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***Water policies and smallholding irrigation
schemes
in South Africa: a history and new
institutional challenges***

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Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges.

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Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges.

1. Abstract

This paper describes the origin and history of smallholding irrigation schemes –SIS– in previously disadvantaged rural areas of South Africa. It then analyses the implications of the 1998 National Water Act on those schemes. An analysis of water rights is presented, along with a brief case study on a water rights transfer. A number of contradictions, uncertainties and possible threats are highlighted, which may hinder further development in SIS. Most difficulties originate from the Act's lacks of clarity regarding water rights and from the objectives and socio-economic prospects of the schemes.

Keywords: National Water Act, South Africa, Institutions, Water rights, Smallholding irrigation schemes

2. Introduction

Since 1994, the South African Government has undertaken massive reforms aiming to address rural poverty and inequalities inherited from the past apartheid regime. Amongst other programs, it has adopted an ambitious new water legislation that promotes equity, sustainability, representativity and efficiency through water management decentralization, new local and regional institutions, water users' registration and licensing, and the emergence of water rights' markets. This paper focuses on the specific situation of the numerous smallholding irrigation schemes (SIS) that are located in former homelands¹, and that now face the new regulations. In order for the current issues to be understood, the paper first describes the plight of those areas and its origin. It also highlights the past and current institutional arrangements regarding access to water and to irrigated land and describes the ones that are supposed to be implemented within the framework of the National Water Act (NWA). It finally emphasizes the economic and institutional challenges, issues, possible contradictions and threats related to the application of the NWA to SIS.

2.1. Rural poverty and a weak African peasantry: the legacy of discrimination policies

South Africa is a lower middle-income country in which agriculture accounts for a particularly low share of GDP compared to most other countries of its category.

¹ From the Natives Land Act of 1913 on, a number of homeland areas (also derogatorily called Native areas) were delineated according to ethnic, geographical and economic criteria, and formed “reserves” for black people. Such spatial discrimination was developed and implemented further under the apartheid regime. Reserves were granted some form of autonomy from central government. Some of them ultimately were declared self-governing independent states (Bantustans), although not recognized internationally. Homelands and the so-called independent Bantustans have all been re-incorporated into the country in 1994 (see map 1).

Although it has a well-performing commercial sector, agriculture represents less than 4 percent of GDP and 14 percent of the labor force. Moreover, irrigated agriculture and stock watering use about 52 percent of total water usage (Government Communications and Information Systems -GCIS, 1998).

The rural population of South Africa is composed of approximately 1.5 million households living on commercial farms (mainly white) and 2.3 million households living in the former homelands. Approximately half the country's population lives in rural areas, and poverty rates are higher there than elsewhere (incidence of 71.6 percent). Poverty is race-related: some 61 percent of black people are poor, compared with 1 percent of whites. Three out of five children in South Africa live in poor households. Households headed by women are more likely to live in poverty than households headed by men (Forgey *et al.*, 1999).

These persistent traits have several causes, the first one directly derives from the past apartheid policy. It excluded black people (representing 76 percent of the population) from owning or renting land outside the 14 percent of the country that was delineated as reserves (known as Bantustans or homelands, see footnote 1 and map 1). Moreover, today, land still remains mostly state-owned, and is granted to users through traditional authorities and regulations. These areas are typically poor rural areas, where many people live under conditions of deprivation as harsh as elsewhere in poorer African countries. Apartheid involved incentives, laws and institutions that favored large farms and discriminated against smaller, labor intensive farming systems (Lipton *et al.*, 1996). Apartheid also gave large white farms privileged access to natural resources, financial and agribusiness facilities, and rural infrastructures.

Black areas still suffer severe backlogs in all the above-mentioned fields. Regarding resource-related issues, 83 percent of agricultural land is in the hands of white farmers, and about 96 percent of irrigation water is controlled by private and co-operative schemes, and irrigation boards (Kirsten *et al.*, 2000). The per-capita consumption of domestic water in black rural area is less than a twentieth of that consumed in typical white areas (Hamann & O'Riordan, 2000).

A second factor in the weakness of African small-scale farming is related to South Africa's relatively well-developed non-agricultural labor market (mines and industries), which has, for a long time, provided higher paying opportunities than farming for rural black labor force (Low, 1986). This off-farm market dominates labor allocations and generates adult male migration. Labor remaining in the rural areas is first assigned to production to home consumption, and, only at last, to production for sale. This suggests that off-farm employment opportunities seriously deplete the available labor supply for farming. Therefore, workers who remain on the farms are those with the lowest opportunity costs as defined by the external labor market. The off-farm labor market favors men. Thus, many rural households are *de facto* headed by women or pensioners for whom household and child rearing responsibilities exclude them from intensive field labor in agriculture (Perret *et al.*, 2000). Such is the case in SIS (Shah & Van Koppen, 1999; Merle *et al.*, 2000).

