FROM WATER COMMITTEES TO EMERGENCE WATER USERS ASSOCIATION:

CASE STUDY OF MOHLAPITSI IRRIGATION SCHEMES IN MAFEFE WARD

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DECLARATION

I declare that the dissertation hereby submitted to the University of Limpopo for the degree of masters in Agricultural Extension has not previously been submitted by anyone in the University or any other University, that's my own work.

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ABSTRACT

The current research is based on several months of action research process within the rural community involved in transforming its current management of small-scale irrigation schemes. Mohlapitsi irrigation schemes used to have water committees but they were very ineffective and poorly managed. The overall objective of the action research process was to support the community members to establish a Water Users Association (WUA) for Mohlapitsi irrigation schemes in Mafefe Ward covering three traditional schemes (Mashushu, Mantlhane and Fertilis) based on their respective existing water committees. Factors of success and constraints in establishing this new water management institution were to be identified in the process. The action research process was facilitated by the researcher who resided on site, in collaboration with the extension officer. Her participation in all events, formal and informal, linked to the emergence of the association was instrumental. A three step process was followed:

1. An *institutional introduction with* sensitisation meetings with local leaders and organizations of mass meetings for all scheme members to identify the institutional challenge posed by the new policy; 2. The *identification of existing* water committees and practices through visits and interviews. Water committees selected representatives to drive up the emerging process and report back to them. Water committees also discussed and drafted bye-laws based on concrete operational rules that were validated by representatives at the association level.

3. *The Water Users Association emerging process* supporting the core team of representatives through drafting the constitution and public meetings with all water users for feedback were organized. On the results, the group of farmer's representatives and water committees themselves through their experience discussed questions and suggestions concerning the roles played by water committees. Members

of schemes were expecting different roles from existing water committees. For example: to ensure cohesiveness (to ensure unity and teamwork). Conditions favouring evolvement of water committees into Water Users Associations were enlisted. For example: Must meet regularly and communicate with each other. The core team of representatives and farmers themselves drafted the bye-laws and a constitution of the schemes.

In Ga-Mampa area, there has been a strong willingness of the local organizations to form a WUA. This could be seen by the willingness to respect new rules and changes that were introduced during the process. However due to changes in the government intervention, the association could not be registered. It is recommended that Government allows a clear registration process to take place regardless of its own intervention programme. Leaders in steering committees should be made aware of what is expected from them. Extension officers need to be trained on how to support a group to draft their bye-laws and be familiarized with various models of constitution. Government should hold workshops to firstly identify the current roles played by water committees in their irrigation schemes and to assist them to transform their current practices into an institutionalised body.

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ACRONONYMS

CAN – National Water Commission

CMAs – Catchments Management Agencies

CMS- Catchments Management Strategies

CNI - National Irrigation Commission

CRCE- Centre for Rural Community Empowerment

DWAF – Department of Water Affairs and Forestry

FAO – Food and Agricultural Organization

HDI – Historically Disadvantaged Institution

HIB- Hereford Irrigation Boards

O & M – Operation and Maintenance

NWA – National Water Act

SIS – Small Irrigation Scheme

WUA – Water Users Association

UL- University of Limpopo

P.T.O- Permission to Occupy

RESIS- Revitalization of Small Scale Irrigation Systems

IMWI- International Management Water Institute

BASED- Broadening Agricultural Service for Extension Delivery

PEA- Participatory Extension Approaches

LDA- Limpopo Department of agriculture

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CHAPTER 1

1. INTRODUCTION

1.1. Background

A Water Users Association (WUAs) is a body registered by the Department of Water Affairs and Forestry (DWAF) in terms of section 92 of National Water Act (Fontenelle, 2002 & Oosthuizen, 2002). WUAs are co-operative like associations of individual water users who wish to undertake water-related activities for their mutual interest. Nineteen catchments areas have been set up within South Africa under the 1998 National Water Act. Within each area, a Catchment Management Agency will draw up a management strategy for the Catchment. In fulfilling their functions, the agencies are required to promote community participation, with voluntary associations of water users to be formalized as "Water Users Associations", in an attempt to regulate the relationships between users and agencies (Fontenelle, 2002). WUAs and Catchments Management Agencies (CMAs) are some of the frameworks supported by the National Water Act (Act 36 of 1998) as water management institutions.

Fontenelle, (2002) and DWAF (2000) emphasized that the broad role of a Water Users Association is to enable people within a community to pool their resources (labour force and expertise) to carry out water-related activities more effectively. Firstly, Water Users Associations enable members to benefit from addressing local needs in terms of local priorities and resources. Secondly, they can be represented in a mechanism through which Catchment Management Agencies (CMA) or the Minister can devolve the implementation aspects of the Catchment Management Strategies to the local level. Stein, (1997 p 2) emphasized that in accordance with the objectives

and tasks, included in the resolution and in their own by-laws, Water Users' Associations are involved in a voluntary cooperation of their members to achieve the following:

