

## **Economic-legal ideology and water management in Zimbabwe: Implications for smallholder agriculture**

*Emmanuel Manzungu and Rose Machiridza*

---

*With an estimated 70% of the 11.6 million Zimbabweans living in impoverished rural areas, and dependent on smallholder agriculture for their livelihoods, it follows that improvements in this sub-sector can contribute to poverty alleviation, particularly food insecurity. This depends on appropriate water management in such a semi-arid climate, making the case for appropriate legal regimes in the water sector self-evident. The paper analyses the constraints that are being encountered in this area by drawing some lessons from the colonial era. The colonial state was more successful because it provided the complementary resources for its white hydraulic mission. The failure of the post-colonial state to deliver a black hydraulic mission can be understood in the same terms – the failure to enunciate and pursue an economic ideology that provided for the development of sustainable smallholder agriculture. One of the main reasons was that the post-colonial state did not capitalize on indigenous and water management experiences, which was ironic given that the leaders professed indigenous roots. This is reflected by the absence of these important experiences in policy discourse. This has rendered the legal reforms in the water sector somewhat cosmetic.*

*Keywords: smallholder agriculture, water management, economic-legal ideology, Zimbabwe, colonial state, post-colonial state*

---

### **Introduction**

With an estimated 70% of the 11.6 million Zimbabweans living in impoverished rural areas (CSO, 2002), and dependent by and large on smallholder agriculture for their livelihoods, it follows that improvements in this sub-sector can lift a significant proportion of the country’s population out of poverty. In this regard the “fast track” land reform programme (in which the majority of white-owned commercial farmland was acquired for resettlement) that the Government embarked upon in 2000, potentially provided an important means with which to address the worsening poverty. It is claimed that some 12 million hectares were acquired. By August 2003 slightly over 130 000-farming households were resettled (Utete, 2003) adding to the existing 1 000 000 and 60 000 households in the communal and old resettlement areas respectively (Muir, 1994). However, these figures are not indications of a success story as increasing food insecurity remains a poignant illustration of the worsening poverty. For example between 1995 and 2002 the proportion of people living below the Food Poverty Line (FPL) was estimated to have risen to 69% from 57 (ZHDR, 2003).

A discussion of access to land alone, without extending it to water, in such a semi-arid environment does not bode well for an informed analysis of the agrarian question in general or an understanding of how sustainable smallholder agricultural production can be structured (Cleaver, 1995). Ideally both land and water accessibility should be addressed simultaneously as these two resources complement each other in agricultural production (Manzungu, 2001). In this regard appropriate land and water legal arrangements are important (since all human interactions are mediated through one form of legal framework or another) especially to protect the interests of the less powerful members of the society, such as smallholder farmers. But a quick caveat needs to be added. Successful agricultural production also depends on other factors such as access to agricultural markets, affordable finance, appropriate technologies, adequate transport network, to mention but a few. This observation constitutes the point of departure for the argument we wish to make in this paper – productive water use by smallholder farmers in Zimbabwe cannot be achieved by merely changing the water legislation. This has already been illustrated by the fact that changes in water legislation in the post-colonial era failed to elicit the much-needed increase in productive water use in the smallholder sector. A case in point is the 10% of water in government dams reserved for smallholder farmers, which has remained unutilized (IFAD, 1997).

From available evidence it would appear that sustainable productive water use in the smallholder agricultural sector in Zimbabwe, in both the short and long term, is not assured. This paper attempts to explain why. The argument being made here is not that changing water legislation does not lead to productive water use by smallholder farmers. Rather the argument is that changes in the water law are likely to succeed if they are underpinned by a sound economic ideology, referring to economic fundamental ideals/values that are popularized and translated into practice throughout society. This will provide a sound platform for appropriate water-related policies. But it is also important to ensure that there is supportive legislation in place. It may therefore be appropriate to speak in terms of an economic-legal ideology as a precondition for productive water use in smallholder agriculture.

In this paper ideology is not used in its pejorative sense of false consciousness but is understood as a critical driver and explanator of social action (Taras, 1984). Ideology incorporates legal, political, religious, artistic and philosophical values, all encapsulated in a 'set of norms'. It has also been referred to as a 'philosophy', 'spirit of the age', a 'political programme', 'form of social consciousness' or a 'political theory' that legitimizes a particular type of social action. Apart from political connotations, ideology also has economic connotations. This is because it is a product of economic relations of a given epoch that may continue to exist after these relations have become outmoded or replaced, and may exert a considerable influence on future social development (Taras, 1984: 4). Seen in this light ideological differences are not necessarily about proving the validity of any one ideology *per se*, but about achieving a desired social effect with economic issues/interests playing a central role. Ideology performs a critical social function in that it makes it possible for society to better perform the necessary roles and functions. Without ideology society lacks an influential regulatory mechanism and motivating force (Taras, 1984).

This paper applies this line of thinking to water management practice in Zimbabwe in relation to how it can best contribute to smallholder agriculture upon which many livelihoods depend. Both the colonial and post-colonial periods are analysed with a view to finding an explanation for some of the current realities. The paper draws upon a number of published sources to make the argument. Three aspects are singled out for analysis, namely water resource management, irrigation development and soil-water conservation (important for rainfed agriculture and catchment management). These are important aspects of integrated water resource management (IWRM). IWRM offers best prospects for sustainable water management. Both irrigated and rainfed farming are critical in improving the country's agricultural fortunes and not just irrigation as is often believed. It is worth remembering that at best only half a million of the 30 million hectares classified as agricultural land can be irrigated due to water unavailability.

## **Colonial era**

### **Creating white agriculture**

The founding economic ideology of the colonial state that began in 1890 and ended in 1980 can be summarized as constructing a white settler economy on the back of a black working class/peasantry. The political and social agenda of the colonial state reflected this fact. In the early settlement years the British South African Company (BSAC), under whose administration the country fell until 1923 when the colony was accorded semi-independence in the form of responsible government, concentrated on finding the 'second Rand' with a view to expand gold mining activities it had started in South Africa. During this time land appropriation was for mining interests and not for agriculture. Settlers then depended on agricultural produce grown by indigenous people (ZCTU, 1996).

The fact that no gold was found, as well as subsequent depreciation of the Company's shares on the London Stock Exchange, forced the Company to revise its economic policy. A new policy based on export agriculture was inaugurated in 1907. This resulted in land appropriation at the expense of the black indigenous population. The British Government was caught between catering for the interests of the white settlers and that of the black majority. For example in 1898 it evoked an Order in Council that created Native Reserves on lands deemed unsuitable for white settlers. By 1910 23.4% of the land had been appropriated by white settlers while 26% had been declared Native Reserves (Herbst, 1990). The reserved land was generally of inferior agricultural quality in terms of inherent fertility and moisture availability. The Native Reserves Commission of 1914 resulted in a

white settler-induced appropriation of the better part of the Reserves. The Land Apportionment Act of 1930 legalized racial segregation of land. By this time 50.8% of the total land had been declared 'European' compared to 30% for the African population. Land for blacks was held under a 'traditional' tenure system according to the perceptions of settlers. Under this system only user-rights could be enjoyed. White settlers were accorded full rights to the land they were allocated.