2.2. Water resource: scarce and unevenly distributed

South Africa is a water scarce country, due to its low average annual precipitation (less than 500mm), and the unevenness of surface and groundwater distribution which are a result of climate and geography (21 percent of the country receives less than 200mm). Only 8.6 percent of rainfall converts to useable runoff, the lowest proportion in the world according to Davis & Day (1998). The same authors estimate that there

will be no spare water in South Africa beyond 2020 if the whole population is adequately supplied.

Still, water scarcity is currently more a “socially constructed concept” according to Hamann & O’Riordan (2000). About 14 million rural and suburban black South Africans still do not have access to running water in their homes. Rural women have to walk long distances to collect domestic water from rivers or water points. Depending on one’s literature source (Department of Water Affairs and Forestry-DWAF, 1997; GCIS, 1998) irrigation and stock watering account for about 52 to 55 percent of all water used in South Africa. Twelve percent is used for domestic and municipal purposes; 7.6 percent by industry; 2.7 percent by mining, and 2.3 percent for power generation. Runoff reduction owing to commercial afforestation is estimated to be about 7 percent and about 15 percent is required for ecological purposes.

2.3. Current reforms and challenges

Since the mid 1980’s, the apartheid system has been gradually dismantled, and from 1994 onwards, the new democratic South Africa has striven to iron out distortions and discrepancies. However, the mere removal of past biases against rural black areas has not automatically corrected the balance between white and black rural areas. The government has undertaken to reduce rural poverty, and has adopted a land reform program, new water legislation and improved services delivery in rural areas (Kirsten et al., 2000; Brooks, 2000). At the same time, it has adopted liberalism as its economic and developmental guideline. Direct consequences are: State withdrawal from former commitments and controls, the liberalization of markets, decentralization, and the transfer of power to local management and decision-making structures. Local government or emerging private management structures are seldom prepared for this quick hand-over process.

Today the major dilemma for a government faced with budget constraints and social pressures, is to reconcile a social, rights-based, gap-filling and developmental approach with an approach based on productivity and economic efficiency. Such an issue is reflected in the difficult circumstances currently facing SIS of South Africa.

3. Water policies and small-scale farmers irrigation schemes

3.1. History

At present, South Africa has an estimated 1.3 million ha of land under irrigation for both commercial and subsistence agriculture. Irrigation was introduced to South Africa soon after the arrival of European settlers, although it was really developed from 1912 onwards. Bruwer & Van Heerden (1995), then Van Averbeke et al. (1998) described thoroughly this evolution, stressing especially the early gap that existed between white- and black-oriented irrigation policies.

In the former Bantustans or Native Areas, minor irrigation developments occurred before 1950. Most irrigation schemes were started after the publication of the report from the so-called Tomlinson Commission on the socio-economic development of the Bantustans (Union of South Africa, 1955). This report and the implementation of some of its recommendations had a major effect on settlements, land use patterns and irrigation development in black rural areas (Van Averbeke et al., 1998). Its effects are still very noticeable today. Based on information collected from existing schemes, the Commission suggested that irrigated holdings of 1.3 to 1.7 ha were adequate to

“provide a family with a living that would satisfy them, whereby the whole family would work on the holding”. It also proposed that:

- *“Determined action be taken to improve and re-plan all existing schemes, so that each holding can provide a full-time living to a Bantu family”;*
- *“New schemes, which can be operated by simple diversion of weirs and furrows, be developed during the next 10 years”;*
- *“The Trust (referring to the Native Trust and Land Act of 1936; the South African Development Trust acquired land from non-African owners within the Scheduled Native areas for redistribution to African people, under management of the Department of Native Affairs,) should acquire ownership of the land, all land belonging to individuals or tribes and which fall under the proposed schemes should be bought up [...] and former owners should be given preference when holdings are allotted on completion of the schemes”;*
- *“All schemes should be placed under proper control and supervision, with uniform regulations as regards water rates, credit facilities and conditions of settlement...”*

Preliminary surveys estimated that the irrigation potential of the Bantustans was about 54000 ha, sufficient to settle 36000 families. Schemes developed during the late 1950s and 1960s followed most of these recommendations (Van Averbeke et al, 1998). They would employ a relatively inexpensive design (furrows would convey water from a weir or a dam), and aim at a family's subsistence through surface irrigation.

