rental market in the dry zone, given that some 30% of the agro-well farmers do not own water pumps^v. Rent of pumps can vary from Rs25-Rs85 an hour without fuel, depending on the level of demand^w.

Construction of some 30,000^x by 2000 (from an initial estimate of 11,000 by 1995), indicates the demand for groundwater use as supplementary irrigation for poor and marginal farmers in the dry zone. Surveys conducted during year 2000, indicated that as many as half of the wells were constructed without subsidies, reflecting the perceived benefits to farmers in terms of improved crop production and household income. However, access to government subsidies targeted at the poor were denied or made difficult in some cases and the transparency and inclusiveness in granting subsidies was challenged. Government attempted to address this situation, but with mixed results. At the same time as increasing production and income, the success of agro-wells has had environmental consequences. Some 10% of dry zone cascades have exceeded carrying capacity due to the indiscriminate sinking of agro wells^y, creating severe draw-down of water in domestic wells in a number of cascades in the dry zone.

New water governance

The bulk (85%) of developed water resources in Sri Lanka are used for irrigated agriculture, which produces approximately 80% of the main staple, rice. However, other sectors with greater purchasing power are increasingly competing for their share of water resources. Annual precipitation is about 108,000 MCM of which 43,000 MCM is renewable. Out of the renewable

^v Aheeyar, M.M.M. and R de S. Ariyabandu 2002. Socio-economic issues pertaining to agro well farming in Sri Lanka. Symposium proceedings. Use of Groundwater for Agriculture in Sri Lanka.

^w Kikuchi, M, R Weligamage, R. Barker, M. Samad, H. Kono and H.M. Somaratne. 2003. Agro Well and Pump Diffusion in Sri Lanka, Past Trends, Present Status and Future Prospects.

^x Ibid 2003

^y Panabokke C.R. 2002. Nature of occurrence of the regolith aquifer in the hard rock region of North Central dry zone and its rational exploitation of agro well development. Symposium proceedings, Use of Groundwater for Agriculture in Sri Lanka.

water resources, only 11,000 MCM^z can be developed for all water uses with most of the remainder disappearing as run off.

With increased urbanization—from 21.5% in 2002 to 30% in 2025—and improved standards of living, demand for safe drinking water is expected to increase by 8%-10% per annum. Currently, few existing water supply systems which can cater for future demand for 24-hour water supplies. It is also important to note that most of the available water sources have been developed and used primarily for agriculture. Additional demand for safe water has to be met through water-sharing arrangements from already developed sources^{aa}. While Sri Lanka can improve on its high (51%) rate of non-revenue-water^{bb}, this alone will not be sufficient to meet the future demand.

At present 72% of the population has access to safe drinking water and includes 28% of the population with access to pipe borne water. However, it is expected that 100% of the urban population will have access to pipe borne water by 2010 and 100% of the total population will have access to safe drinking water by 2025^{cc}. Though there is per-capita water availability of 2,400 cubic meters, spatial and temporal variations in water availability create pressures on demand management given that further water resources development is limited due to environment and economic constraints.

Recognizing the future challenge Sri Lanka has attempted to institutionalize Integrated Water Resources Management (IWRM) with river basins proposed as the unit of management. Wider stakeholder participation in river basin management would allow equitable water sharing among all sectors, including agriculture, domestic and industry. Stakeholder participation was considered vital as issues of water pollution, salt water intrusion and sand mining could be minimized through dialogue and consensus. In order to implement this management approach, a new policy regime was envisaged supported by the Asia Development Bank.

Attempts to develop water policy and implement institutional reforms go back to 1950s and again during the 1980s. In the 1960s, a Water Resources Board was established to advise the minister on policy formulation, planning and coordination. During the 1980s, during the initial period of the open economy in Sri Lanka, most of the currently contentious policy instruments, bulk water allocation, full cost recovery and institutional coordination arrangement were proposed, though not submitted to Parliament.

In 1996, a fresh attempt was made to reintroduce policy and institutional reforms supported by a technical assistance programme of the Asian Development bank. Moving from purely sub-sector issues of irrigation reform, this process looked at sector-wide coverage, including policy, legislation and institutional change. After an extensive consultation process, the “National Water Resources Policy and Institutional Arrangement” was approved by the cabinet. Following approval, however, key components of the policy were challenged by the public, media, NGOs and environmental groups including on issues of ‘ownership’, ‘entitlements’, ‘commodification’, ‘cost sharing’, ‘transferability’ and ‘new institutional arrangement’.

^z Ministry of Irrigation and Water management, 2003. National Workshop on Water for Agriculture and Rural Development.

^{aa} Competing for irrigation and domestic water from the same reservoir, two cases, a) Kudapity Oya (river) in Pytallum district and b) Turuwila tank in Anuradhapura.

^{bb} Includes 35% unaccounted –for-water

^{cc} Wickamage, M. 2005. Water and Human Settlements. Preparatory workshop on Sri Lanka National development Report

Cultural and traditional importance attached to water in Sri Lanka was ill-understood in the policy development process which led to substituting some of the well-accepted concepts in the West into the local policy process. One of the key issues that was vehemently opposed was “water rights through entitlements” to water users. This was a new concept to Sri Lankan water users^{dd} and policy makers and professionals were ill-prepared for its application. Granting entitlements to water users was construed as allowing water to become a marketable commodity for trade. This was reinforced by the addition of ‘transferable water rights’. As a nation Sri Lanka opposed “commodification of water”, and especially when it was water for irrigation.

Key issues in the water entitlement debate were how to grant entitlements to a large number of small (less than 1ha) farmers, whether entitlements would be sold by the already poor farmers and exacerbate poverty, and whether the rich and powerful (read multinationals) would accumulate entitlements leading to further impoverishment of the poor? Proponents of water reforms could not address these concerns satisfactorily due to their own ignorance of the local context and uncertainty.

The concept of water as a common good that cannot be ‘owned’ by any individual or group is stated in the “Roman -Dutch law”, which subsequently came to form part of common law^{ee}. The proposition that water belongs to the State was challenged as contrary to public ownership or public trusteeship as stated in the common law. Devoid of public ownership of water, the Government could allocate (transfer) water to anybody it chose. This was strongly opposed by civil society due to lack of trust between public and State. In public opinion in the absence of ‘public ownership’ to water, governments could transfer water out of agriculture affecting food security and livelihoods in Sri Lanka.

Reference in the draft policy to balancing consumptive use of water between irrigation, domestic and industrial sectors gave the impression that policy was designed to favour private sector economic growth as opposed to traditional livelihoods. The policy also mentioned that future water allocation would be based on “Demand Management” which advocated water moving from low productive agriculture (paddy cultivation) to high value non-paddy crops. Increasing the economic value of water by allowing it to move to crops with higher returns was again seen as neglecting the food security and livelihoods of the poor. As a welfare state, with a high percentage (60%) of rural poor, wilful diversion of water from food security purposes was publicly not acceptable. Critics pointed to a paradigm shift from traditional hydraulic civilization towards a more commercially-oriented culture of commodities.

Sri Lankans do not associate as an input into agricultural water use to be treated as an economic good. The draft policy proposed a pricing system for irrigation, by which farmers would be expected to share water resources development and management costs. It was not clear whether this was for all farmers or only for those who used bulk^{ff} quantities. However, the policy reiterated that small farmers would be subsidized by the state to access water until they were able to contribute to cost sharing. This indicated that all farmers would be targeted to pay for water. In fact, ‘paying’ for irrigation water had been part of ancient irrigation practice. The Irrigation Ordinance (1968) mentions payment of irrigation rates with respect to land use in paddy cultivation. An amendment to the ordinance in 1994 vests powers with farmer organizations to

^{dd} Samad, M. 2001. Establishing Water Rights: A potential instruments for efficiency gains in water resources allocation

^{ee} Rajapaksa, R. 2005, national Water Policy and Legal framework for Water management in Sri Lanka.

^{ff} Not defined clearly in the policy document. Draft water act gives a descriptive list of water users who could be considered as potential bulk water users.

exempt collection of irrigation rates from those canals handed over to farmer organisations, but allows provisions to impose a levy for operation and maintenance with respect to land cultivated. Previously, rates had been paid in respect of area of land cultivated, distinguished from volumetric charges in the new policy. However, this demarcation was not too clear in the new policy. The new institutional arrangement proposed also ignored the importance of traditional irrigation agencies, previously leading subs-sector development. New reforms were perceived as a threat to their existence and authority, prompting their criticism of the reforms process. Traditional irrigation agencies wielded superior political patronage on government and this was cleverly articulated and used by some of these institutions.

Policy to Practice

In spite of many constraints to the institutionalization of water reforms, some key issues like bulk water allocation, cost sharing and demand management were experimented with through the policy initiative. Some of these were results of donor funded projects while others were initiatives of local policy makers. The following two case studies show how policy has been introduced in different systems to varying degree of success.

Box: Turn over of Irrigation systems and Bulk Water Allocation (BWA)

Despite a number of reforms in the irrigation sector, land and water productivity is still considered to be low. Efforts to improve water productivity have not been too encouraging. Participatory irrigation management was introduced in late 1980s but fell short of expectation. It was realized that irrigation systems need to be handed over to farmer organizations for joint management. Joint management was expected to improve system performance through increase farmer participation and decrease involvement of the state.

In 1998 the World Bank emphasized the need to restructure irrigation system management through the Mahaweli Restructuring and Rehabilitation Project (MRRP). This project envisaged decentralization of management of the Mahaweli Authority, and a shift in role to facilitating farmer organizations in joint management^{eg}. By 2003, 256 distributory canals had been transferred to Distributory Canal Farmer Organizations (DCFO)^{hh}. The two main objectives were improving water productivity and increasing cropping intensity.

However, system rehabilitation prior to turnover is a precondition. Though system turnoverⁱⁱ and bulk water allocation^{jj} (BWA) have been in operation since 2001, few studies conducted have assessed the impacts. BWA has improved cropping intensity from 1.5–1.8 with an average of 1.62. This has been achieved through promoting low water consuming crops like Green Gram, Black Gram and Millet. With improved cropping intensity, water productivity has increased by about 35% by using less water on a larger land area during the dry season. Irrigation authorities

^{eg} Mathmaluwe, S 2003. The Effect of Irrigation Management Transfer on Productivity of an Irrigation System. Study on Mahaweli System H, Sri Lanka. (unpublished MSc thesis report)

^{hh} Thiruchelvam, S 2004. Economic Effects of Irrigation Management Transfer in Mahaweli System H. Paper presented at the Water Professional day Symposium 2004

ⁱⁱ A process where irrigation system below the distributory canal is handed over to farmer organisations (FOs) for operation and maintenance. Turn over envisage empowering of FOs with necessary management and technical know how combined with an institutional arrangement which allows farmers to be equal partners in decision making and management.

^{jj} Bulk water allocation defines a fixed quantity of water for a particular water use within a fixed time frame before start of cultivation practices. BWA encourages water users and water providers work on collective decisions, optimize water use per unit of land and improving overall water productivity.

claim that water issues are now based on farmer requests^{kk} and they are informed of the water quota entitled for their canal. This ensures a degree of “water rights”^{ll} to farmers.

However, farmers have complained that although cropping intensity has increased their income from crop production has declined. Research suggests otherwise. A Gini coefficient of 0.33 has been reported from a few canals in Mahaweli ‘system H’, against the national Gini coefficient of about 0.43. Income inequality in some of the canals has not been apparent^{mmm}. However economic inequality of settler farms have been identified in many major irrigation schemes in Sri Lanka. Literature on irrigation management reveals impact of income inequality among users as a major factors affecting corporation among framers. Change observed in Mahaweli ‘system H’ is due to bulk water allocation issues introduced in 2001.

The success of the BAW system for irrigation depends on management and communication between the irrigation agency and DCFOⁿⁿ. Farmers complain that in order to improve management, the irrigation agency advocates low water-consuming crops, which invariably have poor market value. Some farmers defied the irrigation agency and cultivated high value crops like chillies and onions, and suffered crop losses due to lack of water. Cultivating high value crops are a risk unless supplementary irrigation can be provided by Agro Wells. Therefore, DCFOs are faced with the challenge of sharing available water, deciding on the cropping pattern and linking with markets^{oo}. It is now acknowledged that achieving optimum water productivity is not only a function of improved irrigation system management, but also a combination of agricultural knowledge, farmer behaviour, community demand, markets and communication.

On going research^{pp} on BWA reinforces earlier findings. While cultivated extent has been increased in the dry season, farmers have not been able to cultivate crops of their choice resulting in poor income from production. There is general reluctance on the part of farmers to cultivate low water-consuming crops due to low individual income, lack of storage, marketing risks and susceptibility to pest attack, though there are collective gains through increased cropping intensity. Thus, BWA has improved equity in water distribution, but deprived farmers in terms of a better income. More research is needed to ascertain the relationship between cropping intensity and farmer income vis-à-vis irrigation system management by irrigation authorities. Farmer communication too needs to be more proactive with responsive irrigation agencies in identifying and addressing the core issue of equitable water distribution and income equality among farmers.

^{kk} Improved inter agency communication channel now being adopted in Mahaweli System H

^{ll} Expected to be conferred by National Water Resources Act. However, the act did not get parliamentary approval thus making water rights only notional.

^{mmm} Thiruchelvem, S 2004, Economic Effects of Irrigation Management Transfer in Mahaweli System H. Paper presented at the Water professionals Day symposium 2004

ⁿⁿ Bulk water users are large individual (commercial) users or group water users (eg. DCFO) which may include abstraction of surface water, groundwater or conjunctive use of water as prescribed by regulations. Small water users, access water from bulk or group water users or independent livelihood water users (draft National Water Resources Act, 2003) definitions in both categories are vague due to non approval on National Water Resources Act..

^{oo} Guneratne, B. 2003. Bulk Water Allocation concepts for Improving Water Productivity. Paper presented at the water professionals day 2003.

^{pp} HART, 2005. Assessment of Bulk Water Allocation in Mahaweli system H area. (on going research)

Box: Commercialization of Agriculture through Farmer Companies

The turnover of irrigation systems to farmer organizations was to reduce operational cost to the State, improve operation and maintenance efficiency and agriculture productivity. Participatory Management of Irrigation systems was successful in achieving this goal. However, with limitations in land availability caused by fragmentation and scarcity of water, commercialization of small farm agriculture was to be considered as a policy option in the future. This blended well with the commercial orientation of the agriculture policy which prevailed in mid 1990's. National Development Council (NDC), in 1995 recommended unification of farmers under farmer companies as a strategy to accelerate commercialisation process in non plantation agriculture in Sri Lanka.⁹⁹ Farmer companies were expected to overcome major problems faced by farmers, such as water service delivery, procurement of inputs, access to technology, credit, extension and markets. The vision at the time was, farmers would be shareholders, decision makers and beneficiaries of the company¹⁰⁰.

Ridibendi Ela (RBE) Farmer Company is one of the more successful companies out of a total of 59 companies in existence in 2003.¹⁰¹ Some of the key consideration in selecting RBE irrigation schemes for company formation were maturity of the scheme, relatively large size and minimum reliance on other schemes (to minimize collateral damage in case of failure), and proximity from the centre for monitoring purposes.

Combination of identified interest groups and viable business ventures were transformed into farmer companies. Farmer companies are investor owned companies established under companies act as 'peoples companies'.¹⁰² Only farmers and other stakeholders involved in agribusiness, living within the particular geographical region can become shareholders. Share trading can take place among eligible membership through Director Board of the company. At any give time, only 10% of shares can be owned by an individual according to relevant provisions of the act.

The company has two main objectives: commercialization of agriculture and irrigation management. Commercialization of agriculture includes farmer participation in company activities, input and credit supply, value addition, market facilitation, extension and training and private sector participation. Irrigation management includes improvement in irrigation water use efficiency and maintenance of structures¹⁰³. A farmer group loan programme is the key activity of the company while poultry production, seed paddy and vegetable seed production and production of basmati rice, are some of the smaller-scale activities.

The group loan scheme has proven favourable to farmers. Nearly 35% of farmers participate in the scheme. Between 1999 and 2004 the number of loan recipients increased from 549 to 1,035.

⁹⁹ Esham, M. and S.A.P. samarasinghe 2005, Present Status and Issues of farmer Companies in Sri Lanka. A case study of RideBendi Ela farmer Company

¹⁰⁰ Desalos, C. 2003. Water control and Sustainability of the Farmer Company in Ridi bendi Ela, Irrigation Scheme, Sri Lanka. MSc thesis, Irrigation and Water Engineering Group, Wageningen University

¹⁰¹ Established in 1998, by the Irrigation Management Division of the then Ministry of Irrigation and Power. Start up capital and operation cost for the first three years of the company were borne by the government RBE farmer company was a pilot programme with an aim to commercialise agriculture and transfer operation and maintenance of irrigation system to users.

¹⁰² Peoples companies shall safe guard possible private ownership by imposing restriction on membership and share trading

¹⁰³ Esham, M and S.A.P. Samarasinghe 2005. Present Status and Issues of farmer Companies in Sri Lanka. A case study of Ridibendi Ella farmer Company.

Loans are given in kind to a cash equivalent of Rs5,000 per acre of paddy land^{vv}. An 83% recovery rate by 2003 indicates the success of the programme.

Besides the loan scheme, farmers are satisfied with the extension services and input provision (fertilizer and seed paddy) functions of the company and mainly invest in the company to access service provision and not as an investment expecting returns. Some 65% of the shareholders in the company believe that farmer company is an extension of the farmer organizations, which indicates the welfare orientation of farmers as opposed to commercial farming. Initial successes observed in functioning of the farmer company began to fade away with macro policy changes and change in attitudes of the bureaucracy. Political interference in the selection of Board Directors and the recruiting of staff has contributed to poor performance and an overall decline in company performance. These changes have also contributed to maintaining the welfare orientation of the company.

At the inception of the concept in Sri Lanka, it was envisaged that farmers would be given free title to their land and water rights conferred on them. This was to be evolved through land grants and the National Water Resources Act, which was to have been operational by the end of 2001^{ww}. With the ownership of land^{xx} and water being with the State there were issues to do with rights to sharing water from the main reservoir. Concept of commercialisation of agriculture would not be realised without transfer of ownership to land and water to users. This was to be followed by transfer of irrigation system assets^{yy} to farmer company for ownership and better management of water. While these are prerequisite for successful commercialisation of agriculture, non implementation of transfer of ownership due to political reasons affected functioning of farmer company to its full potential. However, use of water for cultivation by farmers have not been affected irrespective of their membership in farmer company. Rights to irrigation is through rights to land.^{zz} At the inception of the scheme, the command area for cultivation was only 1,853 ha. This was increased to 2,063 ha during 1938-1943 by augmenting with water from the Deduru Oya (river) through a feeder canal 15km upstream. The current reservoir command is 2,400ha. At present, reservoir water is used to cultivate one wet season rice crop and field crops in the dry season, and a short third season (depending on the water availability) in between the two main seasons.

The tank also has to meet the demand of drinking water for three cities (approximately 1,200 acre ft /year). Inflow to the tank is restricted due to very high density of small reservoirs in the area and large number of agro-wells. Traditional small tank systems claim prior rights to water for cultivation, and the fishing community which depends on the tank for their livelihood also claim their rights. Hence, the issue of establishing rights was a pre-requisite anticipated at the beginning of the scheme.

In the absence of a clear rights regime, the farmer company's responsibility is limited to supporting farmers with agricultural inputs and agricultural loans. Establishing a pilot river basin

^{vv} Obviously promoting paddy cultivation in the "granary" area

^{ww} Government of Sri Lanka agreed with ADB to finalize and approve the water resources policy and legislation by 2001. Subsequently the deadline was extended, currently the policy and the legislation is on the hold.

^{xx} 80% of the land is owned by the State.

^{yy} Discribed in the tripartite agreement signed between the farmercompany Irrigation agency and System level farmer organisation

^{zz}According to customary law in Sri Lanka access to water for cultivation is gurenteed thourgh access to land. .

management system with an appropriate institutional arrangement would have facilitated settling conflicts of interest over rights issues.

Overall, the farmer company concept is a viable proposition in commercialization of agriculture provided it is given the flexibility to operate as a commercial venture. Farmer companies should be able to make their own decisions for the betterment of shareholders without unnecessary institutional barriers. Currently, though it functions as a company, a number of operational barriers limit efficiency^{aaa}. Besides, the macro policy environment too has not been favourable and consistent for the sustainability of farmer companies. Recent changes in political administration have viewed farmer companies as a means to deny the legitimate rights of farmers to paddy cultivation.

Equity in the Periphery

The key issue in current water governance debates is how to achieve equity while maintaining efficiency in water management? Being an ancient hydraulic civilization, was equity a concern at any time in Sri Lanka?. It could be the ancient rulers realized the importance of equity and constructed a large number (more than 20,000) of small tanks and *anicuts*^{bbb} widely distributed in the dry and wet zones, respectively. Some of the small tanks were built only for domestic use, for cattle and for environmental purposes. In rural Sri Lanka domestic wells are a major source of drinking water. These are shallow wells recharged by surface water and precipitation.

The ancient system of small tank cascades found mainly in the north-western, north-central and southern dry zone are a mechanism to transport water from one tank to the other through gravity. These tank cascades supplied water for irrigation, environment, domestic use and animals over a large area. The Irrigation water distribution pattern always prioritized the first ownership to land when issuing water. Owners of *Puranawel*^{ccc} always got first rights to water as opposed to *akkarawel*^{ddd} land owners. This maintained respect for traditional prior rights to land and water by *puranawela* farmers through pre-determined water issues decided at the Kanna (seasonal) meetings.

Cultivating *bethma*^{eee} was one of the most important mechanisms to maintain equity in water distribution in Sri Lanka and continues as a practice. However, heterogeneity in settlements has caused problems in the working relationships under this system. Under bulk water allocation on the Mahaweli irrigation system, farmers appear to prefer cultivation of their own land with low water intensive crops than cultivating paddy on *bethma*. In the post-independence period, self sufficiency in rice was the main objective, overlooking equity and efficiency. During the subsequent era of irrigation rehabilitation concern was focused on system improvements and productivity increases.

^{aaa} If the company need to make changes to water allocation it has to obtain approval from the Project management Committee, convince the Irrigation agency, Irrigation management Division of the Ministry of Agriculture, Irrigation, Mahaweli and Environment , System Level Farmer Organization (SLFO), farmer organization leaders, and farmers

^{bbb} Run off the river type irrigation facilities (wiers)

^{ccc} Traditional land cultivated by propitiators under small tanks

^{ddd} Land Development Ordinance (LDO) land allocated to settlers under major irrigation schemes

^{eee} Temporary Shifting of tail end farmers to head end areas of irrigation systems during dry season. Under *bethema* cultivation all farmers irrespective of their land holding size cultivate equal portion of land depending on the availability of water.