The rise of Black Nationalism forced some cosmetic revision of the land appropriation. For example amendments were made so as to increase the amount of land for blacks by expanding Special Native Reserves and creating non-racial land, which was termed 'unreserved land' by white liberals. This move drew fire from some white conservatives. The ideological differences among the settlers developed into an open political schism. A white conservative party, the Rhodesia Front Party, later headed by Ian Douglas Smith, was voted into power in the mid 1960s on the basis of a white conservative land agenda. The government restored the Land Apportionment Act and froze the unreserved category of land. In 1965 Smith declared a Unilateral Declaration of Independence (UDI), which resulted in sanctions being imposed by the United Nations. The Smith government represented the antithesis of prosperous black agriculture:

It had an absolutely clear policy of forcing people to grow just enough to be malnourished and prevented them from doing anything more ... By the mid 1970s white agriculture was supplying the Tribal Trust Lands (TTLs) with a substantial proportion of food staples. Therefore the state had almost completely reversed the agricultural supply situation at the beginning of the century when white settlers were dependent on Africans for food supplies (Herbst, 1990: 27).

Apart from land appropriation other measures were put in place in support of white agriculture. There were for example interventions to aggressively promote marketing of white-produced agricultural produce. The Maize Control Act of 1930, which established the Maize Control Board, forced African maize growers to subsidise white farmers. The latter got prices 40% higher than the world market prices while the former got the local market price. In 1931 the Cattle Levy Act imposed a levy on the slaughter of cattle for domestic consumption in order to subsidise white cattle exports. Marketing Boards were also established for tobacco, cotton, beef, pigs and milk with the express aim of supporting white agriculture. Such support to white agriculture was typical throughout the colonial period.

In 1912 the Land Bank was created to enable white immigrants to settle as farmers. In 1935, following the Great Depression, the Farmers Debt Adjustment Act was passed. This abolished interest charges on farm purchases, and deferred loan repayments for three years for white farmers. To counter the UDI-related sanctions the Agricultural Assistance Committee was set up in 1966 for the purpose of extending short-term loans to farmers to cover the cost of inputs, living expenses and hire-purchase commitments. Farmers were also paid a subsidy on nitrogenous fertilizers and diesel fuel. The Farm Irrigation Fund, launched in 1966, extended soft loans to white farmers for head-works, in-field development and purchasing of irrigation equipment. There was a 50% subsidy and free technical support programme allowing white farmers to build soil and water conservation works. In 1971 the Agricultural Finance Authority was launched to extend more credit to white farmers. In addition to the above white commercial farming areas were also well serviced with good infrastructure in the form of road and railway networks.

Research and extension institutions were also set up to support white agriculture. For example in 1908 the Department of Agriculture was created to implement the White Agricultural Policy that had been launched in 1907. The Department of Research and Specialist Services was set up in 1948 to institutionalize agricultural research in the country as a vehicle to increase crop yields and intensify agricultural production in general. In 1950 the Department of Conservation and Extension was established. The Grain Marketing Act was passed in 1950 and led to the establishment of the Grain Marketing Board. The Salisbury and Gwebi Research Stations were set up in 1909 while Rhodes Inyanga and Matopos Estates were acquired for research in 1917. The Agricultural Research Council was set up in 1970 in order to direct research efforts in close coordination with representatives of white farmers.

### **A small window for indigenous agriculture**

There were limited rights in the Native Reserves set aside for the indigenous population. For example, they did not own the land as this was held in trust for them. There was a limit to the size of land on which an individual was allowed to cultivate. The main idea was to facilitate production for household consumption and not surplus for sale. This way the black population would be compelled to work for settlers.

Some cosmetic concessions were made. Between 1930 and 1944, native areas were created to allow natives to purchase and own land privately as was happening with the settlers. This was done because there arose an elitist class of natives, which was agitating for land ownership. There was, however, a prohibition on natives owning land in the 'white' areas following the Land Apportionment Act. Over-population in the Reserves and the consequent lack of economic opportunities for peasant farmers and falling agricultural productivity turned the TTLs into excellent labour reserves for the white economy. As a consequence the country was said to be enjoying the cheapest black labour in the whole of the British Empire (Herbst, 1990). Settlers also trained locals so that they could be a more effective labour force. For example settlers instituted a programme of 'industrialising' the Native Reserves focusing on home crafts through the Department of Native Development. This was achieved through the auspices of the Southern Rhodesia Native Affairs Committee whose objective was to reduce competition between the natives and the settlers in agricultural production. The fear was that settlers, lacking background in farming, could not compete with natives.

The need for ensuring food security in the Native Reserves necessitated a move towards agricultural development of the reserves. This way the colonial government would not have to invest in providing food for the native population. The Chinamora Industrial Farm was started to train the blacks in better agricultural practices. In the same year a research support programme for smallholders was also started. Black smallholder agriculture, however, underwent fundamental changes with the appointment in 1926 of Emery Alvord as an agriculturalist for the instruction of natives. His mandate was to develop native reserves so as to enable them to carry a larger population following the removal of more blacks from the 'white' areas. Agricultural practices of the natives, such as shifting cultivation, which was considered a wasteful, destructive practice that caused soil erosion, were abolished. Alvord started the concept of training in better methods of farming. However the training did not change the agricultural fortunes of the blacks because of limited access to land and other complementary resources. As highlighted above and as will be expanded later, black agriculture has not really recovered because the post-colonial state has not managed to reverse the trend due to a lack of a strong ideology backed by appropriate laws and policies.

### **Water legislation**

#### *The early years: 1890-1927*

As can be expected, in the early years the preoccupation with mining resulted in a situation where water was committed to mining. The later change to agriculture was explained earlier. Varying concepts of water law were tried. For example in the allocation of water rights a frontier mentality was displayed with such claims as '... being a new country, Southern Rhodesia is unhampered by the pernicious common law relating to riparian ownership'. In this way the water rights of the indigenous population, which predated the settler claims were disregarded (Manzungu and Senzanje, 1996).

Conflicts over water did not take long to develop. The frequent and often costly litigations between rival claimants to the use of water culminated in the Union Irrigation Act of 1912. This made provisions for the control, apportionment and use of water. The Act was based on the common law as evolved and expounded by the Courts (McIlwain, 1936). In 1913, the Water Ordinance was passed as a way of comprehensively dealing with problems of rights to water (ibid).

The South African connection had a strong influence on some aspects of water management. For example the settlers, encouraged by the British South Africa Company (BSAC) used the Roman Dutch Law that had been brought from Holland and then in use in South Africa. This was regarded as unsuited to the water resources and production of the region (McIlwain, 1936). There was, however, continued use of the riparian rights doctrine in interpreting access rights and differentiated water use types. The 1920 Water Ordinance explained that:

‘if a farmer has land well suited for irrigation and there is a stream that can be economically utilised, he can acquire the right to use the whole of the water for irrigation even though it may leave others without water except for primary purposes’.

The granting of responsible government in 1923, however, did not result in complete dissociation from the principles of the Roman Dutch Law. The riparian doctrine remained on the statutes until 1998 albeit with some modifications. What needs to be pointed out is that although there were disagreements between the settlers over which was the better legal ideology to guide water allocation, the situation was worse for indigenous people. Land appropriation disadvantaged them in that they were downstream of white settlers and were generally no longer riparian to perennial rivers; the whole legal system was against them and this was compounded by a shortage of the necessary finance.

Another concept that was reflected in the water law was primary water use. This was water for human and farm livestock use and was set at 50 gallons (~228litres) per person per day. This was quite generous more so because it could be used in and around the homestead, which did not preclude gardening. Water for ‘secondary purposes’ was for irrigation and watering of stock other than farm stock. ‘Tertiary purposes’ included the needs of the mines and railways. The water resources legal environment in the colony was marked by three major laws as discussed in the following sections.