During the 1970s, Bantustans were encouraged to become independent on a political and administrative level, resulting in the withdrawal of central government, and homelands' administrations taking-over (homelands' parastatal corporations were created, e.g. Tracor in Transkei Ulimocor in Ciskei, ARDC in Venda, Gazankulu, Lebowa, etc.).

3.2. The current situation and recent developments

As described in table 1, due to history and past policies, different types of irrigation schemes have evolved in South Africa.

INSERT TABLE 1

At the end of the apartheid era, existing smallholding irrigation schemes in South Africa conformed to the following types, referred to as Bantustan schemes in table 1 (Bembridge, 2000):

- Bureaucratically managed smallholder schemes, formerly partly or fully administered by the government or its agencies (corporations) which carried out most farming operations on behalf of farmers. Most smallholding irrigation schemes conform in varying degrees to this category. Such schemes have high recurrent costs and are usually a large financial burden on the State; their usual aim is to help farmers produce their own food and possibly a surplus for sale;
- Community schemes or garden schemes, which are numerous but usually very small in size and supported at the outset by NGOs, development projects or government departments. After several years, many of them collapse due to maintenance and management problems. Some remain operational and are maintained by community users or their representative. Subsistence is the major objective underlying such schemes;
- Several State or corporation financed schemes (such as sugar cane) for which government provides infrastructure down to farm gates. Farmers pay a subsidized

water fee and make most farming and management decisions. Such schemes are rare in South Africa;

- Several large estate schemes, which are State or private sector financed, often managed by agents whose aim is to maximize the use of resources through production of high return cash crops (e.g. tea, coffee, fruit, etc.). There is generally little farmer participation, farmers being more supervised farm-workers than decision-makers.

The current situation indeed reflects the origins and evolution as described in 3.1. In South Africa, SIS cover approximately 46000 to 47500 ha (Bembridge, 2000; Northern Province Department of Agriculture-NP-DAE, 2000) as former Bantustan schemes, and about 50000 ha as garden schemes and food plots. Almost half of them are located in the Northern Province (171 schemes represent 20000 to 22000 ha). It is estimated that two thirds of South Africa's SIS are dedicated to food plots, the purpose of which is subsistence, and that 200000 to 230000 rural black people are dependant at least partially for a livelihood on such schemes.

Bembridge (1996, 2000) states that the performance and economic success of SIS in South Africa have been very poor, and "*fall far short of the expectations of planners, politicians, development agencies and the participants themselves, and that despite huge investments*". However, one must acknowledge that such economic success has never been the clear and unique objective underlying the past and present development policies for SIS. Past policy promoted subsistence-based activities by farmers, who were virtually "*spoon-fed*" by parastatal agricultural corporations (Shah & Van Koppen, 1999). In addition, and conversely to the assumption made by the Tomlinson Commission report, irrigation smallholding families diversified their activities and livelihood systems, especially with massive migration of male labour. The end result being that women and pensioners remained in the schemes, and carried out extensive food crop and livestock farming, with weak or unclear property rights on land and water resources (Merle et al., 2000).

It is worth noticing that the gradual shift in the underlying paradigm of SIS in South Africa (i.e. from subsistence purposes to productivity, economic performance and financial autonomy), continues to lack clear institutional environment, the means to achieve the objectives, and actual people participation. Most schemes were developed for social and food security purposes during the apartheid era, in the early 1960s. From the early 1980s, management agencies (corporations) were faced with such financial and social problems that they encouraged farmers to make cash profits, in order for them to pay back production costs and services. However, food security remained the major objective and crops and production patterns remained the same, along with weak market opportunities and poor agribusiness environment. At the same time, due to infrastructure degradation, consultants were hired to set up rehabilitation plans. Hence, the more sophisticated technologies (pumps, sprinkler irrigation) that were introduced in certain schemes and which require even higher capital, operation and maintenance costs.

Following (and in certain instances before) the dismantlement of apartheid, management agencies were liquidated and government gradually withdrew from its past functions in SIS (service, technical advise and extension, training).

In the Northern Province, it is acknowledged that most of the 171 SIS are moribund and have been inactive for many years (NP-DAE, 2000). Several causes have been mentioned, i.e. infrastructure deficiencies emanating from inappropriate planning and design, and/or poor operational and management structures, both beneficiaries and government assigned extension officers lacking technical know-how and ability,

absence of people involvement and participation, inadequate institutional structures, inappropriate land tenure arrangements. In the Eastern Cape and Kwazulu-Natal, most schemes are also facing major infrastructural and institutional problems, along with local political power games that have characterized those schemes from the outset, and that hinder effective problem solving.