Participatory management introduced to improve coordination between users and the agency was responsible for maintaining some equity in distribution of inputs including water. Equity was not the main focus of many irrigation interventions. As a result there was widespread marginalization of farmers mainly in tail-end areas of major irrigation systems. The agro-wells programme, which began in mid 1980s, was an attempt to provide irrigation facilities to tail end farmers thus improving equity with respect to improved water availability. However, a lack of an overall approach to water resources management and a preoccupation with sectoral management of water, coupled with achieving project objectives, has denied equity concerns in water allocation.

Most of the key institutions dealing with the development of water resources have been functioning according to a project mentality with set objectives and goals. Often these goals have not coincided with equity objectives. Some of the major projects implemented in recent years had targets to achieve in terms of number of families served, extent cultivated or systems turned over, but in most projects equity was not an issue.

Water reforms process which began in mid 1990s attempted to address this issue through introduction of Integrated Water Resources Management (IWRM). The Draft National Water Resources Policy, very boldly introduced the concept of river basin management (RBM), hitherto not practiced in Sri Lanka, which attempted to manage river water through a multi-stakeholder consultation process backed by an enabling legislation. While the intension appeared good, there were a number of problems in formalizing the policy. The overall policy objective mentions that “ National Water Resources Policy is to encourage Integrated water Resources Development and Management, to ensure the national water resources are conserved and efficiently managed and equitably allocated among all stakeholders to meet socio economic and environmental needs of the present and future generations.”

In formalizing the policy there were many gaps. While the policy intended to maintain equity by recognizing water rights of small water users, it however failed to evolve a feasible mechanism to protect the rights of small water users vis-à-vis bulk water users. Bulk water user rights were protected through a system of ‘entitlements’ or ‘permits’. However, the same mechanism was not possible with small water users due to their large number. The policy introduced the concept of river basin management and river basin organizations (RBO). While representation of stakeholders was a good concept for decision making, the power balance within RBOs could be to the disadvantage of the poor and marginalized who are naturally weak in making their voice heard. Therefore, equity could be challenged in favour of those who possess power and wealth. This was one of the key issues that challenged the validity of the draft policy with respect to protecting the rights of small water users.

Future challenges

Improvements in livelihoods, population increase, and industrialization are generating demand for access to water. A lack of clear policy guidance and institutional arrangements has led to poor planning and vision in the development of the water sector. This has forced ill-conceived projects to emerge, while more deserving, nationally-important projects have been shelved^{fff}. This can be largely attributed to institutional and sectoral biases and the lack of a holistic vision to conceptualize an integrated approach. The existence of a large number of institutions and ministries dealing with water resources development has compounded the problem yet in spite of

^{fff} Dharmasena, G.T. 2005, Holistic Approach, Water Resources Management, The Island paper December.

their multiplicity, issues of national concern are not being addressed^{ggg}. Specific challenges will be:

- Implementation of a national Policy for Water Resources Management and Development supported by an enabling legislation
- Institutional coordination and conflict resolution.
- Establishment of an overall coordination body to oversee water resources management.
- Political will and commitment to water sector reforms with a clear national perspective and international collaboration
- Decentralization of decision making in water resources development and management.
- Releasing state control on water and land subject to regulations governing its use.
- Regulating ground water extraction and pollution control.
- Introducing IWRM in water resources management within hydrological boundaries.
- Improving land and water productivity while upgrading traditional systems of small tank irrigation.
- Facilitating water resources development to meet the MDGs for safe and sanitation by 2015.

^{ggg} a) Inadequate drinking water to cities of Anuradhapura and Kandy despite surrounded by reservoirs, case of water allocation between irrigation and domestic water. b) Problems of water diversion from Polgolla diversion in the Mahaweli river when there are water shortages in Anuradhpur and Polonnaruwa for irrigation. These two districts belongs to the rice bowl of the country where large number of major irrigation schemes are fed by Mahaweli waters. Theoretically, decision to divert water for hydropower generation can deny water for agriculture However, this has not happened yet due to livelihood water demands are prioritised over power generation. . Conflict of interest between water for irrigation and power. c) Pollution of river and streams due to industrial waste. Lack of policy on industrial sitting on river banks. Common problem along many urban rivers. Though there are environment regulations on waste disposal, most industries discharge waste to rivers and streams totally disregarding pollution of some of the major drinking water sources in the country. Lack of clear policy preventing such acts and stringent enforcement of regulations may prevent further deterioration of water sources.. (Dharmasena 2005)

India

India is undergoing rapid socio-economic transformation^{hhh}. The economy is industrialising and major changes are taking place in rural areas as people move to the cities and shift in large numbers into wage-labour occupations. These transformations have been part of rapid change taking place in rural areas, including in the relationship between economic sectors and resources such as water.

Governance in India is defined within a federal framework consisting of three tiers, Central Government, State governments and local governance bodies at the village (panchayats) and city (nagarpalikas) levels. Constitutionally, water is dealt with by all three tiers. However, constitutional rights and responsibilities related to water are rather blurred within the federal framework.

It is often loosely claimed that, “water is a State subject and individual states are responsible for the provision of water” (Iyer, 2002). This is subject to Entry 17 of the State list – “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I”.

This is, therefore, not an unqualified entry, but is subject to the provisions of Entry 56 in the Union List which reads – “Regulation and Development of inter-state rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest”.

The link between the State and Union lists is further established by the provisions made in Entry 20 in the Concurrent list pertaining to economic and social planning. According to this provision, major and medium irrigation, hydropower, flood control and multipurpose projects have been subjected to the requirement of Central clearance for inclusion in the National Plan. However, despite this intersection between the State and Union Lists, the subject of water does not, in itself, find any place on the Concurrent list (Iyer 2003:23).

Thus, though not explicitly mentioned, water is as much a Central subject as a State subject, particularly as most of the country’s important rivers are inter-State. Additionally, the 73rd and 74th Amendments to the Constitution specify that, ‘inter alia, drinking water, water management, watershed development and sanitation are subjects to be devolved to the local bodies of governance, i.e. village panchayats and city nagarpalikas’.

Iyer (2002) identifies the following deficiencies in the Constitutional perspectives on water:

- sectorally fragmented, with an overt focus on irrigation
- engineering-dominated, showing little recognition of water as an ecological and thus a basic human and animal resource
- inter-State rivers bias, which ignores the ecological impacts of poor management and exploitation of intra-State rivers

^{hhh} This section draws on the work undertaken by Dr Deepak Joshi under the SecureWater project. See www.securewater.org.uk.

- Lack of clarity on administrative roles and responsibilities of state departments and local bodies of governance, especially as the latter are still evolving as operational units of administration.

Practically and administratively different aspects of water-use in India fall within the purview of several ministries, line departments and institutions at both central and state levels. These traditional distinctions do not adhere to the recent constitutional amendments on water. The water sector is fragmented into several sub-sectors ranging from water for agriculture (irrigation), water for industrial use, water for power generation and water for drinking and domestic purposes. These categories are in turn divided by sub-categories of surface water versus ground water, and large versus medium and small irrigation projects. In general coordination between various institutions within a water sector is minimal, and with other sectors it is non-existent. The lack of coordination visible at policy level is multiplied in the translation of policy to practice.

The division between surface and ground water has important implications with regard to the issue of ownership of water. Surface water is constitutionally considered primarily as river waters. Here there is a riparian perspective to rights to water which is, "...essentially one of rights to the waters of a flowing river inhering in, or claimed by different users located alongside (or in the vicinity) of that river. This can arise at the level of households, farms, communities, villages or towns, but occurs in a more marked form at the level of political or administrative units within a country..." (Iyer 2003: 82).

Thus, the law recognises only use rights and not ownership or proprietary rights over flowing water. Jurisdiction over disputes is vested in the government – explicitly, Central Government in relation to inter-State disputes and, implicitly, the State in case of intra-State rivers.

In contrast, ownership of groundwater is linked to land ownership, which although subject to governmental control and regulation, is difficult legally to regulate, given obscure regulatory legislation and multiplicity of uses and responsible agencies. This leads to inequities of various kinds given that land ownership is skewed in most cases. The linking of water and land rights has led to a situation of unmitigated tapping of groundwater by the richer sections of society with the purchasing power to invest in pumping technology. This has important repercussions on the availability of water for drinking and domestic purposes especially in rural areas. This situation is exacerbated given the fact that groundwater contributes to 50 per cent of irrigation for agriculture, 85 per cent of rural drinking water and a further 5 per cent for industry (<http://ddws.nic.in>).

Efforts by the State to control the over-exploitation of groundwater have largely focused on regulation, through the establishment of legal or administrative controls over its use. Efforts have been made to put in place legislation controlling groundwater extraction through the circulation of a draft Central Government bill to all states. However, in practice pressure exerted by powerful agriculture lobbies—that have both political clout and the money to invest in groundwater extraction technology—has prevented any effective legislation from being implemented. Unregulated use of groundwater has been encouraged by highly subsidised irrigation electricity tariffs and there is tremendous political resistance to the removal of subsidies or power tariff reforms. At a more local level, there are cases of collective action to regulate the use of groundwater primarily by banning the cultivation of water intensive crops. For instance in Hiwri Bazaar in Ahmednagar district in Maharashtra, in a well-known example of the success of a community based watershed development programme, under the leadership of a

charismatic Sarpanch (elected village head) the community programme was effective in controlling over-exploitation of groundwater, through successful bans on growing water intensive crops like banana and sugarcane and the control on spacing out dug-wells used in irrigation. The lives of the small and marginal farmers in Hiwri Bazaar are reported to have radically transformed both economically and socially.

However, collective action on the conservation of ground water has limited value as, firstly, it is rare and, secondly, it can place controls on use rather than on access to water. Effective controls require that ground water be treated as common property, within the constitution of a collective mass, irrespective of traditional user rights and practices (Comman Draft Report: 2004). This requires a radical redefining of property rights whereby water rights are in effect de-linked from land rights. Separating land and water rights has been tried in a few isolated cases in India, but has been more of an exception than a rule.

Sukhomajri: De-linking Land and Water Rights

Located in the foothills of the Himalayas along the Shivalik range, Sukhomajri came into prominence in the 1970s when catchment protection work based on community participation was facilitated in the village by the Ford Foundation and the Central Soil and Water Conservation Research and Training Institute, Chandigarh. The primary motive behind this was to prevent the silting of Sukhna Lake in the downstream city of Chandigarh, which was directly linked to the degradation of the catchment area of Sukhomajri and surrounding villages. Villagers were encouraged to give up free grazing and tree biomass collection in the hills. To motivate them to do so, two earthen dams were constructed from which they were able to derive enormous benefits by drawing accumulated water for irrigation. Most noteworthy was the incentive provided to the landless and the predominantly grazier community in the village to participate in protecting the surrounding forest through the de-linking of land and water rights. All households in the village, irrespective of the size of landholding, were allotted an equal share of water collected in the dam. This allowed the landless and the land poor, in principle, to capitalize on their share of water by selling it to large landowners.

Even in Sukhomajri, however, where there has been a de-linking of land and water rights, this has not included regulating access to groundwater. De-linking water from land in this case was perhaps facilitated by the fact that the water in the reservoir was viewed as common property. De-linking land and water rights will require extraordinary political will.

This is complicated by the multiple institutional interests in the water sector, including the following three major institutions, and more than 10 other institutions:

- **Ministry of Water Resources (MoWR)** – In charge of overall planning and coordination of water resources; however, in practice the focus is on river water irrigation. This ministry formulated the National Water Policies (1987 and 2002)
- **Ministry of Rural Development (MoRD)** – Three departments come under this ministry.
- **Ministry of Environment and Forests (MoEF)** - Also implements watershed development schemes such as the National Eco-Development Programmes and other afforestation programmes

In irrigation management, there is a clear trend towards reducing the role of government in operation and maintenance, through the promotion of 'Participatory Irrigation Management' (PIM) (GoI, 1997). The MoWR since the Ninth Five Year Plan has incorporated PIM as an important component for which funds are made available under the centrally-sponsored scheme

of Command Area Development (CAD). PIM entails the formation of Water User Associations (WUAs) amongst beneficiary farmers. The WUAs enter into a contractual relation with the State, whereby the State has to supply an appropriate quantity of water based on volumetric pricing and the WUAs are given the rights to distribute water to their members, to determine prices and to charge for the water supplied. Appropriate division of management responsibility between users and agency varies in different cases: PIM is seen to be tested in mostly medium-sized and minor irrigation initiatives. Fewer initiatives are seen in the handing over (for operation and maintenance) of portions of major canal irrigation systems to farmers' associations.

On the whole most major water policies in India recognize that water as a social and an economic good and the importance of user contributions; the need for decentralization and community management; and the need for inclusion of historically marginalised sections of communities in water management initiatives. However, both conceptually and practically there is little clarity on how communities can be disaggregated in order to ensure that the marginalized are genuinely able to voice an opinion in decision making processes as well as securing access to water. This is especially evident as water rights continue to be linked to land rights and land ownership is not only skewed but is also gender biased, exhibiting a distinct pattern of male proprietorship.

Until 1985 there existed only one water ministry, the Ministry of Irrigation and Power at the National Level, in charge of a separate Department of Irrigation. In late 1985, the Department of Irrigation was made a separate Ministry of Water Resources, and one of the first achievements of the MoWR was the formulation of India's first National Water Policy in 1987. The need for a National Water Policy was underlined by the recognition that there was a need to move away from an excessive preoccupation with technocratic projects towards issues of resource management. The policy made explicit that the first priority should be for drinking-water. However, it has been argued in hindsight that, "... this was no more than a pious declaration; and, despite the intention of shifting the focus from projects to resource policy issues, it still devoted what may now seem to be a disproportionate amount of space to large irrigation projects" (Iyer 2003: 56).

The National Water Policy 1987: Some Important Propositions

- Water is a scarce and precious ‘national’ resource
- The basis of planning has to be a hydrological unit, such as a basin or sub-basin
- Project planning should be for multiple benefits, based on an integrated and multidisciplinary approach, with special regard to the human, environmental and ecological aspects
- Groundwater exploitation should be regulated with reference to recharge possibilities and considerations of social equity
- The conjunctive use of surface water and groundwater should be ensured
- In water allocation the first priority should be for drinking- water
- There should be close integration of water-use and land-use policies
- The distribution of water should be with due regard to equity and social justice
- Water rates should cover maintenance and operational charges and part of the fixed costs
- Farmers should be progressively involved in the management of irrigation systems and the assistance of voluntary agencies should be enlisted in this context (Iyer 2003)

The National Water Policy 2002

- The new National Water Policy has largely been a revision of the 1987 policy with a few minor changes. These include:
 - o Promotion of watershed management through extensive soil conservation, catchment area treatment; preservation of forests and increasing forest cover and the construction of check dams
 - o Appropriate reorientation / reorganization of institutional structures and mechanisms
 - o Involvement and participation of beneficiaries and other stakeholders from the project planning stage itself
 - o Optimal productivity per unit of water
 - o A participatory approach to water resources management

Whilst the new National Water Policy makes references to people’s participation and local water initiatives, there is no indication of how these can be put into practice. The Policy has come under criticism for its poor conceptualisation of community involvement and management (See Iyer 2003).

The situation in Andhra Pradesh

Andhra Pradesh is generally known as a ‘river state’ but the last decade has been marked by recurring droughts and expanding demands on water. Given this pattern, it is predicted that, by 2025, demands on AP’s water resources will have exceeded available supplies, calculated at 78 bcm (AP Water Vision, 2003). This projection does not take into account the relative notions of water scarcity and stress and the fact that there are regional variations in water availability and in the recurrences of drought.

Present and projected Water Requirements for various sectors in Andhra Pradesh:

Description	Present	Needed by 2025
	bcm	bcm
Drinking-water	0.59	3.45
Irrigation	64.21	107.98
Industries	0.28	1.44
Power Generation	0.03	0.06

Total	65.12	112.94
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Irrigation Department, 2001 (AP water web and AP Water Vision)

Two southern districts in Telangana—Mahbubnagar and Nalgonda—are drought-prone. However, the common understanding is that much of Telangana remains neglected in terms of water development. The Telangana Development Forum, a people’s movement in favour of a separate Telangana State, perceives that successive state governments have neglected water development in Telangana.

Of the three regions of the state, Telangana has the largest area, with 11,48,000 sq km, followed by Coastal Andhra with 9,28,000 sq km. 28.33 per cent of the cultivable land in the Coastal Andhra is irrigated under canal irrigation system, whereas only 4.17 percent of the cultivable land in Telangana receives canal water. By land mass and cultivable area statistics, Telangana is entitled to 975 tmc.ft of water from the inter-state rivers, Krishna and Godavari. In 1974, 82 per cent of this water was allotted to AP by the Bachawat Award to Andhra Pradesh. A re-distribution of Krishna waters in 1981 saw coastal Andhra getting about 47 per cent, Telangana 33 per cent and Rayalaseema only 16 per cent. Telangana's share (by land mass) of Godavari waters is 47 per cent, however only 25 per cent is allotted. The amount spent by the state in Telangana for irrigation is just 20 per cent of the total amount spent in Coastal Andhra. By the principle of expenditure proportionate to cultivable area, coastal Andhra gets more than twice its share of investments in irrigation.

From 1956 to date, additional irrigation potential created in Telangana is only 5 per cent, since none of the planned irrigation projects have been completed although they were initiated some 30-40 years ago. 12 projects sanctioned for Telangana have progressed at a snail's pace for decades. The Sriram Sagar Project (SRSP) was started in 1963 and the first phase of the project is yet to be completed. Experts and decision makers debate interminably as to whether to supply water through lift or tunnel in the Srisailem Left Bank Canal (which is to irrigate about 0.3 million hectares in Telangana). In contrast, the Srisailem Right Bank Canal feeding the coastal districts progresses steadily. Rehabilitation of the people displaced under this project is still pending.

The Bheema project, which is older than the State of Andhra Pradesh, has remained on paper. An initial budgetary allocation of Rs 9 million was made to this project in 1996-97, which was pruned to Rs1 million. To date, only 60% of the latter amount has been spent. Additionally, 33 medium projects proposed in Telangana which could utilize 80 to 100 tmc.ft of water at a cost Rs 500 million are pending. This delay is significant compared to the inter-State Telugu Ganga project, which got funds allocated consistently year after year and was completed within 12 years of its initiation and at a cost of Rs 1075 million.

Inequity in canal irrigation has also been accompanied by a neglect of tank maintenance in Telangana, reducing (as a result) the cultivable area under tank irrigation. The area supported by tank irrigation has halved as compared to figures in 1956-57. This has pushed and encouraged Telangana farmers to exploit groundwater, which is serious in this semi-arid region. The dependence on electric pumps is not only hazardous to water conservation; power supply in Telangana, as in much of the State, is erratic and of low quality (low voltage). Farmers incur huge losses due to malfunctioning of motor pumps.

Changing Crop Patterns, fuelled partly by water inequity and low returns, mean that farmers in Telangana with the resources to exploit ground water are seen to adopt cash crops over food crops. Staple cereals such as jawar, maize and bajra, which serve as local food and fodder, have

declined significantly over the past two decades. Jawar, bajra and maize cultivation has decreased substantially. Groundnut, castor, sunflower, cotton, chillies and sugarcane have witnessed considerable growth in cropped area. While sunflower registered 500% growth, it is more than 100% in the case of cotton. Except for castor and groundnut, all other crops have entered the region recently. It is reported that most of these farmers are migrants (since 1950s-60s) owning lands irrigated by Nagarjunasagar and Sriransagar canals. A development of this change has been the rise of a merchant class in towns dealing in these cash crops, again, the majority of whom are said to be immigrants from coastal area. (<http://www.telangana.org/article1.asp>)

Corresponding to the GoI initiative in Participatory Irrigation Management, the AP Farmers' Management of Irrigation Systems (APFMIS) Act, 1997, provides the basis for handover of irrigation schemes/systems with command areas above 40 hectares (divided into water user units) to Water Users (land-owning farmers) Associations (WUA). Each water-user area is divided into territories, for which directly elected members of the territorial constituencies form a Management Committee and oversee the functioning of the WUA. Presently some 10,300 WUAs exist in AP, covering 2 million hectares of irrigated land and representing 10 million farmers. Compared to official administration and management, under the WUAs there has reportedly been more timely and reliable water supply for irrigation, a 10% increase in crop yields and 20% reduction in maintenance costs (AP Water Vision, 2003).

Net available ground water in the state is assessed at 30.24 bcm (State level Groundwater Estimation Committee, 2000) of which about 43% is currently used. The total area on which groundwater is withdrawn has increased by around 39% from 1975 to 2001. The increase varies regionally. It is reported that Rayalseema has 52 over-exploited water basins. Technological innovations supported by power subsidies and easy access to institutional finance are instrumental in excessive groundwater development. The agriculture sector consumes 36-40% of the power generated in the State, but contributes only 4-5% of the power revenue (AP Water Vision, 2003). Decreased quantity is not the only problem; saline water and fluoride and iron contamination are reported in different areas. Additionally, irrigation systems have resulted in 0.132 million hectares of waterlogged land (water table depths less than 2 m.).

In recent years prolonged drought has prompted changes in approach to managing the State's resources. Officially, it is declared that AP faces a water-stress situation. About 42 per cent of land is declared degraded and 548 Mandals as stressed, with groundwater levels lower than 10 m. A long spell of droughts was experienced throughout most of AP in the early 1990s. Water stress was reported across rural and urban areas, even in areas not formerly drought-prone. Out-migration increased in most rural contexts and there was emergency delivery of water through water tanks in both rural and urban AP.

Local-level control

Chittoor District in has a population of 0.37 million with a density of 247 per square km. The District, in the Rayalseema region of AP, is divided into 66 revenue mandals. Of the total geographical area, 28.6% is cultivable. Wells and bore-wells (groundwater) provide for about 85 per cent of the irrigation source; tanks 14.5 per cent; and medium irrigation canals built in the recent past on the tributaries of Swarnamukhi and Bahuda rivers contribute a low 0.13 per cent. The district receives an annual rainfall of 908mm compared to the highest state level of 1,159mm in Vizianagaram district (AP Water Vision, 2003).

Nattiobannagaripalli and Tanda in Chittoor are two habitations located some ten kilometres away from the Mandal town, Peddamandyam. Together with five more habitations in the distant

vicinity, they make up the Gram Panchayat, or Revenue village, also known as Nattiobannagaripalli. Tanda has 64 households and Nattiobannagaripalli 67, making up an approximate population of 655.