#### ***Agriculture-based water law: 1927-1980***

Table 1 shows the main changes to the water legislation during the time agriculture became a dominant water user. By the Act of 1927 the priority right to water, granted to the mining industry within the Gold Belt areas, was modified in favour of irrigation (National Archives of Zimbabwe, n.d.). Therein were a number of clauses that disadvantaged the indigenous native population. First of all water rights were attached to land, which disadvantaged the natives who had been dispossessed and placed in the reserves where they did not enjoy full rights. Rights to land in the reserves were registered with Communal Area bodies (formerly known as Tribal Trust Lands) and not with individuals. Natives could therefore only apply for water rights as a community, and through government officials. Even then the District Administrator or Minister of Water Development held the water right on the behalf of the natives. There was, however, provision for the appointment of representatives of ‘native interests’ in the Irrigation Boards and in the Water Courts. Not much is known about whether or not they were actually represented. Settlers on the other hand could individually apply for water rights because they owned land in their own private capacity. Another problem was that water rights were issued based on the priority date system; this meant that rights were granted on a first-come first-served basis. The Black indigenous people were disadvantaged because they had not applied for water rights (Manzungu, 2001). When they later understood this, most of the water was committed to rights held by the settlers. Water rights were also issued in perpetuity, which meant that a water right once issued could not be revoked except in special circumstances such as the declaration of a drought or when someone else applied for the same water and was willing to pay compensation. By virtue of the fact that settlers applied for the rights way before the indigenes, most of the water was committed. It should be noted that although racial water allocation was provided for in the 1927 Water Act, it was only in the 1940s that massive transfers of water to the whites actually occurred because of cheap finance. This emphasizes the argument that it is not necessarily changes in water legislation that determines (lack of) access to water.

The 1947 Water Amendment Act had loose allowances for primary water uses especially for gardens and riparian users. The Act also defined vleis (*dambos* [seasonally flooded wetlands] or wetlands in depressions), springs and streams that stayed outside public management because they were defined as ‘private water’. This changed later with restrictions on *dambo* cultivation mainly because of fear of degradation, which had been noticed in the white farms. The Act also identified new water uses such as fish farms and conservation activities that were a result of new commercial interests.

**Table 1. Main characteristics of water legislation between 1927 and 1980**

1927 Act	1947 Act	1976 Act
<ul style="list-style-type: none"> <li>• Differentiation of public and private streams</li> <li>• Differentiation of primary, secondary and tertiary use</li> <li>• Created a Water Registrar and Water Court which centralized water allocation</li> <li>• Required [all] people [using water] to apply for both a water right and approval of works to a Water Registrar</li> <li>• Set up a 'priority right' system for a drought year with applications given priority in order of time</li> <li>• Allowed recognition of 'combined irrigation systems' with Irrigation Boards that had certain rights and responsibilities in payments of development capital</li> <li>• Required registration of all dams storing over one million gallons unless for a primary right</li> </ul>	<ul style="list-style-type: none"> <li>• Declared that all water other than private water was registered with the governor</li> <li>• Reconfirmed that water rights were attached to land and not individuals</li> <li>• Private water was defined as 'that which naturally rises, falls or drains on to any land, provided such water is not naturally capable of entering any water course of natural origin'</li> <li>• Defined primary use as use for humans and animals and was set at 50 gallons (~228 litres) per day per person resident irrespective of colour or race, which can be used in gardens, for waterborne sewage purposes or other activities</li> <li>• Clarified the rights of riparian landowners: 'They have the right, without any reference to the Water Court, to impound, divert or take any public water for primary use, and this right extends to any occupier or tenant of riparian lands. They also have, otherwise than in the public interest, a prior claim over non-riparian owners to be allocated by a Water Court for irrigation or other purposes'</li> <li>• Redefined priority of use as, firstly, all primary rights, then rights for irrigation purposes (based on date of issue) and then tertiary rights</li> </ul>	<ul style="list-style-type: none"> <li>• Clarified and created regulations about groundwater use for the first time. No restrictions were placed on drilling except in underground or surface water control areas.</li> <li>• Rights to use, and permits for groundwater, were linked to land</li> <li>• Required dams of a certain size to be registered, and design and construction to be carried out by a registered engineer</li> <li>• Required a riparian landowner intending to dam a public stream to notify all riparians downstream of the dam and contiguous to the dam</li> <li>• Rescheduled water use types so that irrigation, fish farming and feedlots were registered as agricultural use</li> </ul>

Source: Based on Vincent and Manzungu (In press)

The Water Act of 1976 affirmed the Roman Dutch Law concept in water management and upheld the principles of the 1927 Water Act i.e. rights to water were linked to land, the priority date system of allocating water and granting a water right in perpetuity. The Act also provided for catchment outline plans to be prepared for the development and use of surface water. Three types of water were recognised, public water, private water and underground water. The Act, under a 1984 amendment, also provided for some stakeholder participation in such institutions as River Boards. The participation was, however, restricted to water right holders. The Act also required applicants for water rights to put in place water measuring devices for a water right to be confirmed as permanent. This explains why most water rights in the native areas were temporary –the natives could not afford to put in the requisite measuring devices.

In summary it can be said that the system of water allocation in the colonial period was based on the matrix of ideas of efficiency, modernity, white power, male supremacy and the conception of starving Africans of land and water (Campbell, 2003). Campbell (2003) further argues that the planning mechanism of the settler state was organized around the concept of the scarcity of water. Politicians, agricultural extension officers, water resource managers, hydrologists, engineers, planners and economists propagated the concept of water scarcity when in reality, the problem of water availability was one of democratic distribution and not availability. This was re-enforced by the myth of white supremacy, which was backed up in law and in the allocation of resources. Commercial agriculture was considered a part of the modern sector therefore commercial farmers

were considered modern users of water, while communal agriculture was part of the subsistence and backward sector. Not much effort was made to make the black farmers aware even of the limited rights they had.

**Irrigation development**

Expansion in irrigation in the commercial sector was aided by the availability of low interest finance (Manzungu and Senzanje, 1996). Finance was made available for soil conservation, dam and weir construction and borehole sinking. There were also arrangements to supply cement at cheap rates and payment of rebates of up to 25% of the cost of dams and storage weirs. This system of subsidies was introduced in 1936 to encourage water conservation (Report of Secretary, Department of Agriculture and Lands, 1944: 327). Some estates also benefited from this new arrangement in the form of low interest loans and direct expenditure by the government on irrigation infrastructure (Mlambo and Pangeti, 1996). The government also contributed to road and railway networks. Essentially, public finance played a significant part in entrenching water resources in the white commercial sector.

The remainder of this section turns to developments in the black farming areas. Table 2 shows the various policy changes regarding the development of irrigation.

**Table 2. Policy developments in colonial period**

Period	Policy Objectives
1912 - 1927	Farmer-initiated furrow irrigation with help of missionaries. Government watches from a distance.
1928 - 1934	Government provides services and helps farmers develop irrigation schemes but farmers retain control of schemes
1935 – 1945	Government takes over management of communal irrigation schemes
1946 – 1956	Land apportionment Act of 1930 is amended and Blacks are moved to native Reserves. New irrigation schemes created to resettle Black farmers
1957 – 1965	Government curtails development of new schemes because of its cost considerations
1966 – 1980	Government policy of separate development for Blacks and Whites. Introduction of strategy of rural growth points, mostly based on irrigation.

Source: Manzungu (1999)

The changes were very much shaped by the prevailing economic ideology. After a *laissez-faire* approach to indigenous irrigation the colonial state changed tune in the aftermath of its change in policy towards agriculture. Communal irrigation was then developed for the black population as a way of accommodating more space for many of the indigenes. They were developed for various reasons; to stop competition between the white and native farmers (by increasing government control over native production), to stem rural-urban migration by natives to escape agricultural taxes, to enable better control of native activities and to ensure food security for the native population. What this did was to force native production within the settler systems of policy and legal controls. This started in earnest in the mid 1930s as described below.