Since the late 1990's, provincial governments have set up rehabilitation and management transfer programs across the country (Eastern Cape Restructuring Authority, 2001; NP-DAE, 2000), although the approaches have been very diversified in each case. For provincial departments, the underlying idea is undoubtedly to curtail the heavy financial burden of SIS, as most of them are not contributing to the commercial agriculture stream. On the other hand, departments would like to promote the emergence of small-scale commercial farmers (which is also the motto of the National Department of Agriculture), as well as maintaining the community subsistence function of the schemes.

Still, all rehabilitation and reactivation efforts face the same dilemma, i.e. how can the social and economic aspects of these approaches to SIS be reconciled?

The National Water Act of 1998 provided an opportunity to re-think the paradigm underlying SIS development in South Africa and to develop new institutions.

4. Water use from a property rights perspective

4.1. Past water policies and water rights

Rights to use water in South Africa were subject to successive water legislations, the principles of which had their roots in the Roman, Dutch, then English laws (Thompson et al., 2001)

The creation of the Union of South Africa in 1910 paved the way for the first nationally applicable water legislation- The 1910 Irrigation Conservation of Water Act. The riparian principle was the central feature of water law and State involvement in water resource management was limited to irrigation related works. Post World War II industrial development in South Africa required water legislation to be adjusted, giving birth to the 1956 Water Act. The act consolidated control, conservation and use of water for domestic, agriculture, urban and industrial purposes and perpetuated the riparian principle in terms of "normal" flow and "private" water, which granted exclusive use but not ownership. In practice, the system of riparian rights resulted in commercial white land-owning farmers having essentially unconstrained access to water, due partly to a tenuous distinction between private and public water and streams (Hamann & O'Riordan, 2000). Furthermore, much of South Africa's past water legislation had been largely oriented towards irrigated commercial agriculture (Gildenhuys, 1998). Despite certain legal restrictions, the riparian owner could in effect do and take as much as he/she needed. In commercial agriculture areas, the irrigation boards that administrated the allocation of water were generally heavily biased towards the needs of farmers. In theory, rural black communities and SIS could benefit from the same conditions. However, the lack of proper infrastructure, of property rights regarding resources, and the subsistence nature of their productive activities strongly limited the potential for improvement and intensification. Most black populations were not only deprived of access to water and land for irrigation purposes but also of adequate and clean water for domestic use.

4.2. New institutions for water management

4.2.1. Principles of the 1998 National Water Act

With the dismantlement of former regulations and the adoption of a new democratic constitution, South Africa also adopted a new water policy, which culminated in the acceptance of a new National Water Act –NWA (Act 36 of 1998). The new act broke drastically with the previous water laws in the sense that past key concepts were discarded. These include the individual right to use water for riparian users. Water is now considered a common asset. The NWA specifies that government, as the public trustee of the nation's water resources, must act in the public trust to ensure that water is “*protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons*” (DWAF, 1999 & 2000). The right to use water is granted to users, most of whom have to be registered and licensed, and should pay for this right. Also, the core concept of water management under the new dispensation is decentralization. Finally, protective measures are meant to secure water allocation for basic human needs, ecological and development purposes (concept of “Reserve”, and “Schedule 1” use, see below).

4.2.2. Management entities

Social development, economic growth, ecological integrity and equal access to water remain key objectives of the new water resource management regulation. The Act distinguishes national areas of water management from regional and local ones. New management entities (Catchment Management Agencies and Water Users’ Associations) will be established in order to achieve the aims of the Act. These institutions are to be established at regional and local level respectively, emphasizing a largely decentralized and participatory approach to water resource management. The core purpose of Catchment Management Agencies (CMAs) is to ensure the sustainable use of water resources in their areas of operation, in line with the aims of the Act, the National Water Resource strategy, and with a Catchment Management Strategy. Nineteen Water Management Areas have been demarcated countrywide. Several pilot CMAs are currently being established, with facilitation and supervision activities being undertaken by regional offices of the Department of Water Affairs and Forestry (DWAF) and contracted consultants.

The CMAs provide the second tier of the water management structure set up by the Act and they operate within the framework provided by the Minister of Water Affairs and Forestry. Local implementation of a catchment management strategy will be carried out by institutions to which the CMA may delegate functions, e.g. Water Users’ Associations (WUAs).