The socially dominant and resource-rich Reddys engaged the Sugali tribes, who were traditionally hunters and gatherers, as agricultural labourers. Scheduled Caste families from neighbouring villages were also employed as agricultural labourers and artisans. To supplement their livelihood needs, the tribal community reared animals and collected minor forest produce. In return for labour and goods, the tribal and Dalit families were given agricultural produce and, occasionally, clothes and food. Richer families amongst the Reddys have historically claimed ownership of both land and water resources in the village. The tribal and Dalit families lived in temporary dwellings and, as agricultural labourers, did not own land. Local social culture determined that these families were not allowed equal access to traditional sources of water (wells and tanks) and official sourcesⁱⁱⁱ (handpumps and bore-wells built by the Rural Water Supply department and/or through Gram Panchayat funds).

Land redistribution policies and legislation have resulted in the transfer of land to those tribals who worked on a share-cropping basis. However, this still leaves behind many amongst the tribals, and the Dalit family, who worked as artisans, landless.

Irrigation schemes introduced in the village in the 1980s, together with access to electricity, brought about a dramatic shift in agricultural practise and people's livelihoods. Those with access to natural and financial resources readily exchanged the earlier practises of rain-fed subsistence cropping for water-intensive rice cultivation: three croppings per year. The benefits of improved water delivery technology have not been accessible to the poor. To date the very poor, marginal farmers have little or no access to irrigation sources and continue to grow traditional rain-fed crops, with little market value and are rarely able to sustain family food needs. Assured economic returns from rice production dramatically increased the divide between landowners and landless agricultural labourers. This was accentuated because, while economic conditions have changed, there has been little improvement in daily wages of agricultural workers, especially women, which remain a pittance: Rs 20/day (1 US\$= around 50 Rs), much lower than the officially (GoI) designated labour chargesⁱⁱⁱ.

Intensified agriculture has resulted in severe demands on available water and other natural resources. The dense forest cover in the surrounding Edalugutta mountains, in which tribal families used to access minor forest produce for home-use and barter has decreased as a result of the unsustainable practise of felling trees for firewood and other exploitation of forest resources, and also because of increased cultivation in previously forested areas. This is thought to have contributed to more silting of traditional tanks, located in the mountain foothills, which were and remain the major water sources for rain-fed agriculture^{kkk} and livestock in the village.

ⁱⁱⁱ The terms 'traditional' and/or 'indigenous' imply that the design, management and control of water delivery systems are established without any influence external to the local community (Agarwal and Narain, 1997). Systems of water delivery introduced through British colonialism, which also formed the seed of official water planning after Independence are referred to as official (Sengupta, 1985 and Shiva, 1989).

ⁱⁱⁱ First fixed at Rs 35, revised to Rs 50 in 2002 and revised to Rs 66 in September 2003. *The Hindu* September 18, 2003.

^{kkk} Crops dependent on rainfall.

The Mahbubnagar area, named after the Asaf Jahi ruler Mir Mahbub Ali Khan, illustrates the Mughal influence in AP's history. The second-largest district, it has a population of 3.5 million, but a lower population density of 190 per sq km. Four major rivers flow through the area, including Krishna, AP's largest river. However, of the 40 per cent cultivable area, only 8.4 per cent has canal irrigation and this is an obvious issue of discontent amongst Telengana residents. Scarce groundwater continues to provide the bulk of irrigation (52%). Low rainfall (754 mm), recurring drought conditions, and shallow soil levels contribute to increasing out-migration of Mahbubnagar inhabitants, who constitute the bulk of informal labour in neighbouring districts and states.

Vemula, in contrast to Tanda and Nattiobannagaripalli, is a revenue village, situated 10 kms from the Addakal mandal of Mahbubnagar district. There are 837 households and a population of approximately 3,245. Agriculture is the mainstay of the village economy. Castor, pigeon pea, cotton, jowar, finger millet, maize are the major rain-fed crops, rice and groundnut the major irrigated crops. There are 210 marginal farmers, 218 small farmers and 88 large farmers, cultivating 353.96 hectares, 112.42 hectares and 524.08 hectares respectively. There are 25 landless in the village.

Distinctly characteristic of Vemula (and adjoining areas) is a visible intensity of water-stress related poverty; reports of contract (agricultural and construction) and child labour; and a high number of 'poorest' householdsⁱⁱⁱ. Contract labour is common here. Terms and conditions for farm labour contracts are individually defined while construction labourers are paid about Rs 800 a month and two meals per day. Farm-work requires labour every day of the contract period as and when demanded by the employer, while construction involves travel to adjoining districts and states, like Maharashtra, Orissa etc., working every day for around six months at a stretch. However, wages vary with physical capacities.

"As construction labourers, the elderly like us are paid around 3,000 to 4,000 rupees for six months. If we are sick and cannot work, wages are deducted. If treatment is required, the costs are deducted from our wages and, if one of us dies, a message is sent back to the village for relations to come and collect the body. The food cooked collectively for all is generally unpalatable. Unless we carry mud on our heads, from morning to evening, we are not marked present," says Harijan Pentaiah. Migration is a common phenomenon in Mahbubnagar. 65 year-old Harijan P. remarks that nearly 50% of the village population migrate from November/December to early June. "I migrated once for seven years and kept my wife in her father's home, as I could not afford to keep her. I could barely manage to send money or earn enough to come home. When I returned, I was told my wife had been very sick and she had died. My son, Mannemkoda, now 20 years old, has done the same. I know he is in Hyderabad, but he has not come home or sent anything to me." The migration of adults has serious consequences for children, many such children being unwanted guests at the homes of slightly better-off relatives. In some cases, "Couples with small children take a young girl from her relatives, to take care of the children and to come to the work site for breast feeding. Such girls are often paid small amounts of money – Rs 100 – 300 for the entire duration." Ref

The economies of the poorest households in all locations are precarious and unpredictable as they lack ownership of key livelihood assets, common in rural settings, i.e. land and livestock. Where there is ownership, there are neither the resources nor the implements required to convert physical assets into productive assets. The ability to survive hinges on the other two assets – human and social – which determine how families cope in different situations and conditions.

ⁱⁱⁱ Note categorisation of households in Section 5.2

For those who can work, the dominant livelihood strategy is manual wage labour. Agricultural labour is the key, failing which (in droughts, bad months), these households resort to non-farm labour (brick-making, earthworks and other construction), fuel-wood collection and, if all this fails, to seasonal migration, a common feature amongst this group. However, for a significant number of households, the only option for survival is social welfare.

For the richer households, most are small farmers with three to five acres of land, of which half to two acres are irrigated by bore-wells shared within an extended family. There is assured kharif agricultural return from irrigated fields and they are able to risk cultivation in dry (rain-fed) lands except in peak drought situations. Many households practise leased farming: the terms and conditions—50% of the produce (or its approximate worth) to the landowner—with implementation and losses the leaseholder's to bear. In a good year, we can get 10 bags of paddy, 10 bags of groundnut and clear all our debts. Most have livestock including bullocks for ploughing (their own lands). These households put notable emphasis on education and diversifying their livelihoods.

Many families reported that, as a result of drought-like conditions from 2000 onwards, they started working as farm and non-farm wage labourers and even migrated for wage labour—for the first time in their lives (in 2002). A few families have been migrants for a longer time. Experiences of migration varied from good to bad. Better-off households would not like to go again; whereas households closer to the poor felt migration was a better option than risky farming.

For the richest in the community, access to water is assured, through privately owned bore-wells as well as preferential access to communal water sources, like tanks. Investment in bore-wells is not a huge problem. One farmer, Nagi Reddy, drilled 21 bores before he located water in two sites. He has no constraints on buying agricultural inputs including seed, fertilisers, pesticides, and has better access to markets through assured transport.

At the top of the ladder, the richer Has are indeed resource-rich—from the comparative view point of the whole community. Those households who have diverse livelihoods (secure permanent employment, farming and/or as pastoralists) are the most secure. These are the money lenders, the leaders, decision-makers and, more importantly, livelihood opportunity providers, especially for the poorest and poor families in the village. For most of these households, water for productive use is an assured and secure asset. They are also rich from a human and social perspective. They consist usually of large, extended families with dependable networks both within and beyond the village.

Krishna Reddy's household, consisting of two sons, three daughters and his wife, are the richest family in their village. Two of the daughters have been married. He owns 20 acres of land, of which six are irrigated, through tank irrigation and two through personal bore-wells. The rest are scattered patches of rain-fed fields. He has two bullocks and 20 cows, which are kept for ploughing and, mainly, for manure. He owns 50 sheep, which he has loaned for shared-rearing to three families in Tanda. He has never had to buy rice and in a good year is able to sell up to 75 bags of rice, which fetches around Rs 75,000. He grows several other crops for both subsistence use and sale and his household income and expenses are varied. Krishna Reddy attends and settles village land disputes and commands obligation from many in both habitations.

Nagi Reddy's family is the richest in Vemula village. His 14-member household includes four adult sons, three of whom are in secure employment (army, police and government bus driver). All his sons and his one daughter are married and they have four grandchildren in the house, all of whom are studying. Nagi Reddy's house is large and he spent more than Rs 200,000 on the construction. They

have both electricity and an individual water connection. Nagi Reddy owns 52 acres of land, of which 10 acres is grazing land, 18 acres dryland and the rest irrigated through the tank system and the bore-well.

He drilled 21 wells, spending 2.5 lakh, and has five functional bore-wells. Much of the crop is sold. The family have four bullocks, four buffaloes and eight cows. The milk is both sold and consumed. He also has a tractor, bought on a bank mortgage. Nagi Reddy is not politically active but, undoubtedly, little happens in Vemula without his approval. ref

Vemula presents a complex and conflicting water situation. There are many water initiatives and many water associations here, all of which have, however, been designed to cater to the needs of the better-off. There are 13 water tanks in Vemula. The largest one, Pedda Cheruvu, irrigates 194 acres of land, of which 60 per cent belongs to the Reddys, 35 per cent to other backward castes and five per cent to SC farmers. According to the 1997 GoAP Act, the management rights of such tanks have been handed over to a Water Users Association. This is made up of farmers who are landowners in the tank command area. The 194 acres irrigated by this tank is divided into 30 acre plots, to enable the election of a WUA member from each plot. Large farmers, who own 30 acres of land, are automatically elected members of the WUA, whilst, 15-20 smaller farmers elect one member. Neeti Theeruva Sangham (Water Users Association) members elect the president of the committee, whose tenure is for two years. Every three months the meeting of the main committee takes place.

The WUA members argue that there is not adequate water for irrigation and that tank management initiatives are only partial solutions. “Here in Vemula, we are entirely dependent on rainfall, which has failed consecutively for several seasons now. The answer to our wellbeing is an irrigation channel. The Krishna river is just 40 kms away, water has been channelled from there to all mandals except Addakal. There are 64 mandals in Mahbubnagar district and obviously we are not a priority for the MLAs elected from the district. Behind our façade of well being, we are quite naked now. Huge loans have been taken to intensify irrigation, but the returns are minimal. A large number of us have started to sell our lands, but who (except the mad) will buy land in such conditions? Here amongst us are farmers ready to follow the example of the suicides (of cotton growing farmers) that were noted in Karnataka. We pay Rs 230 to 250 per month for a three-phase connection and the supply is less than five hours a day. At the most, we can only expect produce from one to two acres.”

There is an inequity in distribution of irrigation waters between mandals, as there is across regions, and the reason for this is pointed out as political influence or lack of it. However, none of the rich farmers (and their HHs) have ever migrated or gone through distress-sale of livestock. Another issue of dissent is the conflict between water for irrigation and water for domestic use. “A couple of years ago, a geologist from the Rural Water Supply and Sanitation department identified an area below the Pedda Cheruvu tank as the site for putting a bore-well for drinking-water. Since then the dilemma has been the competing uses of this water. We have lost our (irrigation) rights to this water,” say the WUA members, even though they use the same source for their drinking-water needs.

Conflict between villagers and downstream (known as aayacut) farmers of village tank.

In 2002, the domestic water situation in Vemula was the worst in a decade and villagers put up a collective fight to ensure that water in the tank was not depleted by irrigation use. Irrespective of caste, wealth, gender and political leanings, non-aayacut members of the village approached the village Sarpanch and asked him not to give permission for use of the tank water for irrigation. A village meeting was coordinated, resulting in a lot of conflict between the aayacut farmers and other villagers.

The aayacut farmers contested this move and approached the Mandal Revenue Officer (MRO) for intervention. A decision was made by the MRO to allow the release of water in small quantities, four feet of water in two instalments of two feet each. The MRO assured the villagers that this use would not affect drinking-water needs. The release of water from the tank was strictly monitored by the villagers.

Male farmers from rich HHs constitute the majority in the WUA and are, by connivance or luck, head-end farmers in most tank schemes and also the major consumers of these waters. These farmers also have an informal but distinct control of water in other smaller tanks. Adoni Kunta is a tank lying just adjacent to the Dalit colony. This is on government-owned land, but the water is used mostly by Sudhakar Goud, one of the richer farmers, as his lands lie in the command area of the tank.

Some Dalit farmers also have their lands here. Sudhakar has established a bore-well close to the tank and keeps that under lock and key. Although the Dalits readily access the tank for fetching water for domestic and livestock use, they have never dared to think of pumping this water for other uses. The reasons are more political than economic. The legislation is that groundwater rights are tied to land ownership. Landowners exercise a more subtle ownership and control of surface water located on private lands. Surface water on public lands is said to be communal, but is essentially linked to agricultural uses and practises established over a long period of time. Thus traditional users of such sources continue to exercise a dominant informal right over them. Ref? Also add link to ComMan work?

Bore-wells are the most common irrigating structures in Vemula. However, access to groundwater is dependent on ownership of land and the resources to invest in drilling bore-wells. This enables rich households unlimited access to available ground water and allows them continue production across the year. These facilities are denied to both the poorest and poor households. A large number of medium-rich households in the village have invested in shared bore-wells. The costs for drilling a bore-well, buying the motor, buying other implements like pipes, switches etc, and getting a sanction for supply of the three-phase power amounts to Rupees 40,000 to 60,000. The cost varies depending on the depth at which water is found and this is largely dependent on the absence or presence of competing bore-wells nearby. Some farmers have found good water supply at around 200 ft, while others have failed to source water even at 350 ft.

Water from shared boreholes is enough only for one annual cropping of paddy. These households do not practise agriculture in the summer months. The cost of using the motors, the reduced availability of water, the dangers of motors being damaged: all these factors influence these decisions. Huge losses are incurred when water is not found and this pushes these families into debt. However, this is the difference between medium-rich and poor households. Poor households owning some land are not able to take these types of loans.

As in Vemula, over the last decade there has been a marked increase in the number of bore-wells belonging mostly to richer HHs. Smaller, marginal farmers, primarily dependent on shallow open wells for irrigation, lost access to their irrigation water sources. Almost all the open wells of Tanda and Nattiobannagaripalli dug personally and/or through government subsidies dried up. For the first time in the last decade, farmers like these, and those who depended on rain-fed agriculture, laid fallow their lands. As in Vemula, securing ground water depends on two issues: firstly ownership of land, which is tied to water rights over ground water, and secondly, the ability to invest.

Zimbabwe

The debate on water governance and poverty in Zimbabwe is deeply rooted in colonial history, the processes of land alienation and the emergence and development of white commercial agriculture^{mmmm}. Processes of land alienation underlined patterns of productive use of water in agriculture on the one hand between Africans, located on small-scale farms and communal areas, and on the other Europeans, predominantly on large-scale commercial farms/estates. Land alienation was aimed at the expropriation of fertile land from Africans and their resettlement on poor and marginal soils, frequently in areas that lacked adequate water resources.

The Land Apportionment Act of 1930, amended in 1940 and 1950, was a centrepiece of colonial legislation that facilitated the compulsory acquisition of good agricultural land and instituted the racial division into European and African areas. Invariably, European areas were located in areas of high rainfall with good water (re)sources, while African areas were arid and semi-arid areas, comprised of the Native Reserves, which later became Tribal Trust Lands and were renamed Communal Lands, in terms of the Communal Act of 1982, and the Native Purchase Areas which became Small Scale Commercial Farms after independence. African areas had poor soil fertility, experienced less rainfall and suffered frequent droughts. The water sources were also located further away from agricultural markets and transport routes. European areas, by contrast, were comprised of large-scale commercial Farms, located in high rainfall areas which were also well endowed with good soils and water resources, and were mainly found close to agricultural markets.

The development of African agriculture was thwarted by the existence of a legal and administrative framework, which denied access to and use of water for productive purposes among Africans in communal and small scale farming areas. The Water Act of 1976 legally denied access to water for agriculture among Africans in communal areas on the basis that they did not have title deeds to the land; instead the Act gave right of ownership of surface water in perpetuity to land owners, who were predominantly European commercial farmers.

The Land Apportionment Act of 1930 and amendments and the 1976 Water Act were the principal pieces of legislation governing use of water for agriculture between Africans and Europeans, as well as setting the parameters for agriculturally-based poverty reduction strategies in Zimbabwe.

These historical facts helped establish the basis for a dual agricultural system in Zimbabwe and attendant patterns of productive use of water.

Productive Uses of Water in Irrigation Schemes During the Colonial Period

It is within the confines of land alienation and inequitable distribution of water as well as the need to reduce the impact of droughts in Native Reserves that Africans were allowed water use within irrigation schemes. The main reason that the colonial government promoted the productive use of water in communal areas of irrigation schemes was largely to enable the Native Reserves (hereafter referred to as Communal Areas) to carry a larger human and livestock population and

^{mmmm} Case study provided by Sobona Mtisi.

thus avoid the necessity to acquire more land for African occupation (Phimister, 1988 cited in Bolding et al 2003:12 cp Weinrich 1974).

However, later on the rationale for the establishment of irrigation schemes in communal areas shifted to provision of food security and improved livelihoods for Africans settled in these areas. In this vein Magadla (2000) states that the main reason government promoted smallholder irrigation was a form of famine relief and food security. In addition, Rukuni and Makhado (1994) and Meinzen-Dick (1993:4) point out that small-scale irrigation schemes were regarded as a form of insurance against poor harvests and as cash generating ventures. This latter view dominates current thinking on productive uses in communal irrigation schemes and has shaped water governance and poverty alleviation strategies in this sector post 1980.

Water Governance and Poverty Alleviation During the Post-Colonial Era 1980-2000

Post-Independence Zimbabwe inherited a skewed distribution, access and control of land and water resources. To quantify the landholding situation at independence, it is noted 'that about 6,700 large-scale commercial farmers owned 15.5 million hectares or 47% of total farmland under freehold tenure, 8,000 small-scale farmers owned or leased 1.4 million hectares or 4% of the total farm land, while 700,000 communal farmers occupied 16.4 million hectares or 49% of total farm land' (Government of Zimbabwe, 1989; 2001; Tshuma 1997:30; UNDP 2002, Palmer 1990).

With specific reference to irrigable land it is noted that, of the total 119 038 hectares of land developed for irrigation in Zimbabwe, approximately 82% of this area is on large scale commercial farms and estates, and about 7% in communal areas and resettlement areas (Draft Policy 1994:2). In terms of actual figures, an estimated 8,461 hectares are currently irrigated by smallholders in communal and resettlement areas. This represents about 80 irrigation schemes on which farmers irrigate areas ranging from 0.1 hectare to about 1 hectare. Smallholder irrigation farmers cultivate only 2% of the national area under irrigation (ibid).

Inequitable distribution of land and water and resulting water scarcity in communal and small-scale farms is largely a result of the colonial legislation and administrative fiat that sought to undermine the productive uses of water in this agricultural sector by instituting a water governance framework that limited access to and use of water among communal and small-scale farmers.

Access to water remains the single most important factor in agriculture, on which the Zimbabwean economy and the livelihoods of its rural people are largely dependent. Water plays a central role in agricultural production and economic performance as well as in enhancing food security. Broadly speaking the macro-economy is related to the performance of the agricultural. In 1980, the commercial agriculture sector accounted for 75% of gross output, 95% of marketed surplus, nearly 100% of agricultural export earnings and 33% of the national formal wage employment (Mumbengegwi, 1986:210). By 1988, agriculture contributed about 40% of the total export revenue and irrigated agriculture constituted nearly half the total value of exported crops. Fully irrigated crops like sugar and wheat are major foreign exchange earners. Tobacco and cotton, which are also irrigated (tobacco 26% and cotton 29%), accounted for 25% of the total value of exports. In short, between 1980 and 1999, there was significant contribution of agriculture, particularly irrigated agriculture, to the national economy.

Added to this, is the contribution of agriculture to rural food security and livelihoods. Given the fact that more than 70% of the population in Zimbabwe reside in rural areas where agriculture is

the dominant economic activity, livelihoods are dependent upon agricultural production and labour markets. Given that some 80% of the rural population live in Natural Regions III, IV and V, where rainfall is erratic and unreliable, a significant proportion of the population rely on irrigation for crop production where cultivation is risky. Smallholder irrigators located in these regions grow a variety of food and cash crops including maize, cotton, wheat, beans, tomatoes and other vegetable crops. These farmers, although still poor, achieve incomes higher than their counterparts in dryland areas. In addition, there are small gardens that use either shallow underground water or borehole water which are central to household food security.

It is within this context that government, the donor community and private sector have actively sought to improve to alleviate rural poverty through the development of smallholder irrigated agriculture, particularly given the drought-prone nature of communal areas, 75% of which lies in Natural Region IV and V where average rainfall is less than 600mm per annum. The impact of recent droughts in 1981/82, 1982/83, 1983/4, 1986/7, and 1991/92 was most devastating in communal areas where, inspite of high population densities, water and irrigation development are rudimentary. This is illustrated by the fact that communal area irrigation increased by only about 4,000 hectares in a decade from 4,300 hectares in 1983 to 8,500 hectares in 1993 (Zimbabwe Irrigation Policy and Strategy). Currently, it is estimated that of the total 120,000 hectares under irrigation only 11% are on smallholder and outgrower schemes. The table below illustrates the status of irrigation development in Zimbabwe.

Table 1: Current Status of Irrigation Development in Zimbabwe – Agritex estimates 1999

Sector	Area under Irrigation (ha)	Proportion of Total Area under irrigation (%)
Large – scale	98 400	82
State Farms	8 400	7
Out-grower Schemes	2 200	2
Smallholder	11 000	9
Total	120 000	100

(Source: FAO 2000:4)

Limited development of small-holder irrigation in Zimbabwe has been attributed to the relatively low investment in communal area irrigation development by government (Rukuni, 1990). In addition, the government gave priority to the rehabilitation of existing schemes and expansion of those with potential before undertaking new schemes (Ibid.).

One of the key problems is the absence of a coherent irrigation policy in Zimbabwe. What is in place are draft irrigation policy strategies devised by government departments and non-governmental organizations, with little coordination and consolidation of the strategies. In view of this the irrigation sector has an overall lack of guidance on access to and use of water for irrigation. The default guidance has been provided by the DERUDE document in the 1980s, and the FAO-assisted draft irrigation policy, which is said to have been incorporated into Zimbabwe's Agricultural Policy Framework 1995-2020, in the 1990s. These two documents are largely viewed as having provided a framework for the management and development of irrigation in Zimbabwe in the 1980s and 1990s respectively.