From 1935 to the 1950s there was increased government control on smallholder irrigation. This resulted in increased pressure on irrigators to give up dryland farming and not leave irrigated plots, to produce surplus food crops for the market and later cash crops, to practice prescribed crop rotations, plant on specific dates and pay water rates. Another issue that arose in the implementation of irrigation activities was that of the size of the plots to be given to the natives. Two acres were deemed to be the most appropriate as it allowed farmers to produce enough to feed themselves while not taking too much of their time so that they could provide labour for the settlers. Following debates over the appropriate plot size for natives, in 1966 the standard plot size was set at 4 acres for male plot holders and 2 acres for widows. The allocation of plots to women however, raised concerns in the Department of Native Affairs. Women were considered to be staying at home engaging in domestic activities. Only widows got land on the basis that they provided for their families. Plot sizes were also

designed to enable government to resettle as many people as possible and to encourage the adoption of more intensive cultivation.

Irrigators were required to meet some of the costs of the developments. In 1932 the first water rent for natives was introduced. This was doubled in 1942. But irrigation was still subsidized by the government so as to achieve its settlement policy. But in 1958, there were concerns over the viability of irrigation. The costs of this activity were getting to be expensive. This was worsened by the fact that the schemes were expensive to operate and maintain mainly because they were constructed in physically difficult and largely unsuitable locations in pursuit of the political objective.

It was recommended that future projects be developed with an orientation to enable them to cover the maintenance and capital costs involved. But the white extremist ideology represented by the declaration of UDI resulted in more smallholder irrigation schemes being constructed. In 1965 the Tribal Trust Land Development Corporation (TILCOR) was implemented to foster black development through the establishment of a network of Growth Points. Irrigation developments took place in areas served by these Growth Points. Clearly ideological considerations were weighted more than economic considerations. It was only later that cost considerations were brought into the equation. In order to eliminate subsidies in irrigation developments, in 1973 the water rate was increased in order to discourage poor producers from staying on irrigation schemes.

The dispossession of native individual title over water was also extended to irrigation infrastructure where it is reported that some natives in the now Manicaland Province had their two irrigation furrows appropriated by the Native Department of Agriculture. The Mutambara community is on record as having resisted take over of the scheme with some success (Manzungu, 1999).

### **Soil-water conservation**

As already said there were some important prohibitions in relation to the use of wetlands. The promulgation of the Natural Resources Act of 1941 prohibited the cultivation of lands within 30m of a riverbank. This stifled the development of irrigation furrows by natives as they fell within this restriction. Already existing furrows and *dambo* cultivation were labeled illegal. Another development was the establishment of the Department of Native Agriculture in 1944, which was responsible for enforcing conservation practices in native agriculture. Failure to do so would result in legal action, usually an arrest, being taken against the 'offending' natives.

While for white settlers, conservation entailed financial and other incentives, for Africans it entailed coercion and punitive restrictions on resource use (Mcgregor, 1995). Conservation legislation was passed from the 1920s to justify restrictions on resource use by Africans. Following the 1927 Water Act, the Native Reserves Forest Produce Act (NRFPA) and the Game and Fish Preservation Act passed in 1929, blame for environmental degradation was placed on African 'misuse' of the environment, which justified unequal restrictions on access to and use of resources. For example the NRFPA banned tree cutting in the reserves for any purpose except the 'direct fulfillment of subsistence needs'.

The appointment in 1921 of an Irrigation Officer responsible for soil erosion resulted in agricultural lands for settlers being contoured through the use of incentives. These were not extended to the black community. From 1929 onwards a policy of centralization was implemented. This involved the reorganization of land use, separating blocks for arable and grazing land for a central linear village for the natives located on the watershed (this was again justified on the basis of reduced land allocation for settling more Africans). Centralisation forced Africans to abandon their intensively managed wetland fields because the newly designated arable blocks were on drier, sandy and inherently infertile soils of the watersheds. These wetlands became part of the grazing lands. In addition, homesteads were put into what were called village lines. These were usually removed from water sources (McGregor, 1995). The new set-up increased the incidence of erosion because of the concentration of movements of people and animals along set roads and paths. It can be said that this modernization of indigenous agriculture, which also saw the introduction of the plough and ill-conceived and authoritarian conservation measures, not only downplayed the importance of indigenous knowledge but exacerbated environmental problems (Wilson, 1995). For example contouring exacerbated soil loss by concentrating runoff behind the ridges and in the processes under-utilised a much needed resource.

## Post-colonial era

After looking at how the colonial state intervened in indigenous agriculture this section turns to the intervention by the post-colonial state. It begins by presenting the underpinning economic ideology before turning to interventions in the three areas, namely water resource management, irrigation and soil-water conservation.

### Flip flops in economic ideology

Herbst (1990) has observed that the Zimbabwean post-colonial state lacked a political and economic ideology. It would appear that the socialism ideology developed during the years of the armed struggle did not represent a clear practical-oriented political programme. The focus of the nationalists had been to win political power resulting in a situation where no comprehensive ideology to benefit the Black population was developed. However, there was remarkable progress when there were attempts, albeit small, towards a black economic ideology. For example availability of state crop depots and cheap finance resulted in smallholder agriculture significantly increasing its share of such crops as maize and cotton (Herbst, 1990).

Most of the early post independence plans were on the consumption side with government routing resources to the disadvantaged black community. This was captured by such phrases as 'Growth with Equity'. The policy instruments for achieving the objectives were: establishment of a socialist society; rapid economic growth; balanced development and equitable distribution of income and productive resources; economic reconstruction; development of human resources; rural development; worker participation, development of economic infrastructure and social services, and fiscal and monetary reform (Roussos, 1988). The production targets were not achieved. Due to a slowing down economic growth rate and rising inflation in the mid 1980s Zimbabwe came under heavy pressure from international agencies to implement structural adjustment reforms. The country underwent selective and cautious reforms in the 1980s and did not adopt a structural adjustment programme until 1990 (Rukuni, 1994).

The structural adjustment programme had two important features: trade liberalization and reduction of government expenditure (Chakaodza, 1993). According to Chakaodza, within the context of these two features lie several conditionalities imposed on governments which intend to use the Bank's resources. The Economic Structural Adjustment Programme in Zimbabwe, which lasted about 10 years up to 2000, reversed most of the social advances that had been made. It also affected the productive sector, which was opened to competition. Smallholder agriculture suffered because of the withdrawal of essential support such as credit and state-subsidized markets.

After ESAP there was not much coherence in the economic ideology. According to a local newspaper

Economic commentators can be forgiven for getting their recovery programmes mixed up. There have been so many of them that it is difficult to know which one is currently operational. First we had ESAP in 1991, then Zimprest (Zimbabwe Programme for Economic and Social Transformation) in 1996, Merp (the Millennium Economic Recovery Programme) in 2000, and Nerp (the National Economic Recovery Programme) in 2003. None of these worked because government allowed populist posturing to take precedence over fiscal prudence. Now we have 'Towards Sustained Economic Growth' which forms part of the Marco-Economic Policy framework for 2005-6' (Muckraker Column, Zimbabwe Independent 26 November 2004).

This background explains the rather confused developments in the smallholder farming sector. Black agriculture did not fare any better because until 2000, resettlement was on poor quality land (Skalnes, 1995). The government also failed to put in place comprehensive supporting services such as maintaining adequate marketing depots, road network and transport, and extending credit. It must be conceded, however, that there was some success as represented by smallholder expansion in maize and cotton production, facilitated in large by credit and access to markets. Unfortunately this was not based on a sound economic policy hence the policy reversals. For example the number of loans advanced to smallholder farmers increased from 18 000 valued at Z\$4.2 million (US\$2.6 million) in 1980 to 77 000 valued at Z\$60 million (US\$40) in 1984. This decreased by more than half between 1986 and 1990 (ZCTU, 1996: 29).