WUAs potentially form the third tier of water management and will operate at local level. These WUAs are in effect co-operative associations of individual water users who wish to undertake water-related activities for their mutual benefit. The role of the WUA is to enable a community to pool financial and human resources in order to carry out more effectively water related activities. Irrigation on a commercial or subsistence scale is one of those activities (DWAF, 1999 & 2000).

4.2.3. Water use rights

Table 2 describes the different water use rights that are determined by the NWA. At rural community and smallholding farming levels, all individual users are authorized to take water for “reasonable domestic use, gardens and stock watering”

(though not for commercial purposes) without registration, licensing or payment, as stipulated in Schedule 1 of the Act.

The Act however also stipulates that farmers and rural communities should form WUAs, especially in smallholding irrigation schemes. They must apply for a license, which will determine their collective rights to the water resource and their obligations. It may also concern the community as a whole when a WUA is to manage water beyond irrigation purposes.

INSERT TABLE 2

DWAF has launched a massive users' registration campaign. It will be followed by a verification stage, with satellite and aerial images, as a basis for management and water fee recovery.

5. Water rights: key elements for implementing the NWA

This section discusses the institutional aspects of the NWA and its application to SIS.

5.1. Property-rights as institutions: definition of concepts

The term "institutions" in economics usually refers to the humanly devised rules of behavior that shape human interactions (North, 1990). Since pioneering works by Schmoller (1900, quoted by Furubotn & Richter, 2000), institutions have been defined as "*sets of formal and informal rules, including their enforcement arrangements*". Institutions aim to steer individual behavior in a particular direction, as they "*define the incentive structure of societies and specifically economies*" (North, 1994). Thus, institutions (the Act, water rights, social and cultural norms, etc.) can be considered as a set of rules, even though they remain "*the grin without the cat*" (Furubotn & Richter, 2000), i.e. the rules of a game without the players. The functioning of an institution also depends on the individuals who use it. Institutions together with the people using them are called organizations (e.g. Catchment Management Agencies, Water Users' Associations, farmers and communities...).

Institutional analysis within economics is especially concerned with one specific subset of human interactions, i.e. allocation and use of scarce resources. In this regard, institutions that define property rights are of primary importance.

In an institutional context, property rights refer to a subset of institutions that regulates behavior and social interactions with respect to objects of value, e.g. resources such as land and water. The concept actually does not refer to the objects themselves; it is wider than the legal concept of property rights and private property, and it includes social norms (force of etiquette, social custom and acceptance, voluntary ostracism, codes of conduct, etc.) (Alchian, 1977, quoted by Eggertsson, 1990). When resources are not available in sufficient quantity to meet the objectives of all individuals within a society (concept of scarcity), discrimination is necessary to determine the extent to which each individual's objective will be satisfied (Challen, 2000). Property rights define this discrimination in terms of constraints and permissions, taking into account the consistency, predictability and social acceptability of such discrimination.

5.2. Issues related to water rights

The Act proposes a set of possible water rights (see table 2). It remains unclear as to which category of water rights will apply to small-scale irrigation farms.

Under the NWA, only WUAs may apply for a license and may be granted the right to use water under specified conditions. Failure to become a member would limit individuals' right to use water other than as specified in Schedule 1. Individually (at household level), rural people are automatically granted a free and unregistered right to "reasonably" use water for irrigation (Schedule 1). The NWA urges rural communities and smallholding irrigation farmers to form WUAs, that will be registered, licensed and charged (water fees). Moreover, WUAs are likely to impose water management rules and schedules, which are often sources of conflicts and discontentment in farming communities. A question is pending therefore as to what the incentive is for farmers to partake to a WUA, knowing the difficulties this may entail, while they are allowed to use water otherwise. The DWAF argues that a license might give room for intensification and commercialization through increased water allocation (reviewed license), then consumption. Such a process unfortunately does not only depend on water. The economic history of irrigation development in South Africa shows that success or failure of irrigation development in the past is related to the marketing potential of agricultural products and the level of profitability of farming (Backeberg & Groenewald, 1995). Most SIS are currently not fully using their water rights (low consumption) (Bembridge, 2000). Furthermore, all operators recognize that there is little additional water that can be tapped in most basins, and that the Act itself implicitly recommends reducing the agricultural share of the national water consumption (Hamann & O'Riordan, 2000).

The loss (withdrawal or transfer) of a license would automatically transform a co-operative effort into scattered individual ones as defined in Schedule 1. Although contradictory to the current policy that encourages the emergence of commercial smallholding farming systems through irrigation, such a loss actually might not be a problem at farm level, as most small-scale farmers currently use water very "reasonably", i.e. for crops grown in limited areas, meant for self consumption, even if the plots are part of irrigation schemes (Bembridge, 2000). A report by the International Programme for Technology and Research in Irrigation and Drainage (2000) considers that most small-scale irrigation usages are classified or will be classified under Schedule 1. Schreiner et al. (2000) considers that small-scale farmers who cultivate less than 2ha should not be included in the registration campaign, because it is expected that they will not be obliged to pay, even if they market a substantial part of their crops.