With particular reference to the 1990s onwards, the guiding principles on water and irrigation as stated in the Zimbabwe's Agricultural Policy Framework are that:

- Priority will be placed on farmer-managed and operated systems. Government will assist in capital development while farmers will retain the responsibility for operation and maintenance of irrigation systems;
- Greater emphasis will be placed on more efficient and greater equity of water use;
- Effective water user associations will be encouraged and facilitated in the planning, development and evaluation of irrigation projects. Current Irrigation and Management Committees will be reformed and strengthened to allow broader participation and greater responsibility in irrigation management;
- Water allocation will take into account the imbalances in water supply between large and smallholder irrigators (Zimbabwe's Agricultural Policy Framework 1995-2020b cited in Manzungu 1999:26);

The 'policy' context within which irrigation schemes are located and which forms the governance framework for access to and use of water, is only limited in enabling poor people access to and use of water for productive purposes. While irrigation schemes contributed to increased food security within rural areas, there were no radical changes to increase the number of people accessing water in irrigation schemes. The limited expansion of communal lands brought under irrigation cited above only serves to illustrate this fact.

In the absence of an explicit irrigation policy, the Water Act of 1976 governed access to and use of water. In short, the Act was 'based on the riparian doctrine and recognized the principle of the 'priority of rights' and that all other things being equal, the holder can have the granted water right in perpetuity' (Chitsiko, 1996: 211). However, Mtisi and Nicol (2003) pointed out that the 1976 Water Act provided a legal basis for the denial of Africans access to and use of water for irrigation purposes, while on the other hand, providing access to water in favour of sectional interests, namely commercial farming, mining and manufacturing industries.

Institutions Surrounding the Governance of Water in Irrigation Schemes

It is within this policy context, that a plethora of institutions with an interest in smallholder irrigation existed. These institutions include government departments, traditional institutions, private companies, farmer and agro-industrial organizations. The interaction of formal and informal institutions, at various levels in the irrigation sector, directly and indirectly, provided limiting and enabling factors in gaining access to and use of water among farmers. In exploring the various institutions that are involved in the irrigation sector, particular attention will be given to the role of the State since it is central in the governance of water, the uptake of irrigation technologies and practices, as well as in driving reforms and activities surrounding the irrigation sector which are aimed at meeting national economic development and poverty reduction goals.

The State's role

Formal irrigation schemes in Zimbabwe owe their existence to the State. During the colonial period, the state established smallholder irrigation schemes partly to direct African agriculture to meet the livelihood needs of the rural population under direct state control. This was aptly captured by Weinrich (1975) who noted that smallholder irrigation schemes are exclusively administered by civil servants and plottolders are discouraged from forming their own authority structures. Irrigation schemes, then, are government administered and admission and expulsion is by civil servants. Plottolders are mainly drawn from landless rural Africans who are offered a living on the condition that they conform to the instructions of the scheme personnel (Weinrich 1975:12-13). The colonial state's control of smallholder irrigation was particularly severe after the Unilateral Declaration of Independence (UDI) in 1965, when the state sought to increase crop

production in this sector to meet domestic demand, and to quell social unrest by relieving the rapidly increasing population pressure on tribal lands in the context of economic and political sanctions (Weinrich, 1975).

Similarly, after independence in 1980, the State continued to have control of the smallholder irrigation sector, though its role was premised on being a driver of rural development based on redressing past colonial inequities in access to natural resources—mainly land and water—and the alleviation of poverty (especially as found in Zimbabwe’s Five Year National Development Plans, which were started after 1980). However, from the early 1980s, there were increasing debates on the need by the state to turn over management of smallholder irrigation schemes to farmers, although concern was raised on farmer ability and preparedness to manage the technical aspects of irrigation schemes, particularly maintenance of infrastructure where pumping of water is part of the irrigation system (Magadlela, 2000).

Notwithstanding these concerns, the establishment of Irrigation Management Committees indicated a clear shift in the direct control of irrigation schemes by the State, towards a strategy of encouraging farmers to manage the schemes themselves through elected irrigation institutions. However, despite the reduced role of the state in irrigation management, the state maintained subsidies on smallholder irrigation schemes on the basis that they were socially and politically desirable for improving household food security (Pazvakavambwa 1994; Rukuni and Eicher 1987). Further, the State still exerts control indirectly through various government departments in the management of irrigation schemes.

Other institutions involved in the irrigation sector and the main functions are presented in the table below.

Institution	Roles and responsibilities
AGRITEX (under the Ministry of Agriculture)	Has mandate for the design and management of all smallholder irrigation schemes. AGRITEX was tasked with providing agricultural extension and advice to irrigators
Department of Water Development (under the Ministry of Rural Resources and Water Development)	Has responsibility for the construction of dams and the provision of water up to the field edge
District Development Fund (DDF) (in the Ministry of Local Government, Urban Planning and Rural Development)	Has mandate to construct small dams and irrigation schemes of up to 20 hectares
Department of Rural Development (DERUDE) (within the Ministry of Lands, Rural Development and Resettlement)	Responsibility was stated as administration, management, operation and maintenance of government-run irrigation schemes in the communal areas and for the discipline of irrigators at these schemes. Also, it was responsible for developing new irrigation schemes in communal areas.
Public Sector Investment Programme (comprises of officials from the ministries of finance, agriculture, water development, AGRITEX, National Economic Planning Commission)	Its responsibility is to approve and allocate funds to the irrigation sector as well as planning and implementation of water resources for irrigation schemes
NEPC	Is responsible for the appraisal of all water resources and irrigation proposals for funding
Regional Water Authority	Overall management of water supplies to the

	irrigators (mainly large-scale commercial farmers) in the Lowvled
River Board	Manage water at the river catchment or regional level
Traditional leaders	Has power over the allocation of land and selection of new entrants in irrigation schemes
Local Authority - Rural District Council	
Irrigation Management Committee	Manages water for smallholder irrigators at irrigation scheme level
Agricultural Finance Corporation (currently called Agribank)	Provides credit to irrigators. It also administers the National Farm Irrigation Fund (NFIF) to assist farmers (mainly large-scale commercial farmers) in the construction of in-field irrigation works
Private companies (e.g. Cairns, Lemco, Cottco)	Purchase agricultural produce from irrigators

The table shows that the various institutions governing the irrigation sector had diverse and divergent interests and mandates, some complimentary to, others conflicting with, each other. Complimentary roles and responsibilities led to duplication of activities and functions, which consequently led to inefficiency in the irrigation sector, more so among communal irrigation schemes. It has been commonly observed that the splitting of responsibilities between AGRITEX and the Department of Water Development, which in essence addresses similar challenges, causes problems of uncoordinated priorities (Magadzire, 1995).

For communal or smallholder irrigators, this has ushered in a scenario of institutional complexity that has made it difficult for them to access water for irrigation. Added to this, is the fact that some of the key institutions underwent significant changes from 1980 to 1998, as the government was grappling with various and interconnected challenges of agricultural and economic development, more broadly, and smallholder irrigation development, in particular. For instance, in 1991, the Government of Zimbabwe merged the Water Resources Development wing of the then Ministry of Energy and Water Resources Development with the Ministry of Lands, Agriculture and Rural Resettlement to create the new Ministry of Lands, Agriculture and Water Development. This was a remarkable step in the institutional reconfiguration of the water and irrigation sector. Despite the fact that water and irrigation were put under one ministry, MLAWD, there was still separation of responsibilities for water management between the Department of Water Development and AGRITEX. The Department of Water Development, through its three divisions—Designs, Planning and Hydrology and Operations—is responsible for the identification of national water and irrigation requirements. In addition, DWD is responsible for designing and construction of dams and run-of-the-river schemes. DWD's roles make it the focal point of all water resources planning activities in the country. On the other hand, AGRITEX is responsible for the identification, implementation and operation and maintenance of most communal and resettlement areas irrigation schemes. In addition, it acts as adviser to the Ministry of Lands, Agriculture and Water Development, and to farmers on irrigation matters. The Agricultural Engineering Division of AGRITEX is responsible for practical research on irrigation problems such as design of sprinkler systems and spray nozzle efficiency as well as testing all irrigation equipment.

Institutional Changes from 1999 onwards

As a result of global policy changes in water management, as well as local socio-economic and political dynamics, there were significant institutional changes in the water sector from the late

1990s onwards. Globally, the emergence of the concept of ‘integrated water resources management’ which sought to ‘promote a coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems’ (GWP 2000:22) as well as instituting a decentralized and catchment-based approach to water management, led to establishment of catchment councils and the Zimbabwe National Water Authority (ZINWA).

Catchment councils were expected to oversee sub-catchment councils, which were lower-tier water management institutions, and other water user groups in the catchment councils’ area of jurisdiction. In addition, catchment councils’ functions included, in part, determining applications and granting water permits, regulating and supervising the use of water, supervising the performance of sub-catchment councils, and dealing with conflicts over water (Mtisi and Nicol, 2002:11).

ZINWA was created out of the Department of Water Development, with the objective to participate and advise on the formulation of national policies and standards on water resources planning, management and development, oversee dam safety, drill boreholes set water tariffs as well as provide bulk raw water and treated water to water users (ibid.). These functions and responsibilities turned ZINWA into a central institution in water resources management.

In line with the institutional changes, Zimbabwe’s water sector reforms were underlined by progressive pieces of legislation—the Water Act (1997) and Zimbabwe National Water Authority Act (1997)—that sought to repeal the Water Act of 1976 and redress the inequities embedded in the 1976 Act. Of particular importance was the removal of preferential rights to water held by riparian owners. The new water law empowered the minister to regulate the use of water in times of scarcity, to deal with issues of water pollution and to be the overall custodian of water. Access to water for secondary purposes (i.e., for productive purposes) was based on a water permit system for which fees were charged.

On the basis of the aforementioned legal reforms and the principles that underlay the reforms, ZINWA and Catchment Councils, as institutions governing water governance, were established to help redress colonial injustices and disparities in the allocation and distribution of water, particularly in a political context where inclusive and representative political systems were taking root. As such, the water reforms and the decentralized institutions of water that were established, were aimed at achieving an equitable distribution of water by providing enabling institutional foras of access to water by all water users. In this new water governance regime, access to water was defined through the issuing of a water permit, thus enabling more water users to have access to water for their livelihoods (Mtisi and Nicol, 2002).

Local changes, particularly within ministries of lands, agriculture and water development, and partly in response to the need to effectively manage water resources saw widespread changes in the institutions that directly and indirectly govern water resources. The table below provide a summary of the institutions involved in the water sector and in irrigation, in particular.

Institutions surrounding water governance 1998 to present

Institution	Functions (particularly in irrigation sector)
Zimbabwe National Water Authority (ZINWA)	Provides bulk raw water at a fee to water users. Participates through construction of dams, pipelines, water treatment works, main canals and irrigation systems.
Catchment Councils	Determining applications and granting water permits. Regulating and supervising the use of water.

Department of Irrigation (DI)	Responsible for irrigation development in the smallholder sector. Also responsible for policy formulation.
Department of Agricultural Engineering (DAE)	Field water management, operation of infrastructure and irrigation research.
Department of Agricultural Research and Extension (AREX)	Undertakes soil surveys as well as providing extension to farmers. However, extension services are mainly limited to crop production.
District Development Fund (DDF)	Irrigation development for smallholder irrigation schemes of up to 20 hectares for rural communities. In addition, DDF has the responsibility to build small dams and drill boreholes for water supplies in communal and resettlement areas.
Rural Development Fund (RDF)	Develops smallholder irrigation schemes, usually 5 hectares or less.
Agricultural and Rural Development Authority (ARDA)	Irrigation development for large-scale, state-funded irrigation schemes. Also operates its own irrigation schemes and administers settler schemes that are attached to its estates.
Department of Water Development	Plans and implements all major national water schemes.
Irrigation Management Committee (IMC)	Manages water for smallholder irrigators at irrigation scheme level.

(Adapted from the Report of the Presidential Land Review Committee, 2003:65)

In view of the institutional changes and the resultant establishment of various institutions of water governance, it is important to note the existence of a duplication of roles and functions between various government departments. The functions of DDF and RDF are a case in point (Refer to Table above). There seem to be no quantitative differences in the scale of irrigation schemes that the departments are responsible for, merits of their broader institutional goals notwithstanding.

With specific reference to the smallholder irrigation sector, the splitting up of AGRITEX into AREX (under the Ministry of Agriculture) and Department of Irrigation (under the Ministry of Water Resources and Infrastructural Development) has led AREX to relinquish control of water management responsibilities at irrigation schemes, and to solely focus on crop management. Thus, water management in irrigation schemes falls, at least under three different institutions—the Department of Water Development, ZINWA, Catchment Councils and the Department of Irrigation.

Role of the State

The global changes in water resources management policy set the tone for the changes in the role of the Zimbabwe state in water governance. Chitsiko (1996) aptly captured the changed role of the state by noting that: ‘The process [water reform process] recognizes the need for stakeholder participation. In the general policy direction, this will mean an increased role of stakeholders in water resources management. They will have to shoulder more responsibility at local and regional levels, with government setting and monitoring the rules of the game’ (Chitsiko 1996:212)

Thus, the state had to create an enabling environment to ensure effective water resources governance, though it has the political task to safeguard the interests of poor people in water management. Water sector reforms derived from emerging global discourses of integrated water

resources management, added a new set of institutions of water governance that purportedly widened access of water to previously disadvantaged water users. In practice, this layering of ‘old’ and ‘new’ institutions of water management has led to considerable institutional complexity and messiness which has adversely impacted on rural livelihoods by limiting the ways through which smallholder irrigators access water for agriculture.

The institutional complexity surrounding the governance of water resources in irrigation schemes and the impact it has on poverty alleviation, will be the focus of the next section, where findings from Mutema and Tawona irrigation schemes will be explored in detail.

A Brief Historical Background of Mutema and Tawona Irrigation Schemes

Case study work was conducted in two irrigation schemes: Mutema and Tawona located in Lower Save East Sub-catchment, in Chipinge District. The schemes are in Natural Region IV, commonly known as the lowveld, which receives 450-600mm of rainfall per annum. This region is too dry for successful crop production without irrigation, although some precarious rainfed production takes place within communal areas. The two schemes were established in the 1930s and 1950s respectively, the former being one of the oldest in Zimbabwe. Historical evidence in Mutema indicates that the indigenous people practiced irrigated agriculture prior to the colonial period. The long history of irrigated agriculture in both schemes provides an opportunity to trace changes in governance of water and poverty over time.

The establishment of Mutema Communal Area, where the two irrigation schemes are located, is embedded in the colonial expropriation of fertile land in Chipinge District. The process of land alienation saw the removal of people from the fertile parts of the district to give way to the development of commercial agriculture based, inter alia, on tea, coffee, forestry and dairy. The establishment of commercial irrigation of wheat, maize, citrus fruits and cotton in the lowveld parts of Chipinge district by both government and private companies led to the further removal of indigenous people. These historical processes that led to the establishment of Mutema Communal Area, which only receives erratic rainfall. Interviewees frequently stated that a good harvest from rainfed agriculture occurred once in every 5 years.

Fortunately for Mutema communal area, Tanganda and Save Rivers provided a source of water for productive use, mainly irrigated agriculture. The presence of these rivers provided the impetus for local people to irrigate crops. It is commonly stated that flood irrigation was therefore practiced by local people during the pre-colonial period. This partly provided the basis for the establishment of Mutema irrigation scheme and later Tawona. It is widely acknowledged that the two irrigation schemes were meant to boost household food security and to alleviate poverty among Africans living on marginal land in Mutema Communal Lands.

Current Size and Number of Plottolders in Mutema and Tawona Irrigation Schemes

Area	Plot Size in Hectares	Number of Plot Holders
Mutema Irrigation Scheme		
Mutema I		
Bombeni	7.6	20
Matsikidzi	8.3	21
Total	15.9	41
Mutema II		
Block I	90	143
Block II	92.0	114

Block III	36.8	76
Total	218.8	333
Total for the Scheme	234.7	374
Tawona		
Block A	28.0	40
Block B	48.8	79
Block C	48.0	72
Block D	28.8	45
Block E	11.2	28
Southern Block	32.0	80
Northern Block	40.8	102
Total for the Scheme	237.6	446

(Source: Agritex Mutema Sub – Office 2005)

Access to water for irrigation

Since the development of irrigation schemes were to alleviate poverty in communal areas, in this case in Mutema and Tawona irrigation schemes, the main criteria for gaining access to the irrigation schemes were: one had to be a resident of Mutema communal area; be married and landless; and be willing to take up irrigation on a full time basis. It is important to note that, while the aforementioned were broad guidelines governing access to the irrigation schemes, the rules changed dramatically over the years. During the 1930s and 1940s, it was pointed out that people who were deemed hardworking by their local Headman and government officials were selected to be members of the irrigation scheme. In the early 1970s, rules governing access to water for irrigation changed from the voluntary basis of the 1930s, to ones based on wealth and experience in agriculture. Potential irrigators were asked about the assets that they had. The assets mainly entailed cattle, agricultural equipment (for instance, ploughs, hoes), potential labour (mainly family labour) and experience in farming. The reason being that having a certain amount of agricultural assets and experience would put one in good stead to become a successful irrigator.

A letter to the District Commissioner from the Irrigation Manager dated November 1972 is highly revealing:

Dear Sir, Please can I have your permission to evict the attached list of ploholders from Tawona Scheme. All are poor farmers who cannot pay water rates, several would not plant crops last season, and have no livestock to sell to pay water rates. As the water rates will be increased to \$28 per acre next July, I feel we are wasting our time allowing these people to carry on farming.

The letter explicitly points out that access to water for productive purposes was limited to the wealthy people in Mutema communal area, despite the fact that irrigation was intended to lift the poor from poverty. Notwithstanding such biases, the poor people were also considered on the basis that they had the potential to be successful irrigators.

After 1980, there were slight changes to rules governing access to water for productive purposes in both Mutema and Tawona irrigation schemes. There was need to increase the number of people in the two irrigation schemes in line with the resettlement programme of the 1980s. Although there were new entrants to Mutema and Tawona irrigation schemes, as a result of the land

resettlement programme, the new entrants were governed by the existing rules. The new entrants were recommended by their local traditional leaders, who confirmed their marital and landless status, and the fact that they were hardworking and able to work as a team. The recommended persons were later interviewed by relevant government officials (mainly AGRITEX) and members of the Irrigation Management Committee to ascertain their agricultural assets and experience.

However, new dynamics of access to water in irrigation schemes are emerging. Access to water for irrigation can also be gained through renting and inheritance. With inheritance, the irrigated plot is passed from one family member to the other in the event of the death of the registered plot holder. In instances where the husband dies, the irrigated plot, and by extension the right of access to water for irrigation, are to the wife. In other instances, the irrigated plot is inherited by the eldest son. This was in line with the local patriarchal tradition that viewed the first born son as the head of the household in the event of the death of a father. In both cases, it was reasoned that the inheritors would continue irrigated farming to meet the livelihood needs of the family.

Renting out a plot in the irrigation scheme also provided a means of gaining access to water for agricultural production under various circumstances. Invariably, the circumstances centre on an unexpected financial need, for example a sudden illness that requires urgent hospital fees or the need to pay school fees. In other cases, renting out may be due to a failure by the plotholder to raise enough money to pay water and electricity bills or to purchase seeds and other inputs. In these instances, a plot holder rents out part or the whole plot to an individual in return for financial assistance. Renting out of plots is common among poor farmers. It is also interesting to note that dryland farmers with fields along the 8-km long canal from Save River to Tawona and Mutema irrigation schemes, access water through the illegal siphoning of water from the canal to irrigate dryland crops.

The period from 1999 to present, has witnessed a new political dimension, driven by the dynamics of the Fast Track Land Reform Programme. Rooted in the politics of land redistribution and partly in the militancy of the war veterans and the youth militia the Fast Track Land Reform Programme provided a 20% stipulation in allocation for both war veterans and youths. As a result, there were emerging demands for access to water for irrigation in Mutema and Tawona irrigation schemes based on the political narratives of fast track land reform. While the fast track land reform programme is about the redistribution of land, the narratives used to gain access to land, reveal a similar, albeit latent, demand for access to water when they are extended to smallholder irrigation schemes. It is vital to note that smallholder irrigation schemes are located in communal areas and thus does not constitute part of the land targeted for compulsory acquisition and resettlement. As such, the extension of the fast track land reform programme on smallholder irrigation schemes, such as Mutema and Tawona, reveal an underlying need to gain access to land and water.

However, access to water for irrigation based on the narratives of the fast track land reform have been deeply contested by irrigators and traditional leaders in the two schemes. The irrigators and traditional leaders are arguing that the Fast Track Land Resettlement Programme does not apply to communal areas as well as to smallholder irrigation schemes, as the programme specifically targets large-scale commercial farms. One irrigator, with a flair for diplomacy stated that: 'We are not challenging the State on the application of the Fast Track Land Reform Programme per se, we are merely pointing out that the programme does not have smallholder irrigation schemes, Mutema in particular, on its list of compulsorily acquired farms. As it is currently spelt out, it

targets white commercial farms and large private estates. That is what we are pointing out to the State, War Veterans and the Youthsⁿⁿⁿ.

Added to this, traditional leaders in the two schemes have also argued that they have powers, vested to them by the State, to allocate land in communal areas, and in the irrigation schemes in particular. Traditional leaders have reasserted their powers in land allocation in the Mutema and Tawona irrigation schemes, and are challenging the powers of the Land Committee, an institution constituted for the purposes of allocating land under the fast track land reform programme. Despite the contestations, a significant number of people acquired plots in the two irrigation schemes under the fast track land reform.

Governance of Mutema and Tawona Irrigation Schemes

The governance of water in irrigation schemes is guided by several pieces of loose and uncoordinated legislation, compounded by an unclear policy on irrigation. This mainly emanates from a dual agricultural system and irrigation development in Zimbabwe, which has its roots in the colonial period. This is exacerbated by a general lack of information on the nature and extent of smallholder irrigation. In view of this, the Water Act of 1998, and the Zimbabwe National Water Act of 1998, provide the governance framework through which water and irrigation management and development occurs.

Institutionally, the then AGRITEX was largely responsible for national planning and development of irrigation schemes. At the local level, AGRITEX, through its Agricultural Extension Worker and Agricultural Extension Supervisor was responsible for 'helping farmers or irrigators to increase their agricultural productivity for food self sufficiency and cash income through the provision of agricultural extension, technical services and management services'^{ooo}. These duties are currently performed by AREX as a result of the splitting of AGRITEX into AREX (Agricultural Research and Extension) and the Irrigation Department. In conjunction with AREX, the Irrigation Management Committee is responsible for the day-to-day management of the irrigation scheme, which ranges from maintaining discipline among irrigators, controlling water distribution, collecting fees and other service charges, setting up local rules and regulations and determining local requirements and standards for the irrigators and those intending to join the irrigation scheme.