### Redressing past water injustices

The lack of a clear ideology can also be traced to the water reforms. For close to two decades into independence water resource management continued to be governed by the 1976 Water Act. In fact the water reforms that culminated in the 1998 Water Act began as a knee jerk reaction to the 1991/92 drought, the worst in the country's history (Makarau, 1999). The first step towards reviewing the 1976 Water Act was the setting up of an inter-ministerial review committee headed by the Ministry of Lands, Agriculture and Water development in mid-1993. The committee recommended that a new Water Act be put in place. In the short-term, smallholder farmers were allocated 10% of all water in government dams. This was the origin of the 1998 Water and Zimbabwe National Water Authority Acts.

The new Water Act had the following provisions:

- Water permits, valid for a limited time sufficient to earn back money invested to develop facilities, were to be issued instead of water rights in perpetuity. Priority would be given to efficient irrigation systems
- The priority date system was replaced with proportional water allocation.
- The polluter pays principle was evoked where people who cause pollution of water pay for expenses for removing the pollution.
- The environment was regarded as a legitimate 'user' of water competing with other users such as industrial, agricultural, mining and domestic users.
- The state owned all surface and underground water. Except for primary purposes (mainly for domestic uses such as drinking, cooking and washing) any use of water would need approval by the state
- Water would be managed by catchment areas, as rivers do not match political or administrative boundaries. All people with an interest in the use of water would be involved in making decisions about its use and management. Identified groups included representatives from communal, small-scale commercial and large farms and mines, as well as urban representatives from industry, manufacturing and municipalities. These would replace the River Boards (which used to supervise day-to-day management) and the Advisory Councils (which used to assist in water planning) and would have the responsibility of granting water permits, a function previously carried out by the Administrative Court.
- Water was recognized as an economic good. People who use water would pay for it
- A national water authority, ZINWA, would operate as a commercial enterprise. However, Government would ensure that the poor and disadvantaged would continue to have fair access to water.

While the water reforms could have had a local trigger in the form of the 1991/92 drought it was very much shaped by international donors (Manzungu, 2002; 2004). This is echoed by Campbell (2003) who asserts that the independent government of Zimbabwe predicated its policies on the colonial as well as neo-liberal concept of modern over subsistence farming. He also concluded that the old settler-dominated River Boards were somewhat reincarnated (with some black faces) as Catchment Councils that continued to wield power over water issues to the disempowerment of smallholder farmers. It should be added that the situation has changed since the fast track land reform programme. White commercial farmers who were active in the early stages (see Kujinga and Manzungu, 2004; Kujinga, 2002) have been replaced by a black elite. A research-based critique of the current water reforms in relation to how they affect rural livelihoods seems to converge on the consensus that the reforms did not facilitate the development of irrigation in the smallholder sector in general (see Manzungu, 2001; Mtisi, 2002). This is ironic given that the post-colonial state, led by people professing indigenous roots, has failed to capitalize on indigenous water and irrigation management experiences (see below). This has rendered the water reforms somewhat cosmetic.

While water allocation was the responsibility of the Water Court before the 1998 Water Act, this function has been delegated to the catchment councils. Catchment councils have had to try and allocate water with no guidelines on how to balance what are sometimes contradictory objectives. Research indicates that decentralisation to catchment and sub-catchment levels has in some cases resulted in a concentration of influence to a few already powerful individuals (see for example Kujinga and Manzungu, 2004). With regards to popular participation in water management, the state allocated itself disproportionately huge powers somewhat in contradiction to the democratic claims showing a lack of appetite for strong local institutions with sufficient political clout to complement the positive aspects of the water reform (Manzungu, 2001).

Meanwhile some of the good clauses have not been put to use. For example according to the new Water Act (Zimbabwe, 1998), the Minister has the responsibility to 'ensure the availability of water to all citizens for primary purposes ...'. In order to execute this function it is the duty of the Minister to secure the provision of affordable water to consumers in under-privileged communities and to ensure that water resources are utilised at all times in an efficient manner having special regard to its value and the economic and other benefits that may be derived from it. It is important to state that these safety nets provided by the Act have not been utilized. In fact catchment and sub-catchment councils eager to raise revenue tended to work against the realization of these, thereby showing very weak ideological commitment to a noble concept. In Gwayi catchment there was a suggestion to levy a charge for every herd of cattle, which contradicted the legal provisions. In Save catchment cases, levies were proposed for any water use where some income was realized.

### **Faltering smallholder irrigation**

Twenty years into independence the smallholder irrigation sub-sector in Zimbabwe was considered to be of little socio-political significance since its economic contribution was low. This was because of the fact that it accounted for a mere 10% of the country's irrigated area. (This has increased to about 26% since the fast track land reform programme incorporating the new model A1 and A2, and the communal and resettlement farmers. The A1 resettlement model was designed and intended to decongest communal lands therefore consisted of smaller hectares with room for beneficiaries establishing a new home. The A2 model was designed to create a cadre of black commercial farmers on the concept of full cost recovery from the beneficiary therefore had bigger hectares). A number of evaluation studies have suggested that formal smallholder irrigation schemes (initiated and constructed by the government and these may be community or government managed) have poor performance and are not sustainable. Problems identified include poor water utilization in terms of its timeliness and adequacy to the field and poor water application to the field (Pearce and Armstrong, 1990; Donkor, 1991; Makadho, 1993). Crop yields have been low and way below those achieved in the commercial farming sector. The poor agricultural performance has translated into poor financial and economic viability, thereby necessitating heavy government subsidies, up to 75% in some cases. This contrasts with Rukuni's (1993) assertion that the sub-sector is by and large financially and economically viable. The problem according to Rukuni is the inappropriate conventional budgeting technique, which ignores the sub-sector's unique history. Meinzen-Dick et al (1996) on the other hand, emphasises that agro-economic performance of smallholder irrigation schemes depends on a number of factors such as plot size, level of education of plot holders, access to markets and management structure. It is important to highlight that the state continued the colonial practice of controlling all irrigated activities in the schemes. For example farmers were required to follow set cropping programmes, and irrigation schedules (see Manzungu, 1999).

In 1983 Irrigation Management Committees were introduced in smallholder irrigation in order to improve coordination between irrigators and management. It is significant that these have not been able to take over management of the schemes principally because the state applied a technical measure to their readiness, which underlined state distrust of local farmer institutions (Manzungu, In press). There were also institutional problems where management was located in various ministries. This resulted in duplication of efforts and in some cases, in lack of clarity on division of responsibilities thus creating problems of coordination. Table 3 presents the main policy elements after independence.

Basically the various policies have not done much to change the status of smallholder irrigation. In some cases there were outright contradictions. For example the restrictions attached to the National Farm Irrigation Fund established in 1985 resulted in a situation where only Z\$50 000 (US\$30 000) was taken up by smallholder farmers compared to Z\$6 million (US\$4 million) taken up by white commercial farmers (ZCTU, 1996: 28). This contributed to the slow growth of smallholder irrigation (ibid.) It is also important to add that there was no support that was given to informal irrigation, which used a mixture of indigenous and introduced technologies and techniques. This sector, estimated to cover 20 000 hectares in the late 1990s (IFAD, 1997), was said to be more productive than the formal sector.