All these aspects, along with the emergence or increasing demand of non-agricultural users (especially mines) put pressure on community users, especially SIS, and paves the way to water rights transfer from communities to other sectors (see below).

A valid argument for the establishment of WUAs in a community setting is the need for sound local water management, in a context of resource scarcity and competing uses. The stated objectives are multi-faceted:

- (1) To support the existing subsistence-oriented farming systems (food security),
- (2) To promote the emergence of commercial farmers using water-conservation technologies,
- (3) To facilitate the coordinated access to water by the whole community,
- (4) And finally, to protect the community's water rights.

This should be accompanied by a series of measures and incentives, so that other key functions may also be carried out by the WUA (especially regarding markets access, i.e. inputs, credit, products, services and information). Schemes in which food plots are predominant should be dealt with separately (Schedule 1).

According to DWAF's initial plans, most WUAs should currently be registered. The situation is however very diverse. Most of the former white irrigation boards are registered and have submitted a proposal to form a WUA, whereas the establishment of WUAs in small-scale government-owned irrigation schemes is very slow.

Although some WUAs' constitutions have been submitted for registration, only about ten pilot associations have been established formally so far (amongst about 300 schemes countrywide).

5.3. Possible emergence of a water-rights market: a case study

It has been argued by a number of authors (Armitage, 1999; Louw and Van Schalkwyk, 2000) that the new Water Act provides the framework for water markets in South Africa. Although stated vaguely the water legislation makes provision for water rights trading as an option for water allocation. The Act is however, very unclear regarding the legal transfer of water use licenses.

Sectorial water rights trading already exists between commercial irrigation farmers (Armitage et al., 1999) and has proved to be efficient in certain instances. It must be emphasized that the DWAF played an important role in the successful cases, assuring transparency, supervising and recording transactions.

All large users (mines, industries, cities...) are registered. Certain mines plan to expand their activities and their need for water. Some are investigating the possibility of buying water rights from SIS (Development Planning & Research, 2000), while others are already proactive, negotiating with smallholding irrigation schemes and communities to create "multi-users" water associations, in order to increase their water supply (Rouzere, 2001). Negotiations have already taken place in different areas of the Northern Province in the water stressed basin of the Olifants river (see map 1), under close monitoring by DWAF and the provincial Department of Agriculture (NP-DAE). The idea behind it is that most SIS are not currently using their entire water rights, in terms of allocated quantity, while newly settled mines or mines expanding their activities are in dire need of water. Moreover, mines provide most job opportunities in the areas.

INSERT MAP 1

In the specific case of the Arabie irrigation scheme (Rouzere, 2001), water rights might be transferred temporarily from SIS to mines (5 years), the former then being deprived of about 70% of the water they are allowed to use (which they are not currently using). Mines will pay a financial compensation to NP-DAE for the rehabilitation of schemes (the amount of which represents less than 0.1% of the total cost of mining plant' development). Such an arrangement is supposed to allow the mines to operate quickly, according to their plans and to give DWAF more time to make further plans regarding resource mobilization in the area (upgrading existing dams, building new ones).

A series of issues must be highlighted, with regards to those processes and arrangements:

- Rural communities and smallholding irrigation farmers are often not even aware of the process (Stimie et al., 2000; Rouzere, 2001). Negotiations first take place between mines, DWAF and NP-DAE. Information is not only asymmetric, it is merely nonexistent at community level. Effective community representation and information is only scheduled at a later stage. At the moment, the NP-DAE represents the communities.