ZINWA and the Sub-Catchment Council are also part of a constellation of institutions that govern the different types of water used to irrigate crops in Tawona and Mutema irrigation schemes. The relationship between ZINWA and the two irrigation schemes is based on ZINWA's management and provision of dam water (agreement water) from Ruti and Osborne dam. This is mainly during the winter period when the water flow in Save and Tanganda rivers is extremely low, making it inadequate to support irrigated agriculture in both Tawona and Mutema irrigation schemes.

On the other hand, the institutional role of the Lower Save East Sub-catchment in Mutema and Tawona irrigation schemes rests upon the use of raw (river) water from Save River, and to a limited extent, Tanganda River. With reference to Mutema Irrigation Scheme, its relationship to the sub-catchment council is also based on the use of underground borehole water, which is used to irrigate crops. In view of the fact that the borehole water for Mutema Irrigation Scheme is salty, and thus necessitating the need to use raw water from Save River, and agreement water

ⁿⁿⁿ Interview with an Irrigator in Mutema Irrigation Scheme. 7/12/2005.

^{ooo} Zhakata, W (1991) Role of A.E.W. and Irrigation Committees at Government Run Irrigation Schemes. Paper Presented at Chipinge District Annual Conference.

from Osborne and/or Ruti dams, Mutema Irrigation Scheme deals with both ZINWA and Lower Save East sub-catchment council in water governance.

Added to the modern institutions are traditional institutions of water governance. Traditional leaders, namely kraal-head to headman and the chief, though peripheral to the management of water in irrigation schemes, plays a central role in the allocation of land in the two irrigation schemes on the basis that they are the traditional custodians of the land. Thus, in the allocation of irrigable plots, traditional leaders surrounding Mutema and Tawona irrigations schemes were the people responsible for compiling lists of, and recommending, new entrants into the schemes from their respective villages, in consultation with the Irrigation Manager (during the colonial period) or the AGRITEX officer (between 1980-2000) or AREX officer (post 2000).

It is important to note that there still exists within the two irrigation schemes Water Bailiffs who are under the Department of Water Development (DWD). In addition, some institutions that are indirectly involved with irrigation schemes include, Rural District Council (Local Government), Department of Natural Resources, Zimbabwe Electricity Supply Authority through its subsidiary Rural Electrification Agency, Ministry of Health, Grain Marketing Board and private agro-industrial companies e.g., Cairns (for purchasing of tomatoes), Agri-Bank (provision of loans), and Tarafin and Cotton Company (purchasing of cotton) and many others.

Water and Poverty in the Mutema and Tawona Irrigation Schemes

Central to debates on governance and institutional and policy change in the water sector and irrigation subsector is a concern for poverty reduction and rural livelihood improvement. This is particularly so in southern Africa where water sector reforms in the 1990s—embedded as they were in the discourse of integrated water resources management principles—were founded on the goal of poverty reduction. This section examines the changing nature of the governance of water resources in the irrigation sector and their implications on rural livelihoods and poverty, taking Mutema and Tawona irrigation schemes.

Over the years, the two irrigation schemes have supported the livelihoods of individual farmers, both in terms of food security and food self-sufficiency, as well as providing a major source of income. Invariably, all farmers stated that they sent their children to boarding schools through money earned from irrigated agriculture. In addition, most irrigators in the two schemes boast of having built brick houses and installed electricity to their homes through irrigation. Income was earned through the commercial production of crops for sale to major agro-businesses, such as Cairns for tomatoes, Cottco for cotton and GMB for maize. The table below presents crop production for the ten year period from 1996 to 2005 for both Mutema and Tawona Irrigation Schemes.

Crop Production in Mutema and Tawona Irrigation Scheme 1996 – 2005

Mutema Irrigation Scheme					Tawona Irrigation Scheme			
Year	Type of Crop				Type of Crop			
	Cotton (in Tons)	Maize (in Tons)	Tomato (in Tons)	Beans (in Tons)	Cotton (in Tons)	Maize (in Tons)	Tomato (in Tons)	Beans (in Tons)
1996/97	1.5	2.0	18	1.0	1.0	3.5	16	1.4
1997/98	2.0	4.0	20	0.5	1.5	4.5	20	1.1
1998/99	2.5	5.0	15	0.5	2.0	5.5	22	1.4

1999/00	2.0	2.0	21	0.2	2.8	5.8	18	0.5
2000/01	3.5	1.0	15	0.2	3.0	3.5	15	1.0
2001/02	4.0	0.5	10	1.0	3.5	4.0	14	1.8
2002/03	4.5	0.1	22.5	0.6	2.5	2.5	25	1.0
2003/04	1.5	0.5	4	0.1	0	2.0	7	1.4
2004/05	0.2	0	2.5	0	1.5	0.5	10	1.2

(Source: Agritex Mutema Sub – Office 2005)

Notwithstanding such achievements, the past three years or so have witnessed a precipitous decline in both crop production and income earned from irrigated agriculture, which threatens the very existence of the irrigation schemes, particularly Mutema Irrigation Scheme. These processes have adversely impacted on poverty and rural livelihoods among irrigators. The following section explores the internal and external factors that have affected the livelihoods of irrigators.

Water Governance Policy and Poverty Reduction

At the heart of Zimbabwe’s water reforms are concerns about instituting a water governance system that ensures an equitable distribution and allocation of water to all water users, with a view to improving the livelihoods of previously disadvantaged water users, namely small-scale, resettlement and communal farmers. Further, the drought-prone nature of Zimbabwe and the need for sound management of the country’s fragile water resource base as well as the need to effectively respond to the adverse impact of drought underscore the current policy regime.

Yet the water policy in Zimbabwe as enshrined in the Water Act and ZINWA Act of 1998 draws largely from the global discourse of integrated water resources management, founded upon neo-liberal concepts of less state involvement. This has exposed communal, small-scale, resettlement and newly resettled farmers—and in particular, smallholder irrigators—to the vagaries of a market-based system.

The treatment of water as an economic good has made water unaffordable to small-scale, resettlement and communal farmers, more so among smallholder irrigators who are dependent upon it for their agricultural activities. Added to this is a general lack of awareness of the water policy among smallholder irrigators and of their roles and responsibilities within it, and more importantly the livelihood benefits that they may gain within the context of the current water policy regime. Further, the conspicuous absence of a clear and coherent policy framework that governs and guides the smallholder irrigation sector has provided a recipe for failure in the objectives and intentions of smallholder irrigators. While smallholder irrigation schemes were established with the objective to secure rural livelihoods and attain food security and food self-sufficiency, in addition to providing an income through the selling of crops, the absence of a coherent irrigation policy to steer the smallholder irrigation sector undermines the securing of livelihoods for small-scale irrigators and rural populations.

Institutional Matrix of Water Governance and Poverty Reduction

Institutional restructuring brought about by the water sector policy and reforms in the irrigation sector were based on the need to ensure local level participation and representation of livelihood concerns in decision-making processes of water governance. This is also rooted in the broad theoretical argument that stresses the centrality of institutions as critical channels through which people’s livelihood strategies are shaped and mediated. Now there exists a complex web of formal and informal institutions that govern water in the irrigation sector.

Their existence ensures competing and conflicting roles with a resulting situation in which the institutional environment has bred confusion within the smallholder irrigation. This was clearly illustrated in both Mutema and Tawona irrigation schemes whereby several institutions manage the different types of water for irrigation, a situation brought partly by the current water reforms and institutional changes within AGRITEX. As part of the water reforms, two institutions governing water were created, namely Zimbabwe National Water Authority (ZINWA) and sub-Catchment Councils. Under the water reforms ZINWA's major task is to provide bulk raw water to irrigators. Since ZINWA was a transformation of the Department of Water Development, it took over the operations and maintenance of engines and pumps that supply the irrigation schemes. In addition, ZINWA took over the management and construction of dams, which previously had been under the Department of Water Development which mean that dam water or 'agreement water' became ZINWA's responsibility.

On the other hand, the management of underground and raw water is under the jurisdiction of the SCC. The Water Resources Management Strategy specifically states that the sub-catchment council functions include, *inter alia*, regulating and supervising the exercise of permits for the use of water including ground water within the area for which they are established. In addition, the sub-catchment council reports to the catchment council on the exercise of water permits within its area, monitoring water flows and water use in accordance with the allocation made under the water permit, and collecting sub-catchment rates, fees and levies.

In short, the distinction that is often expressed between ZINWA and SCCs is the 'type of water' each institution manages, with the former managing agreement water and the latter managing rivers and underground water. The apparent establishment of the two institutions of water management and the separation of their respective roles and responsibilities threw the irrigators in Mutema and Tawona irrigation schemes into confusion. Since the two irrigation schemes use *both* agreement and raw water, they have to deal with ZINWA and the lower Save East SCC.

Mutema and Tawona irrigation schemes rely on raw water from the Save River during the rainy season—from November to March—when flow is normal. During periods of reduced flow (June to October) the Save River is augmented by agreement water (i.e., dam water) from Ruti and Osborne dams. It is during the periods of reduced flow in the Save River that the Irrigation Management Committee of Tawona and Mutema irrigation schemes liaise with ZINWA so that they can conduct their winter cropping.

For Mutema Irrigation Scheme, the use of borehole water for irrigation adds another layer of complexity, albeit the saltiness of the borehole water, which necessitates reliance on raw and agreement water from Save River and Osborne and Ruti dams. This demands that Mutema and Tawona irrigation schemes deal with both Lower Save East SCC (during normal flow of the Save River when the schemes rely on raw water) and also with ZINWA (during winter when they use agreement water). One farmer, an Irrigation Management Committee member for Mutema Irrigation Scheme, aptly captured the institutional messiness by noting that: *the fundamental question is which institution do we have to work with for our farming purposes? And secondly, to which one institution should we pay the water rates, since ZINWA has its own charges and the Lower Save East Sub-Catchment Council also has its own charge for the one resource—water?*^{PPP}

^{PPP} Interview with a committee member for Mutema Irrigation Scheme. 9/12/2005.

In order to deal with the institutional messiness brought about by the water sector reforms, the irrigators at both Mutema and Tawona irrigation schemes had resolved, whether by design or by defiance, to pay a monthly lump sum to ZINWA. In the words of the IMC treasurer for Tawona Irrigation Scheme: *we let ZINWA and Lower Save East Sub-Catchment Council sort out their own problems of sharing the money we pay!*⁹⁹⁹

While ZINWA and Lower Save East SCC are central to the management of water in the two schemes, AGRITEX has had a long history of working with farmers in irrigation schemes. AGRITEX officials or ‘madhomeni’ as they commonly known, are responsible for assisting irrigators with the provision of agricultural extension, technical and management services. AGRITEX officials were responsible for the management of water in the schemes, the construction and maintenance of canals, the pegging of plots, and the monitoring of irrigated crops to ensure successful crop production. However, the institutional reforms in 2002 caused the splitting of AGRITEX into two public institutions under different ministries, namely the Department of Agricultural Research and Extension (AREX), under the Ministry of Lands, Agriculture and Rural Resettlement and the Department of Irrigation (DI), under the ‘Ministry of Water Resources and Infrastructure Development’. AREX was created after the amalgamation in 2002 of research and extension functions in the former departments of AGRITEX and Research and Specialist Services. In turn, AREX’s responsibilities in the irrigation sector were limited to the management and provision of extension services that pertain to crop production. Thus, water management on smallholder irrigation schemes was passed to the Department of Irrigation (DI). It was stated that DI is also responsible for the construction of canals and rehabilitation of all irrigation schemes and the development of new ones.

The impact of the government institutional changes, particularly as it transformed AGRITEX into AREX and the Department of Irrigation, led to the exacerbation of the extent and level of confusion among irrigators. One AREX official noted that: *when farmers in the scheme come to our office with water issues, I tell them that this is the wrong office and they should go to the Department of Irrigation. Unfortunately, our office is the one located on the scheme while the offices for the Department of Irrigation are in Mutema*¹⁰⁰⁰.

While the IMC and AREX officials enjoy a healthy working relationship, the logic that underpins the formation of AREX may in the long term undermine the relationship between IMC and AREX, at least on irrigation schemes. As AREX officials lose or cede the control and management of the most vital resource on irrigation schemes—water—they may lose the confidence of the irrigators and irrigators may seek new alliances, predictably with those institutions that control and manage water.

Indicatively, an AREX official, who used to be an AGRITEX official, pointed out that: *In the past we use to control and manage water on the schemes, which enabled us to contribute to high crop production on the schemes. If you observe that some crops are wilting, you could go and tell the water bailiffs to provide to those sections that have wilting crops. We could liaise with the Department of Water Developed to have water released to the relevant fields. Now, as AREX, my hands are tied to crop production, yet water in irrigation schemes is central to that. With the changes, some of the institutions involved in irrigation schemes do not have a clue about agriculture. There are there to make money. It’s frustrating for me to see a promising crop wilt and die just because someone is not willing to provide water to the farmers.*¹⁰⁰¹

⁹⁹⁹ Interview with the Treasurer for Tawona Irrigation Scheme. 5/12/2005.

¹⁰⁰⁰ Interview with an AREX officer in Mutema. 5/12/2005.

¹⁰⁰¹ Interview with an AREX official at Mutema Irrigation Scheme. 5/12/2005

The sentiment and observation of the AREX official were shared by the irrigators in both Mutema and Tawona irrigation schemes, who laid the blame for a complete write-off of the maize crop in January 2004 on the Rural Electrification Agency, a subsidiary of ZESA. See Box, below.

Case 1: Electrifying Crops – The Intervention of Rural Electrification Agency in Mutema and Tawona Irrigation Schemes

After farmers in the two irrigation schemes had planted their maize crop in November 2004, by January 2005 the crop was at the tussling stage. It was during this stage that an official from the Rural Electrification Agency (REA), a subsidiary of the Zimbabwe Electricity Supply Authority, visited the two schemes informing them of a donated engine that could supply the two schemes with more than sufficient water for irrigation. While the irrigators were delighted with the news, they pointed out that the installation of the new engine and pump should be stopped for about two weeks so that their crops could survive, since they were at tussling stage. They reasoned that a further two weeks of irrigating their maize would ensure them a decent, if not bumper, harvest. The REA official insisted that the engine and pump be installed and went ahead to dismantle the old engine and pump, and installed the donated one. The installation led to the stoppage of water to the irrigation schemes and consequently the writing off of all the maize crop in Mutema Irrigation Scheme and a half-ton harvest in Tawona Irrigation Scheme, as the crop was scorched by the heat that characterize this part of the lowveld. Further, the 'new engine and pump' subsequently worked for a maximum of six hours at a time as it is frequently switched off because of overheating. One irrigator in Mutema Irrigation Scheme noted that the engine is either not working or overheating since it was installed in January 2005: *If we call an engineer from ZINWA Harare to come and fix the 'new engine', when he is on his way back we would have already called his office twice about another breakdown. This season's (2005/2006) maize crop was planted during the first rains. The 'new pump' has reduced us to dryland farmers!*

In a corollary to this tale, the Zimbabwe Electricity Supply Authority (ZESA), through its subsidiary Rural Electrification Agency (REA), supplies electricity to pump raw and borehole water for Mutema and Tawona irrigation schemes, thus making these two parastatals important institutions in smallholder irrigation. However, electricity is supplied to the two schemes at a fee. Thus the two schemes pay a significant amount of money in electricity bills to ZESA. Failure to pay ZESA bills results in the electricity being cut-off from the pumps, which directly results in the lack of water supply to the irrigation schemes, and in turn adversely affect crop production. One of the recent problems cited by irrigators in both Mutema and Tawona irrigation schemes is the problem they face in paying their electricity bills, which was viewed as 'always too high'. This is illustrated by conflict between ZESA and irrigators in Mutema irrigation scheme in 2000.

Mutema irrigation scheme had accrued a combined bill of Z\$203,674 in January 2000 and were failing to pay the bill. The electricity was cut-off and thus there was no water to irrigate their maize crop. The farmers argued that most of their boreholes had broken down and only one out of five was working, a situation that had led to the insufficient supply of water for crop production. Consequently, they had not harvested and sold enough crops to earn sufficient money to pay for the bill. In a letter from Mutema Irrigation Scheme to the District Agricultural and Extension Officer in 2000, they pointed out that due to insufficient water to the scheme it was difficult [for the farmers] to pay the bill. In addition, the letter stated that farmers in Mutema Irrigation Scheme paid their ZESA bill in 1999 despite the fact that they lost their crop due to lack of water, a direct consequence of electricity being cut off by ZESA.

However, it is important to note that the lack of payment of electricity bills within the two irrigation schemes is a recent phenomenon as the electricity bills were previously paid by the Department of Water Development, through a budget allocation from the Treasury.

In reference to the January 2000 case, although the Department of Water Development managed to pay the controversial ZESA bill, the official pointed that: *the ZESA bill should be addressed to the farmers and not to the Department of Water because that department had changed into ZINWA*^{ttt}.

Despite the fact that the Department of Water Development (DWD) was transformed into ZINWA, Water Bailiffs still exist, who are under the Department of Water Development. However, it is not clear at present whether the Water Bailiffs are within the Department of Irrigation or are still with the Department of Water. As a result of the transitory nature of institutional changes, some respondents noted that the water bailiffs seem to have no control as indiscipline is rampant. Perhaps, this indicates the lack of clarity with regards to where water bailiffs are institutionally located.

In essence, there are multiple institutions involved in the provision of raw water from the river to the crops. ZESA lays its claim to water for irrigation by supplying electricity, which is necessary for pumping of water. The sub-catchment council has jurisdiction over raw and underground water. On the other hand, ZINWA has authority over agreement water, which it provides up to the field edge, through the main canal. As the water is drained into a network of minor canals, it is owned by the Department of Irrigation and is controlled by water bailiffs who are responsible for ensuring the equitable distribution of water among irrigators in the scheme. The siphoning of water from the minor canal into the field, for flood irrigation, is the responsibility of the Irrigation Management Committee, through the Block Committees, which ensures the equitable distribution of water among individual farmers or plot holders.

The Concept of Water as an Economic Good and Its Implications on Poverty Reduction

One of the central tenets of the water sector reforms of the 1990s was the conceptualization of water as an economic good, with a fee attached to it. The premise is that paying for water will induce effective and efficient ways of water management among users (Mtisi and Nicol, 2003; Movik et al, 2004). Zimbabwe's Water Resources Management Strategy document clearly states that treating water as an economic good is the best way of achieving fair and efficient use, and of encouraging conservation and protection of water resources (WRMS, 1999).

In practice, the treatment of water as an economic good has revealed contradictions that adversely affect smallholder irrigation sector. For both Mutema and Tawona irrigation schemes, the water bill that they pay to ZINWA has drawn significantly from their income. With specific reference to Tawona irrigation, the payment for water constituted 97% of their total expenditure for the year ending 2004^{uuu}. The high water bills are worsened by the inadequate supply of water to the schemes, which has led to poor harvests. Thus, the farmers point out that they are failing to sell enough crops to meet the ZINWA charges. One irrigator succinctly captured the situation by noting that: *the high water charges by ZINWA are killing us. ZINWA is failing to repair the engines that supply the scheme with water, and also to provide water to the field edge as per its mandate. We are paying a lot of money for water to ZINWA, yet we receive inadequate water for*

^{ttt} Minutes of Mutema/Tawona Area Staff Meeting held at Mutema Sub –Office dated 05/09/2000.

^{uuu} Tawona Irrigation Scheme Financial Report for 2004.

our irrigation needs...Crop production has been severely reduced and we are unable to pay for water. We are now selling our livestock and other assets to pay for ZINWA bills!^{vvv}

The comment indicates explicitly that smallholder irrigators are not receiving adequate supplies of water to support viable agricultural production, which would have enabled them to meet the water bills. In such a context, irrigators have resorted to selling their assets in order to pay for water to the extent that it has undermined their livelihoods and led to asset stripping—another dimension of rural poverty.

Irrigation Technology and Poverty

In Zimbabwe, there are two main irrigation technology systems used in smallholder irrigation sector, namely surface (or flood) and sprinkler (or overhead) systems. The sprinkler system is used on 11% of the irrigated area in smallholder sector, while 89% is under surface irrigation (MLAWD and FAO, 1994). It is noted that the overall design efficiencies of surface and sprinkler irrigation systems are estimated to be 40-45 % and 75 % respectively (ibid.).

Irrigation technology in Zimbabwe has undergone numerous changes from simple gravity fed to pump and pressurized overhead sprinkler systems, a process that is associated with changing policies and politics of irrigation management (Chidenga and Vincent, 2004). Sprinkler systems came to increasingly dominate the smallholder irrigation sector from the 1970s onwards. When AGRITEX took over of control of the smallholder irrigation sector in 1987, this sealed the dominance of sprinkler irrigation systems as it expedited the move from simple gravity systems to pump/lift and pressurized sprinkler systems (ibid.). This was largely attributed to the biases in favour of sprinkler systems which originated from the global developments in sprinkler technologies as well as within AGRITEX. With reference to AGRITEX, Chidenga and Vincent (2004) point out that: *the training programmes supported by FAO also helped to focus attention on pressurized delivery systems* (2004:85).

In the case of Mutema Irrigation Scheme, the broad shifts in irrigation technological developments had an important bearing. Largely in response to technological shifts, Mutema Irrigation Scheme moved away from surface to a sprinkler irrigation system in 1973. Of the 237 hectares of the scheme, 183 hectares were put under sprinkler and the other 54 hectares remained under flood irrigation. However, it was commonly reported that the sprinkler system had problems shortly after it was installed. The problems still persists even today. Thus, despite the technological advantages of sprinkler systems, such as the ability to irrigate larger areas and better delivery of crop water, the system was sophisticated and very expensive for smallholder irrigators in Mutema irrigation scheme.

A common complaint by farmers in Mutema Irrigation Scheme was that the system was old and needed replacement. They point out that the pipes leaked to such an extent that most of the water was lost through leakages. This has led to a general feeling of neglect, particularly with the current lack of water for irrigation on the scheme due to frequent engine failures. In addition, a common perception shared by the farmers in the scheme is that the sprinkler system ‘loses a significant proportion of water in the air’. One irrigator in Mutema Irrigation Scheme figuratively pointed out that: *the sprinkler system, spits at the crops! Most of the water is lost in the air, particularly when it is windy. One is only irrigating when one uses a flood irrigation system. That’s what we call irrigating because the water seeps into the soil.*^{www}

^{vvv} Interview with an irrigator in Mutema irrigation scheme. 11/12/2005.