**Table 3. Policy developments in post-colonial irrigation**

Period	Policy Objectives
1981 – 1985	Government emphasises rehabilitation of the smallholder irrigation schemes
1986- 1990	Construction of new schemes under bilateral and multi-lateral arrangements; Development of irrigation infrastructure under the National Farm Irrigation Fund aimed at promoting wheat growing
1991 –2000	Steps taken to formalise farmers' participation in design, financing and management of irrigation; Promotion of self-financing schemes
2001→	No clear policy. Resource diversion to undeserving cases at the expense of smallholder farmers.

Source: Manzungu (1999)

Indigenous irrigation has therefore been undervalued to the extent that it does not feature in official statistics and policies despite the fact that it contributes significantly to rural livelihoods and sustainable resource management. Bolding et al., (1996) have commented on the merits of indigenous irrigation. They note that this contributed to food security and rural wealth for a number of reasons:

- Simple infrastructural set-up e.g. temporary stone weirs for diverting water from the river and earth furrows to convey water to the fields, which placed no heavy demands on required construction and maintenance skills,
- It tends to be much cheaper than government constructed schemes because of the use of locally available materials. For example intakes are made of brushes, which can easily be replaced. This is in marked contrast to government schemes some of which tends to have very expensive pumping outfits. It is quite common for such irrigation schemes to be shut down because of inadequate finances.
- Sharing of water tends not to be a problem as farmers stressed equity compared to the government schemes where government officials often forced impractical mechanisms.
- The state tended not to value the concept of hydraulic property, which is created when farmers actively participate in the design, construction and management of irrigation schemes.
- Agricultural produce is for both subsistence and commercial purposes unlike in government schemes where there is over-emphasis on commercial purposes against a background of unpredictable markets
- Furrows are spread in most cases along the river so as to ensure water supplies and catch run-off from catchments in between water abstraction points thereby limiting the possibility of conflicts over water between different furrows in times of scarcity
- Water rotation schedules are developed to cope with water scarcity and ensure equal distribution,
- Involvement of traditional leadership appears to have enabled and sustained these water scarcity management measures.
- Labour contribution for maintenance of the canal sometimes worked as a water distribution principle along the furrow,
- Water is perceived to be owned by no-one - everybody who has taken the trouble to bring the water to his/her land is considered to have a 'water right'. This principle is in times of scarcity translated into the principle of giving each other chances and leaving certain parts of the command area fallow.

The problems in the sector have however not abated especially following the removal of subsidies for smallholder irrigation and the transfer of irrigation management to farmers. Land reform through the Fast Track Land Reform Programme has worsened the situation as more smallholders are entering into irrigation with very limited knowledge of what is required. But by far the greatest problem relates to the neglect of traditional or customary water resource and irrigation experiences, which could have been used to put in place to support food security at the household level. One of the reasons behind this state of affairs is that these indigenous principles are not part and parcel of the official discourse. For example smallholder irrigation is said to have been introduced by white missionaries despite overwhelming evidence to the contrary.

Due to long standing problems (e.g. lack of secure land and water rights, technical deficiencies, limited farmer participation) smallholder irrigation schemes are reported to be facing a variety of operational and managerial problems culminating in low agricultural production and lack of financial sustainability (Manzungu, 1999; Chidenga, 2003). Even the newly acquired irrigated areas, thanks to the fast track land reform programme, wherein their former white commercial farm owners were achieving good crop yields and reasonable water use, are facing sustainability challenges (Utete, 2003). There was also limited support in the form of inputs and markets.

### **Soil-water conservation**

In essence the philosophy regarding soil-water conservation did not change with the advent of independence. The famed contour ridge continued to be promoted all over the country. This is despite the fact that research by independent as well as government institutions has shown that the best technology in a dry environment is not one that drains water away from the field like a contour ridge but one that concentrates water in the field. Unfortunately this message has not been made part of the extension department's message. This is unfortunate in two respects. First, rainfed crops account for over 90% of the arable area in southern Africa. There has also been more understanding of the science of rainfed crop production, for example the concept of green water. Rockstrom, et al. (2002) observe that there are no agro-hydrological limitations to doubling on-farm staple food yields even in drought prone environments, by producing more 'crop per drop' of rain. This means that the low yields that are currently being experienced in Zimbabwe can be and need to be improved. It is important to make the point that while these interventions are being packaged as new, similar practices have been recorded (see Soper, 2002). What needs to be done is to search for such practices and analyse them with a view to draw out some lessons.

### **Discussion**

The general objective of this paper was to assess the role that water legislation plays in promoting productive water use in smallholder agriculture in Zimbabwe. Our argument, which is worth re-stating, was that it is important to look behind the legislation to uncover the underlying ideology to assess to what extent the water legislation is matched to the social realities. It also allows for an inventory of related issues such as access to markets, inputs and finance without which productive water use cannot be attained. This section provides a brief synopsis of the role played by ideology in water resources, irrigation and soil water conservation development and management.

The role played by ideology was well illustrated by the colonial state which mobilized political, legal, economic/financial, technological and marketing resources in support of a white settler economic ideology to further the economic interests of the settlers. Upon this was constructed various pieces of water legislation, which facilitated the white hydraulic mission. On the other hand, the post-colonial state was less successful in achieving the much-needed black hydraulic mission because the legislation was not based on an economic ideology that was capable of achieving black economic empowerment in the agricultural sector in general and productive water use in smallholder agriculture in particular (see Herbst, 1990). In a way, this was epitomized by the absence of a coherent macro-economic ideology to catalyse economic and social growth based on the participation of the majority of the population. This was amply demonstrated by a water reform process that was not only about two decades late (introduced 18 years after independence) but was based on neo-liberal policies that were not geared towards popular productive water use. There was an embrace of neo-liberalism, emphasizing 'the market' and technical efficiency, as water use-regulating mechanisms (Manzungu, 2001). The legislation framing the water reform was torn between a neo-liberal and social agenda.

Below is a discussion of some of the issues that need to be considered and in some cases reviewed if productive water use is to be attained in the three identified areas. There is no effort here to discuss all the possible interventions –what is presented here is a selection of some of the pertinent issues that need to be attended to.

### **Water resource management**

In water resource management the riparian doctrine and the concept of primary water are important issues for consideration. The riparian principle was debated throughout the colonial period. Standard technical arguments

such as it was not suited to water scarce areas advanced by McIlwain (1936) could not hold sway over the practical needs of farmers to be able to use water within the environs of their farms. This explains why the principle was never expunged from the legislation. It is ironic that it was expunged under the 1998 Water Act. It is ironic because the principle favours irrigation of small gardens for food production and income generation by smallholder farmers without having to endure ponderous and expensive regulatory requirements. Besides it is debatable whether the state is able to control the activities of small time irrigators in order to enforce compliance. At another level one wonders whether this marginalization or exclusion of the interests of rural stakeholders is the right approach to ensure that the riparian communities take an interest in water resources management as per the latest water legislation.

The concept of primary water use was generally accepted in both the colonial and post-colonial periods. What should be highlighted is that the current Water Act does not specify the quantities unlike in the past. The new approach is to let catchment councils set the limits. Empirical data suggests that the rights of some communities can be infringed upon. This underlines the need to review and expand the definition of primary water use. The best way is to increase the quantity of water defined as primary water or define it where it is not. On the same note it is important to remark that the safety nets that are provided in the Act do not seem to be of practical consequence. This perhaps epitomizes the lack of a clear ideological persuasion, which was evident in other aspects.

### **Irrigation**

The idea of modernizing smallholder agriculture has characterized intervention in both the colonial and post-colonial era. This has resulted in a culture of evaluating smallholder irrigation on the basis of the technical efficiency of water delivery from the source to the field (and the crop). In addition, the focus on scientific observations as the standard for all agricultural practices has over-shadowed indigenous methods of water management in irrigation. Commercialization was also one of the pillars of the modern drive. If sustainable smallholder irrigation is to be realized there is a need to reflect on what exactly modernization means and how it can be used to improve the livelihoods of the concerned people.