- The mines have submitted a proposal to establish a multi-sectorial WUA, in which they will use 86% of water and pay 93% of all costs incurred (DWAF and local municipalities will pay 7%). Such a WUA is not likely to promote commercial-oriented production in SIS, nor to co-ordinate water management at scheme level, which are the 2 required conditions for the development of SIS. The question remains as to the role of communities in this heavily top-down oriented process, reminiscent of former institutional and development-support operations (before 1994).
- Overall benefits in terms of water resource are not that clear-cut. If there was no new water allocation, it would be necessary to generate new water resource in the area in 2010; if water were allocated to mines according to their needs, it would be necessary in 2003; with water rights transfer from SIS to mines, it would be necessary in 2006.
- So far, quantitative and economic aspects have been used as arguments for decision-making. However, water quality issues may rise, since externalities from mining activities are likely to be very different from those resulting from small-scale agricultural use. The DWAF takes such concerns into account, however, when granting licenses.
- Even before any final decisions are made, mines are busy building up the necessary infrastructures for supplying water to their plants. They are investigating the possibility of co-funding and organizing water supply to the communities as well. In the short term, communities will obviously be more interested in domestic water supply than in securing their irrigation water rights.
- Mines provide most male job opportunities in the area, while conversely, 70% of small scale irrigation farmers are women, assuring food supply and some cash income to rural families. Socio-economic aspects (poverty alleviation, food security, gender equity) should be taken into account and counterbalance pure economic ones.
- Finally, there is a lack of foresight regarding the close future (5 years). If there is an increase in water demand by mines, and in the event that DWAF can not increase the availability of water resource in the area, the transfer of water rights is likely to be extended further. The prospects for small-scale irrigation development in the area will then just be abandoned.

Such a case study highlights the difficulty of implementing a multi-objective water policy in a context of competing uses and of extremely different users in terms of economic performance and power.

5.4. Links between water rights and land rights

The question of land rights is problematic in SIS. The land reform program that is currently being implemented, and especially its land tenure component, is not evolving as quickly as the water rights reform (Van Zyl et al., 1996; Lahiff, 1999; Kirsten et al., 2000).

Most SIS areas form part of former homelands and are State-owned land (communal land). Plots are allotted and occupiers are issued with PTO (permission to occupy) certificates. PTOs used to be granted mostly to male farmers by traditional authorities, with control, monitoring and records being taken charge of the local magistrate and/or local offices of the Department of Agriculture. A PTO gives exclusive individual life-time usufructuary rights to the land but does not allow it to be sold, mortgaged, leased

or subdivided. Although it falls far short of private ownership, such a system appeared to be a relatively secure form of tenure (Lahiff, 1999; Merle et al., 2000).

PTO certificates remain the main visible claim to land, even though, technically, they have been obsolete since 1991 (Abolition of Racially-based Land Measures Act, 1991). The subdivision, rental or even sale of plots are now observed as emerging practices by SIS farmers (Merle et al., 2000). In other words, the PTO system has gradually shifted from a real land entitlement to a convention, as records are no longer kept on allocation or tenure in most rural areas. SIS farmers, and especially women, actually do not exactly know what their current land rights are. At the same time, water rights based on a convention are being replaced by entitlement (licensing).

In SIS, land rights transactions (casual rental, lease or sale) remain highly dependant on the water rights attached to that land, especially in terms of land pricing. In most SIS, emerging commercial farmers might be interested in taking over both rights from subsistence farmers. The current uncertainty is a hindrance to SIS development.

6. Conclusion

The National Water Act (1998) of South Africa is internationally recognized as the most promising legal framework to adequately address the countries' challenges in water management.

The present paper analyses its possible or observed implementation features in smallholding irrigation schemes, and highlights a series of issues.

Although highly commendable, the Act has to deal with several objectives (i.e. resource protection, social equity and development, economic efficiency) that may show contradictory and difficult to implement in a context of resource scarcity, severe backlogs in rural areas, competing users, needs for economic performance and job creation, etc. This creates a strong dilemma, which is reflected in the different streams of thought inside the National Department of Water Affairs and Forestry -DWAF, and in the implementation features of the above-mentioned case study. The overall task seems challenging if a balance has to be obtained between at least maintaining the current production capacity of commercial agriculture, modernizing developing agriculture and creating new off-farm employment opportunities (and added value) that reduce poverty in rural areas (Backeberg & Odendaal, 1998).

On a practical level, the National Water Act also remains unclear about the implementation features of several key issues (e.g. water rights and local institutions, water market).

This forces the DWAF to operate on a case basis, which is time consuming and expensive. Lack of manpower and skills means that external consultants, who are not liable for their recommendations and advice, are resorted to. Such an approach, however, seems unavoidable at the moment.

The Act is difficult and slow to implement in the realm of smallholding irrigation farming, due to a number of uncertainties and contradictions regarding the objectives and prospects of SIS. A key issue will probably be to set clear objectives for SIS, on an individual case basis. The ones with a good potential for sustainable irrigated productive activities should have clear, irrigation-oriented, and protected water rights, as well as irrigation WUA for sound local water management. If this happens, water rights and their management might become levers to alleviate poverty and promote local development.

A brighter future depends not only on water-related matters, but also on sound institutional and market-related environment. Especially land tenure systems should be revised and secured for SIS farmers.