^{www} Interview with a farmer at Mutema Irrigation Scheme. 10/12/2005

Given the technological problems associated with the sprinkler system at Mutema Irrigation scheme, the situation is exacerbated by the prohibitive costs of rehabilitation. The economic reforms of the early 1990s, and the later water reforms, saw an increased reduction in the role of the state in smallholder irrigation, particularly in providing funding for such rehabilitation programmes. For instance, the notion of cost recovery, which was at the heart of the economic reform programme in Zimbabwe, called for reduced government spending in water with negative implications for smallholder schemes such as Mutema and Tawona. The water sector reform programme, which similarly called for reduced role of the state in providing funding to the water sector necessitated a broader funding base for the water sector since government had been the major financier of water development projects in the context of simultaneous increased demand on its resources and a sharp decline in allocations to the water sector (WRMS, 1998:1).

Added to the decline in government funding, the current economic crisis, with triple digit inflation and a depressed commodity price for agricultural produce, has made it difficult for farmers in Mutema to pay for rehabilitation on their own. In short, the livelihoods of farmers in Mutema irrigation scheme have borne the brunt of the adoption of the sophisticated sprinkler irrigation system. The reliability of the sprinkler technology was in doubt shortly after installation and the high costs associated with its maintenance have resulted in added problems to the irrigators. Consequently, such technological problems have led to inadequate supply of water for crop production.

The leakages within the pipes and the perceived inefficiency of the sprinkler technology have led to delays in crop planting. The situation has been worsened by frequent engine failures. As a result, this has led to a significant drop in hectareage under production. For instance, farmers in Mutema have significantly reduced maize cultivation for the 2005/2006 season partly due to sprinkler unreliability. It was common during the study to see uncultivated irrigation plots. One owner stated that he did not plant any crop since he was certain that no water was going to be provided in Mutema Irrigation Scheme because of frequent pump failures. The owner of the uncultivated plot reasoned that his failure to plant was to safeguard the savings that he had, rather than to use his savings to buy inputs and then ‘to sow and reap disaster’.

Environmental factors and Poverty

One of the major impacts on water provision is the siltation of the Save and Tanganda rivers. Excessive siltation of the Save River can be attributed to poor land husbandry within the communal areas of the catchment, which in turn is a result of colonial land policies that resettled thousands of people and livestock on marginal lands. The effect is to reduce the period of flow for Save and Tanganda rivers, hence the period of time that raw water can be abstracted for irrigation purposes. It was commonly stated that the ‘perennial Save River has been reduced to a seasonal river, with the river flowing from late November to about May, and having reduced amount of water available for irrigation between June and October’^{xxx}. Secondly, it was noted that siltation has severely affected the life span of irrigation pumps to the extent that the frequent breakdown of some pumps is attributed to it. Siltation of Save and Tanganda rivers has led to the shortages of water for irrigation in Mutema and Tawona, a situation that has adversely affected the livelihoods of irrigators and surrounding communities.

Fast Track Land Reform Programme, Water Supply and Poverty

^{xxx} Interview with an AREX officer. 8/12/2005

The current politically-charged Fast Track Land Reform Programme has altered the terrain of the water governance and poverty debate, particularly within the smallholder irrigation sector, and particularly so given the fact that smallholder irrigation schemes are located in communal areas, where demands for land and water are more severe.

There exists a rich body of literature on the Fast Track Land Reform Programme (UNDP, 2002; Government of Zimbabwe, 2002; Moyo, 2002; 2004 on the origins and rationale of the fast track land reform; Chaumba, Scoones and Wolmer 2003; on the politics that surrounds the land reform programme). The land reform programme was aimed at the compulsory acquisition of land—largely from the white commercial farming sector, private companies and absentee landlords—for resettlement purposes and without paying compensation. The programme was aimed at decongesting the densely populated communal areas, and to increase agricultural production in these new schemes and thereby reducing the extent and intensity of rural poverty.

For Mutema and Tawona irrigation scheme, fast track land reform has led to an increased number of plot holders, leading to a simultaneous increased demand for water for irrigation. In the context of prevailing water shortages at Mutema irrigation scheme, the additional plot holders are adding another dimension to the water shortages experienced by the scheme. Firstly, it was pointed out that the available water is failing to adequately support the existing plot holders let alone additional new members. Secondly, in trying to meet the irrigation needs of the increased numbers of farmers, this inevitably results in prolonged periods of each plot holder getting water to irrigate his/her plot. In view of the prolonged down-times due to engine failures and leakages within the sprinkler system, the addition of new plot holders extended the length of irrigation cycles. A Water Bailiff at Mutema Irrigation Scheme, pointed out that: *In the past, one irrigation cycle took five to nine days, and when the engine and sprinkler problems started, the irrigation cycle extended to 21 to 30 days, and with the current addition of new plot holders under fast track land resettlement, the cycle has increased to 40 days. By the time I move water to the first plot, there will be nothing to irrigate. All the crops would have died^{yyy}.*

These observations were also true for Tawona Irrigation Scheme, where the irrigators expressed an increased number of days for the irrigation cycle. In short, in the absence of a concomitant increase in the supply of water to the two irrigation schemes, the addition of plot holders under the fast track land reform programme is proving disastrous to the livelihoods of the people that it purports to lift out of poverty.

Conclusions

The global and local debates that underpin the broad policy on water governance and smallholder irrigation rest on the need to reduce poverty through increases in food crop production, raising rural incomes and creating employment in rural areas. Policy changes in the water sector in the 1990s were premised on improving access to and use of water for productive purposes in communal and resettlement areas and to correct inequalities in the distribution and allocation of water among different water users. The institutional restructuring that accompanied the water reforms was aimed at providing the institutional mechanisms for gaining access to the resource as well as providing an institutional fora for the participation of users in the governance of water. At the heart of this reform process was a need to reduce the level and extent of rural poverty that is common in Zimbabwe's rural areas, where more than 70% of the population reside and rely on agriculture for their livelihoods.

^{yyy} Interview with a Water Bailiff at Mutema Irrigation Scheme. 12/12/2005.

As the water reforms were founded on the principle of equity of access for all water users, the reforms presented an opportunity for poverty alleviation through opening up access to water for productive uses among the previously disadvantaged smallholder irrigators, communal, resettlement, small-scale and newly-resettled farmers. Access to water could be legally gained through the issuing of a water permit, a process that was intended to benefit the previously disadvantaged water users, particularly smallholder irrigators. More importantly, the water permit system replaced the tying of water rights to land rights, thus people residing in communal and resettlement areas (a majority of whom are poor people and without land rights) and smallholder irrigation schemes can gain access to water, and enforce their claims to the resource.

However, there is a general lack of adequate information about the water reform process, particularly the aims and objectives of the water sector reform, and how the Water Act and ZINWA Act seek to improve the means and mechanisms through which users can gain their access to water for productive purposes. This lack of knowledge has proved to be an obstacle in the policy implementation process. Added to this gap in information is a lack of proper delineation of roles, functions and responsibilities of decentralized institutions. The creation of SCCs to 'replace' the River Boards, has witnessed the emergence of strong commercial farming interests within the SCCs and CCs to the extent that they can thwart the interests and livelihood concerns of new water users (Mtisi and Nicol, 2003). In addition, the establishment of ZINWA along commercial lines has led this institution to be mainly concerned with collecting water levies from water users at the expense of representing and safeguarding the interests of poor farmers. This has encouraged the dominance of sectional interests (i.e., large-scale commercial farming interests in SCCs and financial interests in ZINWA) in the new institutions.

These new institutions have been overlaid on existing institutions of smallholder irrigation governance, including government departments and locally-based institutions such as the Irrigation Management Committees and traditional leaders. The institutional complexity that has emerged has distorted institutional routes through which smallholder irrigators gain access to water and manage the resource effectively. At present smallholder irrigators on Mutema and Tawona schemes are failing to establish viable institutional linkages with the relevant institutions of water management in order to enhance their access to the resource.

Despite the merits of enhanced crop water efficiency that are attributed to the sprinkler technology, its adoption in Mutema irrigation scheme highlights the problems that may arise in the absence of adequate funds to maintain the system. Thus, declining government funding to the scheme and the associated high costs of rehabilitating the sprinkler system is threatening both the irrigation scheme itself and the livelihoods of the people that the scheme supported. This is largely due to the unreliable supply of water for irrigation. Lastly, the fast track land reform has added to the problems affecting smallholder irrigators in Mutema and Tawona irrigation schemes. The increases in the number of plotters in the two schemes, as a result of the land reform programme, has led to increased demands on a declining water resource base (as a result of siltation) and an unreliable supply of water (as a result of technological problems, engine failures and so on). This has led to increased irrigation cycles per plot which has reduced the number of plots cultivated in the 'fear of sowing and harvesting disaster'.

Palestine

Agriculture is a central feature of Palestinian national identity^{zzz}. Although in recent years it has only contributed a dwindling proportion of GDP, the sector continues to provide an economic core to many rural households in the West Bank and Gaza. In recent years the sector has played the role of employer of last resort under economic crisis conditions. Debate over its future role in the Palestinian economy continues, but an enduring narrative remains the connection between agriculture, land use and Palestinian political aspirations to statehood.

Agricultural production in Palestine has varied historically and has been subject to major external impacts ranging from Ottoman laws and the British Mandate to Israeli occupation and restrictions. Changes to land title under the Ottomans allowed creeping control by large families and tribal and helped to precipitate the decline of Palestinian peasant farming in the latter part of the 19th Century, well before the political *nakba* or ‘catastrophe’ of 1948. Additional factors contributing to this decline included lack of rural credit, low levels of technological innovation and continued land fragmentation under Islamic inheritance systems. One consequence of the changes in land ownership instigated under Ottoman control was the poor registration of land title that was never fully completed due to the rapidly deteriorating political situation in the 1930s. This is a problem that persists to this day.

The forced dispossession of Palestinians from their lands in 1948 and 1967 (mainly to Jordan and Lebanon) shook the economy and undermined much of Palestinian society. Only some 30% of the indigenous Palestinian population remained in the West Bank, 15% in the Gaza Strip and 5% in Israel, leaving behind economic enclaves along the spine of the West Bank and in the Gaza Strip. Much economic activity in these enclaves remained isolated from the most productive land and important markets plain (Al-Malki, 1994: 74-76)^{aaaa}.

Occupation, control and dependency

The structural impact of Israel’s occupation post 1967 contributed further to marginalization of Palestinian agricultural activities. In 1968 agricultural output was 40% of GDP, declining to 25% in 1990 and 19% in 1994 (El-Jafari, 1997: 102). In parallel employment in the sector dropped from some 43% in the mid-1960s to 24% in the mid-1990s (Foundation for Middle East Peace, 1998). By the 1970s unskilled wage labour in the Israeli economy had come to absorb up to a third of the WBS^{bbbb} workforce. Israeli labour markets substituted for indigenous employment in the Palestinian industrial sector which from just 11% in the WB and around 2% in GS by the 1960s had risen to just 17% in the WB and 13% in the GS by 1997. High levels of employment in Israel during the 1980s made the Palestinian economy one of the most remittance-dependent in the world.

The loss of land and property to Israel combined with the emergence of a salaried and wage labour economy strengthened the value to households of education and migration. The latter in

^{zzz} This section draws on an unpublished report produced under the SUSMAQ project, Shalabi et al (2005).

^{aaaa} ‘Enclave’ development is again becoming a feature of the Palestinian economy under occupation and closure—see below and final section.

^{bbbb} In 2000 the population of the West Bank and the Gaza Strip were 2.3m and 1m respectively. There are also some 800,000 Palestinian Israelis living within the Green Line (1948 ceasefire lines).

particular became a major goal within extended family networks^{cccc}, but frequently decisions to migrate and/or educate favoured male family members, which helped to entrench intra-household gender disparities in employment, skills acquisition and education, continuing to this day. The value placed on education led a third of the population in the WBGS to become students in schools and universities causing a flood of new graduates to enter what was an already overloaded labour market in the early 1980s thereby exacerbating unemployment (Al-Malki and Shalabi, 1993: 46-61). This was at the expense of investment in agricultural development.

New rules of the game and the second intifada

The Oslo Accords and subsequent emergence of the Palestinian National Authority (PNA) changed the rules of the game by presenting the possibility of Palestinian statehood in the near future^{dddd}. At the outset PNA decision making was dominated by the challenge of leading a society and economy still largely economically dependent on, and controlled by, Israel. In spite of the accords, however, and the Paris Protocol on economic relations^{eeee}, Israel continued to periodically close its border and prevent access to the Israeli labour market. Large tracts of the WB, including crossing points and most of the natural resource base, remained under Israeli control at the same time as settlement expansion continued^{ffff}.

The result of this new situation was substantial change in the socio-economic relationship of Palestinian society to Israel. Combined with the introduction of the closure policy^{gggg}, Palestinian unemployment began to increase substantially and reached 25% by 1996 (World Bank, 2002: ix), before declining again towards the end of the decade as the Palestinian service sector—predominantly public services—began to expand rapidly. Participation in the labour force also grew significantly from 1995-2000, increasing from 39% to 43% of the active population. In fact that the economy was faced with a labour force annual increase of some 6% and, with it, an exceptionally high dependency ratio of 1 : 7 dependents (reflecting both the extremely young population and the low rate of women's participation in the labour force) (Fischer, et al, 2001: 262). Significant social change which took place following the PNA's establishment included a widening social gap between the rich and poor and the emergence of new public sector and returnee investor elites (Hilal, 2002: pp 86-90).

The outbreak of the second—or Al-Aqsa *intifada*—in December 2000 led to a dramatic decline in economic activity in Palestine and helped to redefine again the relationship between Palestinians and Israelis. Many Israeli responses to the second intifada directly affected Palestinian livelihoods, blocking farmers and rural consumers from urban markets, and by extension major urban centres from their key rural hinterlands. One of the main impacts was to isolate and 'atomise' Palestinian economic activity. The Separation Wall which began construction around the WB, continued this process through encroaching on more than 1,000 dunums of agricultural

^{cccc} An estimated 20,000 people migrated annually from Palestine until the late 1980s (Hilal, 1998: 27).

^{dddd} Although some authors still regarded the Accords as 'legal cover' for Israel's continued, if not intensified, 'policy of confiscation of Arab lands and construction of settlements' (Abed, 1999: 30).

^{eeee} Signed in April 1994 the Paris Protocol on Economic Relations envisaged a trade regime that would encourage the expansion and reorientation of the WBGS productive base towards agricultural and industrial exports, and start reducing dependence on the export of labour (Kanaan, 1998: 69). Three critical features of the Paris Protocol are that it retained: a) Israeli military law over the territories; b) Israel's full control over key factors of production (including land and water); and c) control over external borders and the perimeters of Palestinian areas (Roy, 1999).

^{ffff} In fact from 1992 to 2000 the settler population in the WBGS nearly doubled from 109,784 to 213,672 (which does not include East Jerusalem; here the total settler population rose from 141,000 in 1992 to 170,400 in 2000) (Roy, 2002).

^{gggg} Which between 1993-1996 is estimated to have cost nearly twice the sum of disbursed donor aid over the same period, roughly equivalent to a year's GDP (Diwan and Shaban, undated: 7).

land and dozens of wells along the western aquifer. The Wall's location immediately affected agriculture through the destruction of land and water assets or rendering them inaccessible. The Wall also limited the mobility of people and goods, contributing to higher transaction costs, and dampening investment and overall economic activity (unnamed, 2003: 14). Particularly affected areas were around Jenin, Tulkarem and Qalqilya governorates, which together account for some 37% of all agricultural land in the WB, and the most fertile. Just 5% of the land is irrigated in these areas, but alone produced 16% by value more than the remaining 95% rain-fed land in the same areas in 2000. And in that year these governorates produced 45% of all WB agricultural production, with an output value some 41% greater per sq km than other WB governorates (unnamed, 2003: 15).

An important impact of the second intifada has been to highlight again^{hhhh} the important role agriculture plays as employer of 'last resort' in local economic activity. In the second quarter of 2002 agricultural workers reached 16.9% of the active labour force, compared to 11.7% in the third quarter of 2001, directly preceding the outbreak of the intifada. At the same time employment rates in other sectors dropped, with the exception of the service sector which remained roughly the same, and transport, storage and communications which rose marginally. The rise in agricultural work appeared slightly higher in the GS than in the WB, from 9.4% in the third quarter of 2001 to 21.8% in the second quarter of 2002, against respective figures of 12.8% and 14.9% in the WB (MAS Economic Monitor, December 2002). At the same time as underscoring its key social significance, the continued economic challenge to commercial production posed by occupation remained, not least due to the increasingly complex marketing structure occasioned by barriers to internal market accessⁱⁱⁱⁱ.

Local water sources in most communities provide a key resource for small-scale, household horticulture and other productive activities, providing vital access to natural assets that help to provide a minimum of economic activity. Most of these activities use non-network sources and rely on local, private initiative to ensure a regular supply. A recent survey of water and livelihoods noted that where there was irrigation this was in small gardens averaging just 0.3 dunumsⁱⁱⁱⁱⁱ, with regional variation from 0.46 dunums in the central West Bank to just 0.09 dunums in the Gaza Strip. This small size is both due to the fragmentation of holdings and complexities of arrangements for managing access to water.

Institutional arrangements

The institutional environment in water management is dominated by the Palestinian Water Authority (PWA). The PWA grants licenses, monitors the yield of sources and quality of wells and large springs. Municipalities, village councils and water undertakings manage the public networks within their respective powers and jurisdiction and are responsible for maintenance and collection of water fees from consumers. Local government—represented by municipalities, village councils and project committees—comes under the supervision of the Ministry of Local Government, which certifies their formation and ratifies plans and budgets. They may also enter into relations with the Governor. At the local level municipal and village councils also work with PECDAR, which is responsible for the implementation of developmental projects, and through the MLG, other government ministries and organizations, including the Ministry of Public Works and Housing responsible for infrastructure.

^{hhhh} The first time being during 1996-1997 when Israeli closures were also severe.

ⁱⁱⁱⁱ As an example of impact, Roy (2002) speaks of the Hebron plum harvest worth \$2.5m 2000, but dropping in value to \$250,000 a year later because of the transport restrictions between the southern and northern WB (where the major markets are located for producers).

ⁱⁱⁱⁱⁱ 1 dunum is the equivalent of 1,000 m², or 0.1 hectares.

Local-level institutional arrangements managing water are extremely diverse, in number and type of stakeholders involved and in the way resources are allocated. Ownership structures vary from individual to community and municipal control, and in some cases private owners are under contract to provide from private wells to municipal users. Generally resource owners controlled distribution and tariffs, frequently through unwritten rules between clans. Charing for water was usually based on stepped tariff rates per volume, or their approximate ‘pump hour equivalent’, and varied widely across the territories from NIS 2 to NIS 7 a cubic metre.

Some local management structures had mechanisms to respond to shortage, introducing new systems of irrigation ‘minutes’, which gave priority to domestic needs over agricultural use. However, there was also evidence that private owners used periods of shortage to exploit demand by raising tariffs. Key informants in many communities noted that not only did women perform the bulk of agricultural work, but that they were increasingly beginning to market their own produce in towns. In some cases this was in response to demand, including where Israeli demand for organic Palestinian produce had prompted increased investment in greenhouses and drip irrigation.

Spring sharing arrangements varied greatly. Sometimes a combination of allocation mechanisms existed. In many cases these arrangements were unwritten agreements between extended families making regulation and control not simply a management issue but a highly localised political issue as well. In other cases the systems were large-scale and formalised, with, for example, hundreds of farmers involved in the Ein as-Sultan cooperative in Jericho. Here the relationship was particularly complex because of linkage to Municipal supply, complex methods of distribution based on land title and use and the fact that new investment to improve management of the resource (shifting from open channels to piped water) was beginning to challenge the vested interests of more powerful farmers within the cooperative.

Stakeholder meetings held across the territories revealed a range of management concerns including the need to improve existing PWA management, which was generally regarded as poorly coordinated, overly centralised and lacking key managerial and technical capacity within local authorities (at both municipalities and council level). Key concerns at the user level included inadequate and outdated networks and irrigation distribution systems, as well as a lack of a regulatory authority to deal with illegal connections. Stakeholders called for greater leadership on strategy and policy, improved institutional clarity on overlapping roles and responsibilities between water sector institutions and improved coordination outside the water sector.

Reaching a consensus on local water management in the absence of a strong regulatory framework poses a challenge in some areas. Inhabitants of Badan, for instance, differed widely on the collection of water and its distribution via closed networks. Although there was general agreement that the spring needed better protection from contamination, the owners of tourist projects believed that the current flow regime was a part of the ‘character of the area’, that attracted tourists. By contrast, farmers who irrigated wadi lands from Ein-Al-Nasariéh believed that closed networks would increase water availability. The head of a household with no tourist project said, ‘We support the storage of spring water in reservoirs and distribution by pipe to agricultural lands, instead of keeping it opened and exposed to contamination and loss—even if nominal fees are imposed. We have a problem of contamination especially when the valley water mixes with Nablus sewage water. But water is important for agriculture and this area is an agricultural area. If supplies are transformed into domestic use only, agriculture will decline and the livelihoods of many will be affected, and so will tourism’. Another farmer stated that

agriculture was already not very profitable anyway, so would a piped network make much difference?

Water resources in Palestine

Total precipitation in the WBGS is some 2,990 mcm annually, of which 2,870 is received in the inland region and 120 mcm in the GS. It is estimated that two-thirds are lost to evapotranspiration. Until the 1950s and 1960s, most water in the WB came from springs and rain collection because drilling in the rocky soil was too costly. With better technology farmers began drilling wells along the north-western edge of the WB, pooling their savings and creating 'well companies'. Water was sold on a 'time basis' (unnamed 2003: 54). From 1967 to 1990 only 23 permits were granted by the Israeli Civil Administration for new well drilling of which 20 were for exclusive domestic use. Quotas were imposed on existing wells, according to the quantity matching the first year of metering (from 1968-1970). (unnamed, 2003: 54).

Total annual water consumption in the WBGS is about 220 mcm annually, some 62% of which is extracted from artesian wells, with the remainder from Israel, minor spring and cisterns, etc. Domestic and industrial use together account for 60 mcm (27%) of which 27 mcm (45%) is in the GS and 33 mcm (55%) in the WB. Only 70% of households are directly connected to supply system. Most water—160 mcm (73% of the total)—is used in agriculture. Of this quantity the GS draws 65 mcm (40%) and the WB 95 mcm (60%). Some 60% of agricultural water comes from 2,310 wells of which (86%) are in the GS. The remaining 40% of agricultural water is drawn from springs and surface run-off in wadis (PECDAR, 1995).