It would appear that the point of departure between the state and farmers seemed to have been the definition of 'commercial' farming or what constitutes it. The state relied on scientific models of cropping programmes, crop rotations etc., and equated what was considered to be scientific farming with commercial farming. But farmers had no fixed philosophical position but looked for practical solutions that could improve their livelihoods. In this 'game' farmers do not consider themselves permanent commercial farmers (Manzungu, 2003). Depending on circumstances, they can be commercial farmers but also turn subsistence when the situation so demands. An informed analysis shows that this was about risk management. Issues of crop intensification based on market principles, where there is in reality no market, presented problems for farmers. Farmers were therefore reluctant to follow all the advice offered by state agencies precisely because of different perceptions they held about risk compared to that of the former.

The above discussion emphasises that one of the main reasons behind faltering smallholder irrigation was the neglect of indigenous water and irrigation management. State intervention tended to disenfranchise smallholder farmers because of the introduced legal systems. For example smallholder irrigators lost their rights over land, water and other resources. In fact the benevolence of the state as witnessed by 'donation' of smallholder irrigation schemes was a clear manifestation of ignorance of the concept of hydraulic property: Diemer and Huibers (1996) argue that irrigation development can be said to be a process of creating hydraulic property. For example individuals who help to build an irrigation system, either personally or through paid labour, receive a right to the water. Often a person's contribution to the initial investment equals that person's share in the water. Any allocation of water to later shareholders, no matter how complex, may in principle be traced to the configuration of initial shares. The co-owners usually unite in some kind of self-governing association with elected officers to define and enforce rules on the exercise of rights by members. Those wishing to join the association of owners of hydraulic property will have to either buy rights or be granted usufruct on the condition that they take responsibility for the maintenance of all or part of the infrastructure for the benefit of the early right holders.

What is important to highlight is that state intervention in smallholder irrigation development in Zimbabwe materially changed the concept and practices that allowed hydraulic property to thrive. The result has been that smallholder irrigation schemes are characterized by lack of clarity of farmer rights, be they individual or group rights. This situation perhaps poses the greatest danger to sustainable smallholder irrigation development.

### Soil-water conservation

We see the same ideological problems in soil-water conservation in both the colonial and post-colonial periods. In this regard the contour ridge provides enough illustration. Contour ridging is one soil conservation practice that has been promoted throughout the country. The facts, however, are that due to the arid nature of the country, instead of using contour ridges to drain water from the field there is need to keep the water in the field (see for example Nyamudeza, 1999). In addition, the contour ridge is said to aid erosion in that it concentrates the movement of water in one area facilitating the washing away of the soil. There is however evidence about local innovations that are proving useful. For example, Nyagumbo (unpublished) reporting on a study in Chivi district says that ‘... a wide range of technologies were experimented on by farmers. Some of the technologies originated from farmers ... The membership of farmers in clubs carrying out soil and water conservation had increased by about 400% in three years. In field crops, these measures included tied ridges/furrows, mulching, rock outcrop water harvesting and infiltration pits and included water conservation measures such as sub-surface irrigation, inverted plastic bottles, composting and mulching in vegetable gardens. It is also worth noting that some of the techniques originated from farmers and were simply revived by the project’. The increasing body of knowledge on *in situ* water harvesting, now donning the more fashionable term of greenwater (Rockstrom et al, 2002) renders state conception anachronistic and inimical to rural livelihoods.

### Conclusion

One ideology or another has impacted water resource and irrigation development and management in Zimbabwe. As this paper has shown the colonial state had a better ideology in line with its objectives. While traditional water management practices have been realized to contribute to rural food security, there has been a failure to acknowledge these practices by both the colonial and post-colonial state. By so doing the latter, by design or default, perpetuated the undermining of traditional African agriculture that was instigated in the colonial period. This applied to measures meant to redress the problem as represented by the water reforms. Instead of devising strategies for local empowerment it would appear that the post-colonial state was compromised in this endeavors by the latest international water debates.

### References

- Bolding, A., Manzungu, E. and van der Zaag, P. 1996. Farmer-initiated irrigation furrows: Observations from the Eastern Highlands Pages 191 – 218, in Manzungu and van der Zaag (editors) *The Practice of Smallholder Irrigation: Case Studies from Zimbabwe*. University of Zimbabwe Publications, Harare, Zimbabwe.
- Campbell, H. 2003. *Reclaiming Zimbabwe: The Exhaustion of the Patriarchal Model of Liberation*. David Philip Publishers, Africa Books (Pty) Ltd. South Africa.
- Central Statistical Office, 2002. Preliminary Report, National 2002 Population Census, Government Printers, Harare, Zimbabwe.
- Chakaodza, A. M. 1993. *Structural Adjustment in Zambia and Zimbabwe: Reconstructive or Destructive?* Third World Publishing House (Pvt) Ltd, Harare, Zimbabwe.
- Chidenga, E. E. 2003. *Leveraging Water Delivery: Irrigation technology choices and operations and maintenance in smallholder systems in Zimbabwe*. PhD Thesis, Wageningen University, The Netherlands.
- Cleaver, F. 1995. Water as a weapon: The history of water supply development in Nkayi District, Zimbabwe. Pages 313 – 33 in Grove and McGregor (editors), *Environment and History Journal: Special Issue Zimbabwe*, Volume 1, Number 3, The White Horse Press, Cambridge, UK.
- Diemer, G. and Huibers, F. P. 1996. *Crops, people and Irrigation: water allocation practices of farmers and engineers*. Intermediate Technology Publications Ltd. London, UK.
- Donkor, S. M. K. 1991. *A project management model based on observation – response practices for small scale irrigation schemes*. PhD Thesis, Colorado State University, Fort Collins. USA.