South Africa's new water policy faces a difficult transition period. It has to deal with the legacy of apartheid and the history of SIS. If well managed, the NWA may form a powerful tool to achieve equity, poverty alleviation and development in rural areas. Early experiences in South Africa and internationally show that sound, cautious and State-controlled implementation remains necessary.

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Table 1. A typology of the existing irrigation schemes in SA

Type of scheme	Private schemes	Irrigation board schemes	White settlement schemes	Bantustan schemes	Food plots, community garden schemes...
Period of development Number	1650 onwards -	1912 onwards 300	1930s-1940s	1950s-1980s 250	- -
Total area	450 000 ha	400 000 ha	350 000 ha	40 to 50 000 ha	50 000 ha (est.)
Scheme size (range)	2 to 10000 ha -	20 to 60000 ha -	40 to 120 000 ha 40ha	30 to 2000 ha Initially 1.3-1.7ha, sometimes more	1 to 30 ha From several m3 to less than 1 ha
Scheme ownership	Private	Private	Government	Government	Communities, CBOs...
Land tenure	Private	Private	Private	Mostly Communal	Communal
Scheme development and maintenance	Private investment and running costs	Capital = 2/3 private + 1/3 Government	Government	Government	NGOs, CBOs, various donors, Departments, communities
Current processes and issues	Registration and Licensing	Registration as WUAs Some facing financial problems	Most of them turning into boards, then WUAs Some are being re-allocated to black emerging farmers Most are facing financial problems	Rehabilitation and management transfer processes Forming WUAs Land tenure Uncertainty of sustainable management (costs recovery)	Uncertainty of sustainable management (costs recovery)

Sources: IPTRID-FAO, 2000; Vaughan, 1997; Bembridge; 2000; ARC, 1999.

Table 2. An overview of water use rights, as determined by the National Water Act of 1998.

Water use right	Description
Licence	<p>A license is a legal entitlement to use water, granted for a period of 40 years maximum (users must be registered). Its terms and conditions may be reviewed and amended at a period listed in the license, which will not be more than 5 years.</p> <p>It does not guarantee water availability or quality to the licensed users.</p> <p>It may be surrendered, withdrawn, transferred totally or partially, temporarily or permanently. It may be inherited by a successor-in-title to a licensed water user.</p> <p>Transfer of licenses is possible (water rights' market).</p> <p>A use is regulated by a license when there is a high risk of unacceptable impact if not controlled (overuse, degradation...).</p> <p>A reserve must be determined for a water resource before any license can be issued.</p> <p>DWAF may call for compulsory licensing of water use (i.e. decide on license allocation, terms and conditions for all prospective users) in stressed resources areas where there may be problems experienced from over-utilization, competing water users, or very inequitable allocation. Such calls for compulsory licensing will apply to all water users and rights, including general authorizations and existing lawful uses. An allocation schedule will be proposed in such instances.</p>
General Authorization	<p>A general authorization is an authorization to use water without a license, with certain limits and conditions, and it is valid for 3 to 5 years. It may be reviewed at intervals of not less than 2 years.</p> <p>It only applies to new water use that has taken place since October 1999, when the Act was fully promulgated.</p> <p>It applies to any water use anywhere in the country, unless areas are specifically excluded from it. It may also apply to a particular water resource. It is generally issued in an area with relatively sufficient water.</p> <p>It allows certain water use which has a small or insignificant impact on a water resource (i.e. limited abstraction and storage, irrigation with waste water, discharge of waste water...)</p> <p>General authorization users are usually not required to apply for licenses (except in water stressed situations), but they must be registered in most cases.</p>
Existing lawful use	<p>Existing lawful uses correspond to authorization that were granted from October 1996 to September 1998, just before the application of the National Water Act.</p> <p>Existing lawful users are usually not required to apply for licenses (except in water stressed situations), but they must be registered</p>
Schedule 1	<p>Schedule 1 uses of water have minimal or insignificant impact on water resources.</p> <p>They include amongst other uses "reasonable" garden watering and rainwater storage.</p> <p>Schedule 1 users are not required to register, or to apply for licenses.</p>
Reserve	<p>The Reserve is the only right to water in law. It is not a water use right per se.</p> <p>It consists of 2 parts, i.e. the ecological reserve and the basic human needs reserve, which</p>

includes water for drinking, food preparation and personal hygiene.

It specifies the quantity and quality of water that must be present in a given water resource, according to its hydrological, ecological and demographic features.

All other water use rights are subject to the requirements of the Reserve.