In September 1995 the Interim Agreement allocated 28.9% of total water resources (including water to be extracted from the eastern Aquifer through later development) to the Palestinians and 71.1% to Israel. Annual renewable underground freshwater in the order of 600-650 mcm of which Israel permits the Palestinians access to only 167 mcm a year to irrigate 240,000 dunums. Israelis currently use more than 80% of this resource for irrigation and other purposes, including 60 mcm consumed by about 340,000 Jewish settlers in the WB (including East Jerusalem), compared to 62 mcm of non-agricultural water consumed by 1.9m Palestinians in the WB. The Palestinians have not fully drawn their allocation; the quantity authorised including 78 mcm from the eastern Aquifer yet to be developed looks overly optimistic without harming the resource base (Unnamed, 2003: 55). The Interim Agreement recognized Palestinian Water Rights without defining them, instead specifying that rights would be settled in the context of permanent status negotiations (ibid, 56). It is estimated that there is long-term potential to extend the irrigated area in Palestine by 400,000 dunums (FAO, 2000: 26). Out of a total of 612,556 ha only some 178,669 are currently under irrigation—down from 240,000 ha.

Agriculture uses some 60% (167 mcm/year of which half in the WB, half in GS). Currently non-agricultural sectors consume some 112 mcm (62 mcm in WB and 50 MCM in GS) accounting for about 40% of total consumption, but demand in these sectors expected to grow exponentially reaching 236-338 mcm by 2020) (FAO, 2000: 26). Irrigation efficiency ranges from 450 cubic m/dunum in the coastal semi-arid area to 900 cubic m/dunum in the Jordan valley. This is reflected in wide difference in irrigation water prices which vary from \$0.03/ cu m in the Jordan valley to \$0.12-14 cu m in the GS, and to \$0.21-0.34 in Jenin/Tulkarem. Lower water prices in the Jordan Valley explain current low levels of water use efficiency. Although irrigated agriculture covers only 10% of the total cultivated area it contributes about a third of agricultural output (FAO, 2000: 10). The agriculture sector in the WBGS uses on average 70% of the water and contributes about 15% of GDP; industry and construction consume about 13% but contribute some 25% of GDP. Typical value added by irrigated agriculture in the region is between \$0.15 and \$0.30 per cum, while for industries this can be as high as \$30-\$50 per cum. But given the large share of the labour force in agriculture the future adjustment required will be substantial (Diwan and Shaban, undated: 24).

Ein as-Sultan spring, located just north of Jericho, is one of the largest in Palestine and provides the town's water supply for both drinking and irrigation. Located in the Palestinian portion of the Jordan Valley some 300m below sea level, Jericho has a unique climate and an abundance of springs and wells. Ein as-Sultan is one of the largest springs in Palestine with an average hourly flow of 670 cubic meters (see Box 4). The spring both feeds a recently-established public network managed by Jericho Municipality, as well as providing farmers with irrigation water through an extensive cement-lined canal network extending over 28 km.

Livelihood activities in Jericho are numerous and range from working in the public and private sectors within the city to work in Israel or neighbouring settlements^{kkkk}. Agriculture forms a main income source for some households, but particularly for Ein as-Sultan Irrigation Society members with medium-sized holdings. Smaller farmers tend to undertake more diverse occupations. According to official statistics, 16% of the labour force works in agriculture, though this has increased significantly since the outbreak of the intifada. Farmers of Ein as-Sultan focus their cultivation on vegetables in the winter and *mulokhia*^{llll} in the summer, in addition to some animal husbandry. Many activities in Jericho town are related to agricultural service provision. Tourism was previously important, but since the intifada is now virtually non-existent.

Better-off households tend to lease their lands and water shares from Ein as-Sultan spring and/or construct wells and sell water on to the farmers who rent their lands. Many of the farmers who rent land come from other parts of the WB and are provided with a complete 'package' of inputs from fertilizers, pesticides and other production inputs, to final control of marketing. Many households ensure that they grow a range of crops to avoid serious losses due to crop failure. According to one Jericho farmer, 'Crops balance each other out—vegetables that are loss-making are compensated for by others. Last winter aubergine was the most profitable, whereas cucumber achieved only low prices and we lost money on it. Our aubergines compensated for the losses'.

This is the largest shared spring in Palestine. Records of farmer ownership shares are registered with the municipality. Farmers own pumping hours which are inherited and hence are in danger of fragmentation. Share size is proportionate to size of land holding and the type of crops cultivated. There are two types of ownership: first is 'orchard water' (where a pumping hour is the standard 60 minutes). This right cannot be rented, sold, mortgaged or transferred (though there is some bending of the rules). The second type is farming water (*moftalah*), a pumping 'hour' of which is far shorter at 23 minutes and is separated from land ownership (i.e. it can be rented, sold, mortgaged or transferred). Irrigation water is distributed along four main channels each of which irrigates a specific command area. Every channel has 168 pumping hours per week (at 80 m³ per hour). An orchard hour therefore equates to 80 m³. Two employees supervise the transfer to the various quota holders, who usually receive their quota weekly. The large landlords can distribute their quota on their lands any day of the week, dependent on the availability of water within the nearest channel, many of whom have constructed substantial reservoirs to hold their quotas until application is required.

The Ein Al-Sultan Irrigation Society (a co-operative) comprises 943 irrigators, but in mid-2003 just 350 members owned 80% of the allocated water. Part of the rationale for establishing the society was to respond to increasing water theft. Membership fees are charged (originally J.D 30,

^{kkkk} In the West Bank as a whole some 30% of all permits since 1994 have been provided for employment in settlements (Farsakh, 2002).

^{llll} A species of mallow which is commonly used in Middle Eastern cooking. Farmers use Ein as-Sultan waters to cultivate *mulokhia* in the summer as it needs little water to grow. The Jericho crop is marketed across all parts of Palestine.

but subsequently reduced to J.D 10 to encourage affiliation by small farmers). Land ownership ranges from one to 100 dunums, and just 5% of spring owners have 50 dunum plots or larger. The majority have small plots of one or two dunums. A high percentage of owners have fewer than 11 hours of water. The society represents farmers with the Municipality with whom there is joint management of the spring water and distribution of quotas. Presently the society is investigating replacement of open canal irrigation by piped water.

An agreement between the Society and the Municipality allows the latter to obtain 42% of the outflow for the public network with the remainder allocated to irrigation. According to this agreement neither the Municipality nor the farmers pays for the water. The Municipality imposes fees on the water from this spring according to the size of water ownership. It also collects NIS 3 annually for every water minute owned, such that farmers owning an orchard meter pay NIS 180 annually and owners of farming meters pay NIS 69 annually. The municipality also charges fees for registering water leases of JD 15 from each of the tenant and landlord. The orchard water meter is JD 200 annually and the farming water meter JD 120. Despite the renting of orchard water being technically illegal, people in charge overlook this in order to increase municipality income. The Society has found external funding and expertise (Chinese) to renew the irrigation system. This project is to be implemented in two phases working down from the major to minor canals. The project management committee comprises the PWA, the Society, the Municipality, and the Agricultural Department in addition to a local engineering office. Open water channels are to be replaced with sub-surface pipes connecting farmers through metered pumps. The idea is to reduce unaccounted-for-water due to evaporation (and probably from water ‘theft’). Whilst the majority of farmers support the project—particularly the smaller land-owning farmers—some farmers will lose their system control over the system and benefits of receiving ‘extra’ water unused upstream and oppose the project. (Source: case study research, key informant interviews).

In Dhinnaba wells are privately owned and the water privately distributed, for which there are four main pipelines. The water is sold at J.D. 15 per pumping hour, and an average pumping hour yields some 60 m³. In case of damage or disruption to a well, beneficiaries will be supplied with water from an alternative. Modern irrigation methods are practised and the proximity of Dhinnaba to Israel has encouraged more commercial exploitation of water. Usually a portion of each share is used for irrigation whilst the remainder is stored for subsequent use. Shared wells come under partnership agreements, which sometimes limit their scope for development. In Abasan, for example, one respondent stated that he paid an annual sum of around NIS 800 for fuel and equipment to maintain the well owned by his family (his immediate family’s share of operating costs). At the same time he pays nothing to use the water for irrigation: ‘The water capacity of the well is limited and is only used by partners who belong to the same family and some other relatives. My uncle, father and I thought of drilling another well to increase the quantity of water and provide farmers with water (to sell water to farmers as a source of livelihood), but our project is presently frozen because of high costs (exceeding \$7,000) in spite of the increasing demand on wells in the village’. (Source: case study key informant interviews).

Key governance issues

Institutions and Decentralisation

The emergence and centrality of the concept of ‘governance’ in the debates on water management is challenging intellectually and practically many established management and allocation norms at a local level. Governance is increasingly conceptualised as a relationship between the state and civil society, covering a whole range of institutions and relationships such that the term ‘water governance’ is taken to refer ‘to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society’ (GWP, 2003:7).

This understanding is driven by notions of entitlements and the ways in which entitlements lead to access to the resource. Entitlements can range from market entitlements, to direct entitlements, public entitlements and civil entitlements. The route to these entitlements varies from direct sources—i.e. direct access to the resource and indirect access through membership or affiliation to organisations—arrangement by the State (i.e. public entitlements) and by affiliation to institutions.

A particular focus in new water governance debates are notions of decentralisation, embedded in which are elements of accountability and local level participation and representation, as well as issues of legitimacy, institutionalisation of central and local power, and the interface between political institutions and institutions of water management.

Central to many conceptualisations of governance are notions of ‘institutions’^{mmmm}. From an institutional perspective, governance is the institutional capacity of public organisations to provide the public and other goods demanded by a country’s citizens or their representatives in an effective, transparent, impartial, and accountable manner, subject to resource constraints’ (World Bank 2000:48). Governance processes provide institutional fora for citizen empowerment and participation in governance of their lives (and livelihoods).

However, this World Bank’s articulation centres on formal institutions, whilst other theorists increasingly emphasise the role of informal institutions of governance—i.e. the norms, rules and expectations in binding behaviour for the collective good. In this understanding institutions operate not just because of reform of rules, procedures and routines but because of the norms, expectations and customs that guide behaviour (North, 1990; Woodhouse, 1997; Hulme and Murphree 2001; Scoones 1998).

^{mmmm} The term ‘institution’ has been variously defined by different authors from different academic disciplines. From a sociological and anthropological perspective, North (1990) defines institutions as ‘rules of the game of a society’. Giddens (1979) defines ‘institution’ as ‘regularised practices (or patterns of behaviour) structured by rules and norms of society which have persistent and widespread use’. From this perspective, institutions may be formal and informal, often fluid and ambiguous, and usually subject to multiple interpretations by different actors (Scoones, 1998). Further, institutions are viewed as dynamic, continually being shaped and reshaped over time. Institutions are thus part of a process of social negotiation, rather than fixed ‘objects’ or ‘bounded social system’ (Ibid.).

Thus, “governance” highlights “rules of the game” (Young 1994) or “rules-in use” (Watts 2000), which are “as dependent on inter-subjective meanings as on formally sanctioned constitutions and charters” (Rosenau 1992:4). In other words, “governance” points to a complex of relations ordered through the interaction of a panoply of governing and mutually influencing actors (Kooiman and Van Viet 1993:64). This demonstrates a shift in the balance between the state and civil society, resulting in the opening up of governance space to a variety of interested actors in the search of common ground and shared solutions.

A concern with institutions leads to a broader concern that of how various institutions and actors are accountable to each other, and to their respective constituencies. How are they arranged (vertical or horizontal; central or local); what is their nature (i.e. are they legitimate, participatory and democratic?, and if so, do they foster efficiency and equity in the management of resources?). Wedded to the above, are attempts to describe the key features of governance with the view of providing a guiding map for understanding governance and drawing its constituent elements (Newell, 1998; Stoker 1997).

Stoker (1997) proposed key features of governance (cp. Newell, 1998) which are: a set of institutions and actors drawn from but also beyond government; autonomous self-governing networks of actors; the blurring of boundaries and responsibilities for tackling social and economic issues; power dependence involved in the relationships between institutions involved in collective action; capacity of getting things done which does not rest on the power of government to command or use its authority; participatory and accountability.

Where does this leave water governance and production debates?

From this backdrop the term ‘water governance’ evolved and became a key theme, both in academic and policy circles. One definition commonly used is that it refers ‘to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society’ (GWP, 2003:7). Water governance thus encompasses the mechanisms, processes and institutions through which citizens and groups articulate their interests on water, exercise their legal rights, meet their obligations, and resolve their differences (adapted from OECD 2003). In addition, the term ‘water governance’, “encompasses norms, values, actions, laws, regulations, institutions and policies” (GWP 2003:4) that surrounds the management of water resources. National sovereignty, social values, religion or political ideology have strong impact on the governance arrangements related to the water sector and play a role at least as significant as institutional structures. Clearly the relationship to the resource is mediated by the relationship to layers of decision making which is structured according to different institutional set-ups, both formal and informal.

In global terms, the 1992 Dublin Principles on Water and Sustainable Development, Agenda 21 Declaration in Rio, and the 2002 Johannesburg Ministerial Declaration all sought to promote water governance, supported by a set of fairly recent international institutions—the World Commission on Water, the World Water Council and the Global Water Partnership. The legal framework for water reforms were largely entrenched in the 1997 UN Convention on the Law of the Non-Navigational Uses of International Water Courses, which in principle provides a legally binding framework for member states who have ratified the convention, including the development of institutional mechanisms for collaboration and recognition of equitable water utilisation.

Many authors have indicated that the role of the state or government in water governance is to ‘provide an enabling environment for establishing effective institutional, legal and policy

frameworks based on democratic institutions' (OECD, 2000; World Bank, 2000; Turral, 1998; GWP 2000; 2002; 2003). The State as a partner with non-state actors in natural resources governance. Conceptualising the state in this manner is typical of international organisations (e.g. the World Bank) and other donor agencies, which through 'good governance' programmes, wish to support reforms that strengthen the recipient governments' capacity to steer, while at the same time seek to promote and strengthen participation by civil society in the governing of water.

Challenges to governance: the role of the State?

Many premises of water governance—including the role of the State—are sharply challenged by the reality of states in regions of Africa. Several texts conclude that states in the Horn of Africa, for instance, exhibit varying degrees of weakness and ineffectiveness to the extent that terms like, 'failed states', 'failing states', 'states at risk of failure' (Mephram and Gaass, 2004:5), 'stateless state', 'stateless part of the world' (Little 2003:1) or 'collapsed states', have been used. Consequently, the state's capacity to establish democratic institutions or the will to provide an institutional, legal and policy environment conducive for effective governance is greatly reduced. In effect, this challenges the premise of the existence of stable states occupying homogenous socio-economic and political spaces, currently espoused in the new discourses of integrated water resources governance. The reality of the nature and character of states in the Horn and other parts of Africa has posed serious challenges to the state in governance.

Non-State Actors in Governance and then Natural Resources

Others, including Ostrom (1990), have pointed out that communities have relied on non-state and non-market institutions to govern resources systems with reasonable degree of success over long periods of time. Studies by Odell, (1982) Sandford (1983) Doughlin, Doan and Uphoff, (1984) Little and Brokensha, (1989) Woodhouse (1997) Hulme and Murphree (2001) similarly illustrate existence and centrality of an elaborate and resilient traditional and religious systems of natural resources governance in sub-Saharan Africa. With specific reference to the Horn, Kebebew, Tsegaye and Synnevag's (2001) study of the Borana and Afar of Ethiopia shows the persistence and importance of traditional institutions of natural resources management. For the Afar, the *Medaa* and *Adaa* institutions are central in natural resources management (livestock and rangeland management) and conflict resolution, while for the Borana, the *Geda* system is vital in governing access and use of grazing lands and water resources.

Ray and Reddy (2002) also noted that the role of traditional leaders in rural local governance has been widely overlooked. Yet, because their authority originates in pre-colonial times, traditional leaders and institutions have often retained legitimacy and a failure to recognise their importance results in lost opportunities for local governance. Since the early 1990s, there the development community has increasingly recognised the need to incorporate these leaders into local governance. In post-colonial states, people often see political legitimacy as divided between the state and traditional leadership, and believe that democratic practice should include aspects of both. But is traditional leadership compatible with local and state democracy? This is a complex question, though in many African countries, traditional leaders continue to enjoy popular support and remain important political actors who can and do play a significant role in rural local governance

Huggins (2004) observed that, Chiefs in Burkina Faso have traditionally managed village conflicts and controversies over natural resources. Replacing chiefs with democratic institutions during the *Gestion de Terroirs* programme ended up releasing, rather than restraining, conflicts, particularly as no higher authority was willing to mediate in local conflicts. This underscores the

importance of traditional institutions in water governance and in determining who or what has access to the resource for productive purposes. Hence the important role of traditional institutions in determining entitlements.

However, it is significant to note that despite the significance of traditional institutions and their notions of communality, as with all laws and custom, these institutions are produced out of negotiations over competing meanings by groups of people with unequal power. As such, indigenous institutions, laws and custom, are embedded in inequality, and in particular, women and the poor may be marginalized. Wedded into customary institutions are different conceptualisations and multiple meanings attached to natural resources.

Water Governance and Decentralisation

In contrast to Ostrom (1990) and Hyden and Bratton (1992), the involvement of non-state actors in local level governance is attributed to a scramble for space by non-state actors created by a 'rolled back state' in the context of globalisation and neo-liberal reforms, particularly through decentralisation. Wunsch (2001) notes that, over the past 15 years, many African countries have invested in political and administrative reform aimed at increasing local governance.

Decentralisation was premised upon the rationale that it would result in state structures that are more exposed and therefore more responsive to local needs and aspirations (Crook and Sverrisson, 2001). This, it is argued, will produce systems of governance that are more effective and accountable to local people (Blair, 2000; Crook and Manor, 1998; Manor, 1999). Crook and Manor (1999) also argue that democratic decentralisation leads to partnerships between institutions and agents of government as well as between civil society and grassroots communities, and may foster a sustainable public-private-NGO co-operation. In addition, democratic decentralisation is viewed as having the potential to foster sustainable development, contribute to monitoring of government performance and enhance local political participation and citizens' understanding of government programmes.

In many cases, however, decentralization is not a smooth process as different interest groups struggle to assert themselves at different levels. Experiences of decentralization differ widely from place to place and the results are understood differently by different actors. Participation of a wide range of stakeholders, and increased political space for articulation of their needs, expectations, and grievances, tends to reveal social tensions and may actually lead to latent conflicts becoming more manifest. Decentralisation of natural resource governance calls for the inclusion and active participation of multiple and diverse stakeholders in water management, thereby challenging the state's sole responsibility in management and distribution of water.

Similar conclusions were drawn by Besteman and Cassanelli (1996) who, in their examination of local struggles for natural resources (i.e., land and water) and the legal and administrative institutions that regulate access to them, aptly noted that, at the heart of the Somali crisis is the tension between the state and society, specifically the state's attempt to control natural resources and the latter's resistance and contestation. Further, embedded in the struggle over control and access to natural resources, is the contestation of power and legitimacy over the leadership of a reconstituted Somali state. The findings by Milas and Latif (2000) and Besteman and Cassanelli (1996) confront the embeddedness of public involvement and participation in governance, and the legitimacy of democratic decision- making.

Examples of problematic aspects of decentralization exists include the tendency of some states to provide local institutions with many responsibilities, but few rights or resources to fulfil those

responsibilities; the resistance of some civil servants to facilitate the process, because it threatens their vested interests; or a situation where ‘local’ institutions are headed or captured by some actors so closely linked to the top that decentralization actually represents a penetration of grassroots organizations by the centralist power-base (Huggins, 2004).

In decentralisation concerning natural resources, Ribot (2003) notes that local institutions being chosen to receive powers and the degree and form of power transfers do not automatically establish conditions for more efficient or equitable use and management. A combination of locally accountable representation and discretionary powers are required. This combined condition is rarely established. Alternative local institutions are chosen even when democratic local bodies exist. This choice and the failure to transfer discretionary powers can undermine local democratic bodies and concentrate powers in the executive branch. The choices being made around natural resources appear to reflect a broad resistance of central governments to local democratisation and decentralisation of powers. This resonates with Hesse and Trench (2000) who observed that in most Sahelian states they studied there still existed resistance by government to the transfer of full natural resources management responsibilities to communities.

Further, it is stated that some policy makers are doubtful as to whether natural resources can be properly managed by community-based organisations, and it is still believed in some quarters that privatisation or state control are the only means of preventing the degradation of resources that are customarily held in common (ibid.). In Mali, for example, creation of ‘decentralized’ local municipalities and councils may actually result in a loss of downward accountability, as (informal) village taxes (e.g. for use of water sources by livestock-keepers) will be channelled upwards away from local resource-managers. These situations result in latent or manifest conflict, typically between government and local actors, or between local actors who have become (further) divided due to differing roles (Huggins, 2004).

An East Africa exampleⁿⁿⁿⁿ

In Tanzania there is a long and complicated history of decentralisation and local governance, with each decentralisation process located within a different political milieu. Initial decentralisation was wedded to colonial state politics, which were aimed at using decentralisation as a political tool for effective control and management of local communities, sometimes in conjunction with local traditional authorities (as was the case during British administration) or without them (during German administration). The second phase of decentralisation was founded on Tanzania’s socialist politics of the 1960s to late 1970s, which gave primacy to central state planning and viewed decentralisation as the deployment of the state’s development agents from the centre to the periphery.

The socialist development agenda ‘resulted in the centralisation and consolidation of power by the State’^{oooo}. This was exacerbated by a dearth of competitive multi-party democratic politics added to which was the transformation of political structures of the ruling party – Tanganyika African National Union (TANU) – into institutions of local governance. This politicisation of local governance institutions was legalised through the Local Government Election Act No. 50 which decreed that all councillors had to be TANU members. Consequently, elected division secretaries in Ward Development Committees were replaced by TANU’s division secretaries, who were acting as both party and government heads in their respective communities. The

ⁿⁿⁿⁿ This section draws on a survey of issues carried out by Sobona Mtisi at a conference on water resources management in East Africa in March 2005.

^{oooo} Interview with Ambrose Kessy, University of Manchester.

localisation of central power became a central feature of Tanzania's decentralisation process with important repercussions for water management.

Similarly, decentralisation of local governance in Uganda was rooted in the National Resistance Movement and the 1980s popular struggle led by Yoweri Museveni. In view of this, the decentralisation system in Uganda evolved within the context of political struggle of the 1980s to the extent that the decentralised institutions of local governance mirror the National Resistance Council system. From this backdrop the current decentralisation of local government in Uganda was inaugurated in 1992, and enshrined in the Local Government Statute of 1993, which stated that decentralisation was aimed at 'bringing political and administrative control over services to the point where they are actually delivered, thereby improving accountability, efficiency and effectiveness, and promoting people's feelings of ownership of developmental programmes and projects in their districts'. Further, decentralisation in Uganda was intended to ensure people's participation and democratic control of decision making in local governance.