- Herbst, J. 1990. *State Politics in Zimbabwe*. University of Zimbabwe Publications, Zimbabwe and University of California Press, United States of America.
- IFAD 1997. *Smallholder Irrigation Support Programme*, Formulation Report.
- Kujinga, K. 2002. Decentralising water management: an analysis of stakeholder participation in the management of water in Odzi subcatchment area, Save Catchment, Pages 897 – 905 in Jonker, Beukman, Nyabeze, Kansime and Kgarebe (editors) *Integrated water Resources Management: Theory, Practice, Cases, Journal of Physics and Chemistry of the Earth*. Volume 27 Nos. 11 – 22. Pergamon Press
- Kujinga, K. and Manzungu, E. 2004. Enduring Contestations: Stakeholder Strategic Action in water Resource Management in the Save Catchment Area, Eastern Zimbabwe, Pages 67 – 91. EASSRR, vol XX, no.1.
- Makadho, J. M. 1993. An approach to quantifying irrigation water delivery performance. Paper presented at the University of Zimbabwe/AGRITEX/IFPRI workshop: 'Irrigation Performance In Zimbabwe', Juliasdale, 4 – 6 August 1993. Zimbabwe.
- Makarau, A. 1999. Zimbabwe's climate: Past, present and future. Pages 3 – 16, in Manzungu, Senzanje and van der Zaag (eds) *Water for Agriculture in Zimbabwe: Policy and Management Options for the Smallholder Sector*. University of Zimbabwe Publications.
- Manzungu, E. 1999. *Strategies of Smallholder Irrigation Management in Zimbabwe*. PhD Thesis, Wageningen University, The Netherlands.
- Manzungu, E. 2001. A Lost Opportunity: The Case of the Water Reform Debate in the Fourth Parliament of Zimbabwe. *Zambezia XXVIII (i)*. Zimbabwe.
- Manzungu, E. 2002. Global rhetoric and local realities: the case of Zimbabwe's water reform, Pages 31 – 44, in Chikowore, Manzungu, Mushayavanhu and Shoko (editors) *Managing Common Property in an Age of Globalisation: Zimbabwean Experiences*. Weaver Press, Harare, Zimbabwe.
- Manzungu, E. 2003. Of science and livelihoods strategies: Two sides of the commercialization debate in smallholder irrigation schemes, Pages 110 – 130, in Bolding, Mutimba and van der Zaag (editors) *Interventions in smallholder agriculture: Implications for extension in Zimbabwe*, University of Zimbabwe Publications, Harare, Zimbabwe.
- Manzungu, E. 2004. Water for all: Improving water Resource Governance in Southern Africa, *Gatekeeper Series No. 113*. International Institute for Environment and Development (IIED), London.
- Manzungu, E. (In Press). Public Institutions in Smallholder Irrigation in Zimbabwe in Moll, Leeuwis, Manzungu and Vincent (editors) *Agrarian Institutions between Policies and Local Action: Experiences from Zimbabwe*. Weaver Press, Harare, Zimbabwe.
- Manzungu, E. and Senzanje, A. 1996. A Political-Economy Approach to Water Reform in Zimbabwe's Agricultural Sector. Paper presented at the University of Zimbabwe/ZIMWESI Workshop 'Water for Agriculture: Current Practices and Future Prospects' Mandel Training Centre, Marlborough, Harare, Zimbabwe, 11 – 13 March 1996.
- McGregor, J. 1995. Conservation, Control and Ecological Change: The Politics and Ecology of Colonial Conservation in Shurugwi, Zimbabwe. Pages 257 – 79 in Grove and McGregor (eds) *Environment and History: Special Issue Zimbabwe*, Volume 1, Number 3, The White Horse Press, Cambridge, UK.
- McIlwain, R. 1936. 'Water Law in Southern Rhodesia'. *Rhodesia Agricultural Journal* 33: 788 – 801.
- Meinzen-Dick, R., Sullins, M. and Makombe, G. 1996. Agro-economic performance of smallholder irrigation in Zimbabwe. Paper presented at the University of Zimbabwe/AGRITEX/IFPRI workshop: 'Irrigation performance in Zimbabwe' Juliasdale, 4 – 6 August 1993. Zimbabwe.
- Mlambo, A. S. and Pangeti, E. S. 1996. *The Political Economy of the Sugar Industry in Zimbabwe 1920 – 1990*. University of Zimbabwe Publications. Harare, 90p.
- Mtisi, S. 2002. Water sector reforms and implications for livelihoods, Pages 109 – 141 in Manzungu (editor) *The Processes and Dynamics of Catchment Management in Zimbabwe*. Proceedings of a workshop held at the Crowne Plaza, Monomotapa Hotel, Harare, Zimbabwe, 24 June 2002. Save Africa Trust Publications.
- Muir, K. 1994. Agriculture in Zimbabwe, Pages 40 - 55 in Rukuni and Eicher (editors) *Zimbabwe's Agricultural Revolution*. University of Zimbabwe Publications Office, Zimbabwe.
- Nyamudeza, P. 1999. Agronomic Practices for the Low-rainfall Regions of Zimbabwe, Pages 49 – 63, in Manzungu, Senzanje and van der Zaag (editors) *Water for Agriculture in Zimbabwe: Policy and Management Options for the Smallholder Sector*. University of Zimbabwe Publications.

- Pearce, G. P. R. and Armstrong, A. S. B. 1990. Small Irrigation Design, Nyanyadzi, Zimbabwe: *Summary Report of studies on Field-water use and Water Distribution Report OD 98*, Hydraulics Research, Wallingford.
- Report of Secretary, Department of Agriculture and Lands, 1944: 327
- Rockstrom, J. Barron, J and Fox, P. 2002. Rainwater management for increased productivity among small-holder farmers in drought prone environments, Pages 949 – 959 in Jonker, Beukman, Nyabeze, Kansiime and Kgarebe (editors) *Integrated water Resources Management: Theory, Practice, Cases, Journal of Physics and Chemistry of the Earth*. Volume 27 Nos. 11 – 22. Pergamon Press
- Roussos, P. 1988. *Zimbabwe: An introduction to the Economics of Transformation*. Baobab Books, Harare, Zimbabwe.
- Rukuni, M. 1993. Irrigation issues in Zimbabwe. Paper presented at the University of Zimbabwe/AGRITEX/IFPRI workshop: ‘*Irrigation performance in Zimbabwe*’ Juliusdale, 4 – 6 August 1993. Zimbabwe.
- Rukuni, M. 1994. The Evolution of Agricultural Policy: 1890 – 1990, Pages 15 - 39 in Rukuni and Eicher (editors) *Zimbabwe’s Agricultural Revolution*. University of Zimbabwe Publications Office, Zimbabwe.
- Skalnes, T. 1995. *The Politics of Economic Reform in Zimbabwe: Continuity and Change in Development*. International Political Economy Series, Macmillan Press Ltd, UK. St Martins Press Inc, USA.
- Soper, R. 2002. *Nyanga: Ancient fields, settlements and agricultural history in Zimbabwe*. British Institute in Eastern Africa Memoir 16, London.
- Taras, R. 1984. *Ideology in a Socialist State: Poland 1956 – 1983*. Cambridge University Press. London.
- Utete, C. M. B. 2003. *Report of The Presidential Land Review Committee*. Volume 1: Main Report. Government of Zimbabwe.
- Vincent, L. F. and Manzungu, E. (In Press) water rights and water availability in the Lower Odzi watershed of the save catchment, in Moll, Leeuwis, Manzungu and Vincent (editors) *Agrarian Institutions between Policies and Local Action: Experiences from Zimbabwe*. Weaver Press, Harare, Zimbabwe.
- Wilson, K. B. 1995. Water used to be scattered in the landscape: Local understandings of soil erosion and land use planning in southern Zimbabwe, Pages 281 – 296, in Grove and McGregor (editors) *Environment and History: Special Issue Zimbabwe*, Volume 1, Number 3, The White Horse Press, Cambridge, UK.
- Zimbabwe (1998) Water Act [Chapter 20:24]
- Zimbabwe Congress of Trade Unions (ZCTU). 1996. Beyond ESAP: Framework for a long-term development strategy in Zimbabwe. ZCTU. Harare.
- Zimbabwe Human Development Report, 2003. *Redirecting our Responses to HIV and AIDS: Towards reducing vulnerability – the ultimate war for survival*. Produced by the Poverty Reduction Forum, Institute of Development Studies, University of Zimbabwe, Zimbabwe.
- Zimbabwe Independent Newspaper, Muckraker Column, 26 November 2004

### **Acknowledgements**

The authors would like to thank the Challenge Programme, Project Number 47: ‘Transboundary water governance for agricultural and economic growth and improved livelihoods in the Limpopo and Volta Basins – Towards African indigenous models of governance’, without whose financial support the writing of this paper would not have been possible.

### **Contact addresses**

Emmanuel Manzungu, Department of Soil Science and Agricultural Engineering, University of Zimbabwe, Box MP 167, Mt Pleasant, Harare, Zimbabwe ([manzungu@mweb.co.zw](mailto:manzungu@mweb.co.zw))

Rose Machiridza, Department of Soil Science and Agricultural Engineering, University of Zimbabwe, Box MP 167, Mt Pleasant, Harare, Zimbabwe ([roma877@yahoo.co.uk](mailto:roma877@yahoo.co.uk))