Institutionally, decentralisation reforms in Uganda led to the creation of hierarchical structures of councils and committees composed of elected officials, from village to district level. Village representatives become part of a Village Executive Committee, with villagers residing within the constituency. Village Executive Committees in a parish form the Electoral College and elect another Executive Committee at that level. Elected representatives constitute the Electoral College from which an Executive Committee is elected. Whilst the election of councillors by universal suffrage occurs at the village level, beyond that, the democratic right to elect representatives into higher structures of local governance is a privilege of elected village officials, who in turn, surrender the same democratic right to vote to representatives in the upper echelons of local government. It appears as if direct and democratic participation of people in electing their respective representatives into institutions of local governance is limited to the village level.

In Tanzania, the current decentralisation process was initiated in 1982, largely as a result of the failures of central state planning, bad local administration and mismanagement during Tanzania's socialist period. The 1982 decentralisation reform was inaugurated through several pieces of legislation constituting the Local Government Act. The various pieces of legislation were aimed at facilitating a more effective democratic participation in decision-making at the village, district and regional levels. Further, this reform process was in line with Tanzania's multi-party democracy and the need to promote good governance at national and local level. The political institutions of the liberation movements – geared towards political mobilisation and mass participation of the peasantry – were transferred to manage the bureaucratic task of local governance. There remain, therefore, strong linkages between the ruling party and local level administration and development, a situation which shaped the tone and character of decentralised local governance in both Tanzania and Uganda.

Under this political context, water reforms were established in Uganda and Tanzania. The impetus to reform the water sector is located within the global discourses on water management, particularly the integrated water resources management principles. In the case of Uganda, pressure for water reforms came from donors, which called upon the government to open up space for other stakeholders to come on board. With regards to Tanzania, the process was being led by global forces, particularly, the World Bank which is central in drafting Tanzania's Water Resources Assistance Strategy document. At the heart of the water reform exercise in the two countries, is the decentralisation of water resources management to local water users, increased stakeholder representation and participation and a strong drive to promote private sector participation.

The water reforms in Uganda were promulgated through the Water Act of 1998, which is a synthesis of the Water Statute of 1995 and the Water Action Plan, which is partly aimed at; promoting the rational management and use of water; conferring all rights to use and manage water to the State. Institutionally, the Ministry and Directorate of Water, through the Water Policy Committee coordinates the rational management and use of water and arbitrates disputes between agencies on water management. The Water Policy Committee is tasked with the overall responsibility for developing national policies, standards and priorities, and for coordinating revisions to legislations and other sector ministries' plans and projects which affect water resources.

The Water Sector Planning and Coordination Unit serve as the secretariat for the Water Policy Committee, and also ensure that the principles of the Water Action Plan are adhered to. In addition, there is a Water Permit Unit, which falls under the Directorate of Water Development and is responsible for the coordination and processing of applications for water permits. The Local Government Act and the Water Statute defines the roles and responsibilities of central and local government in the management of water. The National Water Policy also allows for the decentralisation of functions that can best be performed at lower levels.

Local level representation and participation is ensured through the election of representatives into the village executive committees and water user associations. The institutions of water governance are linked up with local level governance through the District Environment and Natural Resources Committee, located within the District Council. Thus, at district level DENRC is mainly involved with local decision-making and management of water resources within the framework of the National Water Policy.

Water governance in Tanzania is enshrined in the 2002 National Water Policy, which is aimed at providing a clear and comprehensive legal and administrative framework for water resources development, management and supply. The water policy framework in Tanzania is composed of two draft bills, namely the Water Resources Management Bill and Water Supply Bill. [The aforementioned Bills will be presented to Parliament in July 2005 with the view that they will be passed into law.] The Water Resources Bill seeks to operationalise the water policy and to repeal the 1974 Water Act and other previous pieces of water legislation, and thus becoming the ultimate Water Act. On the other hand, the Water Supply Bill seeks to improve the supply of clean water to rural and urban population by defining ownership and management structures of water supply mechanisms. More importantly, it strongly encourages private sector participation in water supply and sanitation.

Central to the water reform process in Tanzania is a need to decentralise the management of water resources to lower level institutions with the view that this will ensure equity in access to water among diverse water users and facilitate their participation in use and decision making regarding water. Consequently, Tanzania transferred all responsibilities for water management from the State to lower level institutions, mainly river basin management authorities, catchment and sub-catchment councils, and water users association.

The conceptualisation of the role of the State has shifted in the context of the water reforms, from managing, supplying and developing water to the provision of a conducive environment for effective water policy implementation. Further, the State's role is limited to policy formulation, coordination and management. However, both the State in Tanzania and Uganda is actively involved in irrigation development through training of farmers and funding irrigation development. This, it is argued, is in line with the goals of poverty reduction which is central to

water reforms in East Africa. In Tanzania, it is noted that once the state has funded an irrigation development programme, it hands the project to irrigators on a built-operate and transfer system.

On the other hand, the State in Uganda is noted as playing a dominating role in water management on the basis of the Water Act of 1998 which vested the overall responsibility for water management in the State. This control is extended to districts through various mechanisms, for instance through funding of district water management programmes. Within this framework, the State in Tanzania through the Ministry of Water and Livestock, and Ministry of Agriculture, plays a facilitating role and providing a conducive environment for the diverse stakeholders to participate in the management of water. The State's role also includes preparation of policy, strategy and enacting laws for water resources management; capacity building of water user associations; financing irrigation schemes; allocation of water rights; collection of water fees; data collection on water flows. The river basin authority is central in implementing the water policy, as it is tasked with the coordination, management and charging of water as well as monitoring water flows.

Despite the absence or weakness of traditional leaders, the water act in Tanzania recognises the existence of customary institutions, viewed broadly as social organisation of people at an informal level. To illustrate the conceptualisation of customary institutions in Tanzania, if there is a problem, for instance in water scarcity areas, people will form an association for digging canals, and such an association of people is referred to as customary institution. Further, customary institutions are mainly communal organised association of people, and are marked by their fluidity.

What emerges from both Tanzania and Uganda is that decentralisation of water management is fraught with problems to the extent that the process 'can neither be defined as decentralisation nor centralisation but a mixture of the two.'^{PPPP} This arises from the fact that State continues to play a dominant role in decentralised water governance. In Uganda, the State implements and controls local level water management processes through the control and provision of funds necessary for implementation of local level water management programmes. While decentralisation entails the transfer of all responsibilities for water management from the centre to the local level, decentralisation of responsibilities is not accompanied with a corresponding transfer of funds to district councils, leaving them with unfunded mandates. Since central government in Uganda provides funding for water management activities at the district level, this gives the State the power to influence and control local level water governance processes. This is exacerbated by the lack of capacity in water management at the district level, without which decentralisation does not deliver its intended better water governance goals, such as effective participation.

At a national level, the State in Uganda has been described as lacking the capacity to effectively implement a decentralised water management regime in the first place. Uganda has limited human capacity to effectively prepare guidelines that will be used at the district level, and worse still to monitor delegated functions. In addition, central government lacks the funds to effectively implement and monitor decentralised water management. Consequently, the central government in Uganda does not have adequate financial resources to distribute to the 45 districts with the view to implement integrated water resources management at a local level. The combined effect of a lack of financial and human resources has resulted in incomplete decentralisation of water, which militates against implementation of effective water governance.

^{PPPP} Interview with Charles Sokile, 6 March 2005.

The lack of local capacity also acts as a justification for increased State and NGO's involvement and dominance in local level water governance at the expense of other water users, mainly poor farmers and irrigators. To this end, participation in water governance in Uganda is limited to State and NGO's, despite the fact that the latter work closely with local communities. It is noted that local water users are neither consulted on water governance issues nor informed about the water reform process. Where participation of the poor is required, it is limited to the provision of their labour and materials in borehole construction.

Given that the water reforms in Uganda and Tanzania are geared towards 'big water issues' – water for agriculture – it appears that the lack of wide-scale participation in water governance is a consequence of the logic of the water reforms. Since Uganda and Tanzania have an underdeveloped irrigation sector, mainly among the poor, this subsequently leads to fewer stakeholders coming from this sector to participate and engage with other water users (i.e., commercial and private sectors) on issues of water governance. Inadvertently, the arena of water governance is thus open to the State, NGO's, commercial and private sectors, and 'a few irrigators dotted along the Nile River', as is the case with Uganda. Water is mainly used for domestic purpose, thus making the policy highly irrelevant to the majority of people it is intended to benefit. Put differently, the major thrust on water for agriculture embedded in the water reforms in Uganda and Tanzania seems to disenfranchise a significant proportion of the population who use water for domestic supply.

In the corollary of the above, another emerging challenge of decentralised water management in Tanzania, is the fact that participation in water governance is limited to registered irrigators at the expense of unregistered ones. A key informant from PAMOJA Trust, a non-governmental organisation, noted that in Pangani basin there are 1,000 registered users and 1,800 unregistered users, of which, the later are not represented at all levels of water management from basin to water user association.^{qqqq} In Tanzania, the issue of participation and its problems are intimately related to the conception of water user associations. The lower tier of decentralised institutions of water management is the water user association. Which, it is noted:, *In theory, water user association should be composed of different participants or stakeholders, but in practice they are sectoral. For instance, small-scale farmers, irrigators, livestock keepers, and households who use water for domestic supply form respective water users association. As one moves up the structures of water management, the politics and power of numbers comes in to adversely affect representation. You have instances where small-scale farmers are represented by large-scale farmers*^{rrrr}.

It appears as if the structural arrangement of decentralised water institutions, particularly at basin level, promotes a form of elite capture based on numerical supremacy. A general lack of knowledge about the water reforms and the role of local communities in water governance adversely affects the participation of local communities. One respondent noted that, "people do not know about the water reforms, their rights to water and the fact that they can demand water from government."^{ssss} The lack of knowledge is intrinsic to the lack of resources within government and district councils which would have enabled both central and local government to conduct information awareness and educational campaigns about water reforms in local communities. While there has been a concerted effort to decentralise water management to local level, central government still retains the overall responsibility of water management and in a poor informational environment there is little local people can do to challenge this role.

^{qqqq} Interview with Mr. R. Burra (PAMOJA Trust). 9 March 2005

^{rrrr} Interview with Charles Sokile, 9 March 2005.

^{ssss} Interview with Joseph Mulindwa

At the local level, the district council plays a rudimentary role of providing and maintaining of water supplies in liaison with the ministry responsible for water, and to assist government in the preservation of the environment through the protection of water resources. At lower local government levels, local governance institutions and actors are reduced to environmental stewards, tasked with the control of soil erosion and protection of local wetlands, rather than active involvement in local-decision making regarding water.

Contrary to Uganda's experience, in Tanzania there exists a weak link between the institutions of local governance (i.e., district councils) and those of water management. This is illustrated by the District Water Engineer, a district council employee, whose role is described as the 'overall management of all water projects in the district, that is domestic water supply (boreholes) and gravity feed irrigated agriculture.'^{ttt} In addition, the District Water Engineer, is also tasked with the responsibility to advise farmers on water rights application. Mapunda described the relationship between district council and sub-catchment council as 'limited to water right application.'^{uuu} However, another respondent noted that the District Water Engineer is also involved in training water users, and raising awareness on water reforms and other water related issues. Despite the fact that the relationship between district council and sub-catchment council has been variously described as 'weak' and 'limited to water right application', one respondent noted although weak the relationship is significant. The significance being the role that the engineer plays in water rights application.

In Tanzania, the government has been scrapping what it terms 'nuisance taxes' which cut into people's already low income. The danger is that in this context water user fees risk being viewed by people as a further 'nuisance tax'. Added to this, is fact that poverty in Uganda and Tanzania is high to the extent that the State may be called upon to intervene in implementing water reforms. The problem of introducing water user fees in a context where poverty is rampant was illustrated by Sokile who noted that, 'sometimes people do not eat for two days in order to save user fees for water.'^{vvv} Despite the fact that water reforms calls for reduced intervention of the state in water governance, the state in Tanzania and Uganda may be unwilling to relinquish its role in water governance.

Participation and IWRM

A critical issues emerging is whether or not the inclusion of more stakeholders leads to better managed decision making and whether or not it really brings the user closer to the centre of resource control. This is a central tenet of the emerging policy theme of Integrated Water Resource Management (IWRM), which forms one of the main planks of new water governance debates.

This idea envisages a resource-centric management process that is focused on managing natural units—or catchments. Most policy processes during the 1990s and 2000s have focused on IWRM. The 2002 Johannesburg Convention buttressed the process by stipulating that all signatories must draw up national water plans in line with IWRM principles by 2005. In this

^{ttt} Interview with Kristian Mapunda, 8 March 2005.

^{uuu} Ibid.

^{vvv} Interview with Charles Sokile, 9 March 2005.

context IWRM principles emerged as the key guidelines for effective water governance in developing countries, particularly in sub-Saharan Africa.

Turrall (2000) notes that in an ideal framework, such an approach to water governance would possess the following characteristics:

- A decentralised and accountable structure that is coherent and consistent at each layer of administration, from national through provincial/river basin levels to local;
- Self management of independent bodies and self-financing at user and higher levels of activity, according to user's ability to pay;
- Increased involvement of water users and other stakeholders;
- Government plays an enabling rather than controlling role, with key responsibilities for capital investment, supporting legislation, data collection and processing, and support for basic technical research and development;
- A comprehensive and consistent legal code which clearly defines the water rights and responsibilities of individuals, groups, agencies and government bodies. A set of procedures for *de jure* and extra legal arbitration of disputes and established enforceable penalties for misuse and degradation of water resources;
- Market mechanisms are an integral part of water allocation, determining the value of water between sectors, the value to the management agency and to the user (Turrall, 1998:5).

In defining IWRM and outlining its key principles, GWP (2000) makes no reference of politics, yet it notes that water governance is about power. Power is exercised through articulation (access, voice), mobilisation (of groups), distribution and confirmation (through procedures and institutional practices). In addition, IWRM emphasises decentralisation of management, stakeholder participation, and "user pays" principle. Problems of adoption in many contexts include the lack of capacity by new institutions to address agricultural concerns in a region, and in particular of poorer small and communal farmers. In Zimbabwe and South Africa, new catchment institutions of water management are supposed to provide better access to water for small-scale users *and* large-scale farmers. They become institutions for representation and participation and information on water issues.

Research in Zimbabwe has shown that many farmers spend a lot of time trying to gain access to the appropriate institution, often resulting in significant delays to water provision for irrigation, and with adverse impacts on agricultural crop production (Mtisi and Nicol 2003). Such institutions can also provide a focus for struggles for political control between water users. In Budzi and the then Lower Save sub-catchment councils, many commercial farmers viewed the access and use of water by small-scale, communal, and newly-resettled farmers, as leading to land degradation, siltation and the disappearance of rivers. This focused the institutional environment on wider issues of land reform and environmental degradation, rather than the agricultural concerns of poor farmers and the ways in which they could benefit from water reforms. Ignoring local issues can precipitate failure and/or encourage conflict between different user groups.

Put differently, the comment explicitly indicates that smallholder irrigators are not receiving adequate supplies of water to support viable agricultural production, which would have enabled

them to meet the water bills. In such a context, irrigators have resorted to selling their assets in order to pay for water to the

Gaps in pro-poor governance and production: issues of equity

Knowledge

The studies show # that current governance environments demand knowledge of changes to established processes and how these changes will impact on livelihoods. In Zimbabwe, in some areas, the first that small-scale irrigators new of the change in systems of permits was when sub-catchment council representatives turned up to levy charges.

The institutional ‘messiness’ in many countries including India and Zimbabwe adds confusion to the daily lives of irrigators and makes their claims to entitlements of water hard to fathom in some cases, and hard to execute in others. In one scheme in Zimbabwe the water was ‘divided’ between two different institutions on the basis of where it came from. The same applies in India where groundwater and surface water are governed by different policies and institutional structures. Knowledge of institutions—and individuals within them—is often the preserve of the richer irrigators, providing them with an immediate advantage in determining who gets permits and where and how rights can be granted. Institutions themselves may not therefore be creating the barriers, but their inability to disseminate knowledge may lead indirectly to invisible barriers to entitlements by the poor.

Frequently it is not water alone that is part of an institutionally complex environment, but land too. In Palestine and in Sri Lanka land fragmentation has been a problem. In the former, within families as well as between them. Within schemes this can create major problems of management, or, in some case, precipitate (where allowed) the trade in usufruct or ownership rights. In Zimbabwe too, the recent land return policy has created a confusion of new irrigators in established schemes with major issues for the long-term equity of existing farmers. In some cases the grant of land has been a route to achieve control over water access.

Of particular concern in all of the above is the rapid change to the ‘rules of the game’ governing water access and how well these changes are understood, either formally or informally. This calls for government institutions to manage information on policy implementation more effectively, having organised its content and drafting. How, for instance, do local users understand shifts from informal and customary rights and rules governing ownership to new, formalised systems of permits, with associated layers of bureaucracy and form-filling for which many farmers may be ill-equipped to respond?

Participation

Lack of knowledge can lead to lack of participation and a disenfranchisement of marginalised groups. With lack of participation can come lack of power over institutions that are supposed to be locally-driven. This can enable abuse of position by officials. An example from Zimbabwe shows how this can lead to poor decisions being pushed on communities—in this case to accept new technology, but at the wrong time—with disastrous production consequences.

The new environment of IWRM expects user participation, but does it support it? Frequently the new decentralised environments require technical and communications skills in order to

participate effectively. How can the poorer and less equipped irrigators be encouraged to develop the skills required to participate? At the same time as participation, frequently the agenda is broadened to include new ways of generating revenues for operation and maintenance.

Farmers are empowered on the one hand, but also shouldered with increasing financing responsibility under many participatory irrigation management schemes, on the other. In some cases these has become an issue at a national level within policy environments, where the new directions perceived on 'privatisation' and the 'commoditisation' of water are regarded as inimical to existing rules and cultural stitudes. Such has been the case of Sri Lanka, where the draft policy has now been scrapped. But what will be the long term repercussions be for the equity of small users when there is no clear guidance on the rights regimes governing access to water?

In the past traditional systems of participation have been critical to ensuring continued supplies of water for production—for instance the *rajakariya* system in Sri Lanka. But their perception as wither voluntary or forced caused them to be questioned. How, in the modern era, can the balances and incentives for participation be enhanced so that participation is on the basis on sound knowledge and equal say? Sri Lanka has more recently found that human catalysts for participation can help the process to succeed at a local level.

Investment

Investments in the sector have been patchy. In the 1990s the investment climate in irrigation was very sluggish. However the repeated mantra of a 'water crisis' and the perceived global demand for food products generating a 'water gap'—according to organisations such as IWMI, IFPRI and FAO—has now forced irrigation investment back onto the agenda. There are strong arguments for the increased provision of water for food in order to address a looming 'food gap', but there are also other ways in which food products can be brought to ameliorate national demands, including trade. These debates need to be brought down to national-level decision making.

Whilst investment may well be needed, the question is from where is it likely to come? In parts of Africa, for instance, where there is high variability and drought proneness, it might have to come from farmers themselves. In recent drought scenarios, evidence points to the greater success of farmers in drought-proofing their own sources rather than relying on others to do so.

The collection of fees is a part of the participatory irrigation management approach. It has been supported in countries including Sri Lanka and India, but is subject to pressures including costs of collection and the impact of broader conflicts (in the case of Sri Lanka, in particular). The absence of a clear rights framework in Sri Lanka continues to hamper the operation of farmer companies, and as on many schemes, where equity has not featured, there has been widespread marginalisation of tail enders.

At the level of the State, institutional fragmentation and poor decision making environments have hampered investment decision making. In some cases the range of investment decisions driven by perceptions and realities of water availability have changed substantially market for local crops, with cash crops replacing key food staples. This has been fuelled by water inequity and low returns. Invariably, in communities in India, it is only the richer households that have the capacity engage in new irrigation schemes to exploit cash crop production or intensive rice cropping, as examples from AP have shown.

Power

Equity and power are closely related. The achievement of equity comes through claiming entitlements. In many water-production contexts there is severe disempowerment through lack of knowledge. Knowledge helps in increasing human capacities which support adaptation to change—including the vagaries in weather and the availability of the resource. Knowledge also empowers individuals to understand how they should seek access to the institutions and systems that provide their public entitlements to water for production. Likewise, they can help in regulating the actions of others—the well drilling and abstraction in India that is drying up the shallow irrigation wells of the poor, for instance.

But there remain barriers to empowerment—education, income, group and class affiliation—that are hard to overcome and that go beyond knowledge. With water supply access affecting over a billion people, at an aggregate scale the problems are huge, but the opportunities substantial too. Improved access can have many related production impacts as well as providing more water for crops. Less time spent in ensuring access for water for productive uses—and domestic uses—opens up opportunities for decision making on other activities and access to other livelihood opportunities. This in itself can be immensely empowering.

The behaviour of water as a resource can be influential at higher levels in shifting perceptions of vulnerability and enabling policy to be established that creates new management and allocation decisions. Drought in the 1990s in southern Africa and the Middle East managed to do just that—but was it for the benefit of the poor water users? Did it generate governance for poverty reduction and equity? On paper yes, in many cases, in practice, perhaps not, as the paper shows.

At root issues of power drive notions of ‘social scarcity’; the social conditions that determine access, foremost amongst which is the power to control land. In India this is critical to accessing groundwater, given the riparian rights relationship that exists. In Zimbabwe too, the two are closely linked. The lesson to be drawn is that in understanding water and production and issues of equity, one has to broaden the analysis to the political economy of the land-water relationship.

Conclusions

This paper has provided a summation of some of the issues involved in water and governance for poverty reduction. It has highlighted a selection of the challenges, but offers not ‘ideal type’ governance as a solution. Rather all circumstances are subject to a relative set of political, power and economic challenges. The key to understanding the relationships is understanding what is happening locally to the livelihoods of the poor. If there are any ‘findings’ from this paper they are the following:

1. Equity is not easy to accomplish without support (and without interference, where necessary—though a key balance has to be struck);
2. Water and land rights have to be considered together; to separate them out is fraught with difficulty and likely to complicate future management processes;
3. Decentralisation has to avoid benign views of local actors and understand the local environment as political and complex; transparency and greater accountability cannot and should not be assumed; transaction costs may rise at a local level;
4. Water management is not just about the resource; what happens beyond the resource is key in the broader political economy of decision making; and beyond the national political economy lies the global food-water economy;
5. In seeking to respond to change, the nature of change needs to be understood and how best adaptations can be made need to be assessed; responding to water problems with water solutions if the cause lies elsewhere continues the boxed in thinking that will fail the poor and their right to more equitable access.

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