- Operation of irrigation, drainage and discharge networks as well as ponds, reservoirs, wells, pumping stations, sprinkler installations, outlet structures and other hydraulic structures;
- Maintenance of special buildings, constructions, bridges, power lines, roads and other elements of infrastructure which are linked to the water management system;
- Water intake from the source and distribution of the water among the members of the association, in accordance with the provisions of the license for water use, in case of intake of water from natural sources, or with the terms of the contract, in cases where water is provided by enterprises holding the license for water use;
- Construction, rehabilitation, maintenance, cleaning and other activities aimed at maintaining the associations' network in proper condition, developing this network and improving the status of irrigated and reclaimed lands;
- Organizing the most efficient use of water resources, taking into account the needs of all farmers and farmer groups which are members of the associations;
- Implementation of measures aimed at preventing and mitigating the adverse effect of excess water on land and on economic and natural facilities;
- Implementation of measures aimed at preventing and mitigating the effects of water pollution on natural and economic facilities;
- To account on the use and protection of water and on the use of irrigated and reclaimed lands;

- Organizing the improvement of the professional skills of the associations' members in the area of irrigated farming, the introduction of advanced methods of irrigating agricultural crops, water-saving and environmental protection technologies and in other activities related to water use.

Water Users Associations will normally operate at local level. However there will be exceptions, such as when the length of a river managed by water users associations is so long that it relates more to a regional rather than a local interest. A Water Users Association may be concerned with a single purpose, such as providing water for emerging farmers. The purpose of WUAs is to provide water for emerging farmers. Alternatively, a Water Users Association may be multi-sectoral, dealing with a variety of water users of different nature within the area of operation (DWAF, 2002a). Water Users Associations, as water management institutions, are potentially located on the bottom tier of water management under the Act (DWAF, 2000). Water Users Associations may derive their functions through a process of delegation from the Minister or the Catchments Management Agencies. The Water Users Associations are accountable, for exercising a delegated function, to whoever gives the specific delegation. Historically disadvantaged communities must be empowered or encouraged to have their say without being oppressed by those who are economically stronger (Fontenelle, 2002). Successful policies will depend on the identified stakeholder involved in information and decision-making processes and also implementing programmes in cooperation with community groups (Agrawal, 2001 and Meinzen-Dick, 1997). Therefore, the responsibility for the success of the WUAs does not just lie at the door of central government. Civil society also has a responsibility. WUA must build its own capacities to propose viable options to

address the problems in collaboration with Department of Water Affairs and Forestry (Perret, 2002).

1.2. Statement of the problem

The government serves as the custodian of the public trust and interests; managing, protecting and determining the proper use of South Africa's scarce water resources. The general idea of the trust is that the government has a duty to regulate water for the benefit of all South Africans (Fontenelle, 2001). Fontelle, (2002) asserts that former irrigation boards, which were established under the water act of 1956, excluded the participation of the disadvantaged groups on managing the water resources. These groups were also not supported in terms of human and financial resources.

Ga-Mampa community, as other historically disadvantaged communities, has been involved in water related activities for many years. It established water committees to effectively pool the community resources to better manage the water resources. Those water committees were not effective and efficient in meeting all the needs of the community such as more information, resources and facilities. They were not effective and efficient due to lack of sufficient information, leadership and managerial skills. Hence, there is a need for Water Users Associations, it could be used to improve the efficiency of these water user's committees. Water Users Associations (WUA) will enforce a better control and avoid conflict in the community. WUA is an arrangement to manage water related aspects of the community in order to improve the rationale utilization of water resources. One of the particularities of the Water Users Association as compared to water committees is that it has to be registered by the Minister of Water Affairs and Forestry, which implies that it fulfilled precise requirements that were met during a registration process period. According to Tushaar et al, 2002 the only way farmer management of African smallholder irrigation can be

sustainable is for management transfer to be part of a larger "lift strategy" that can dramatically enhance economic returns to smallholder farming. But, such a lift strategy will have to include much more than just irrigation management transfer. It will need to effectively deal with the whole host of constraints that African smallholders schemes are facing.

1.3. Objectives of the study

1.3.1. The overall objective of the study

The overall objective of the study is to describe how to establish a Water Users Association (WUA) for Mohlapitsi river irrigation scheme in Mafefe ward covering three traditional irrigation schemes (Mashushu, Mantlhane, and Fertilis) based on their respective existing water committees, and to identify the factors of success and constraints in establishing new water management institutions.

1.3. 2. The specific objectives of the study and research questions

1.3.1.1. To describe the roles played by water committees in small-scale irrigation schemes like Mashushu, Fertilis and Mantlhane.

1.3.1.2. To determine conditions which favor the evolvement of water committees into an effective and efficient Water Users Association.

1.3.1.3. To recommend and facilitate the formation of Water Users Associations in other similar small-scale irrigation schemes.

1.4. Research questions

a) What are the roles played by the three water committees in small-scale irrigation schemes in Mashushu, Mantlhane and Fertilis?

b) What are the conditions, which favor the evolvement of water committees into effective and efficient Water Users Association?

c) What recommendations can be used to facilitate the formation of water users association?

1.5. Research hypothesis

The establishment of efficient and effective WUA involves existing water committees as a basis for social transformation to improve the utilization of water resources for irrigation and therefore increase the agricultural production that leads to a betterment of the livelihoods.

1.6. Significance of the study

This study will come up with important roles played by water committees in small-scale irrigation schemes in establishing Water Users Associations and steps followed in establishing Water Users Associations. The study will propose how the constitution for Water Users Associations could be adopted by emerging groups who are interested in establishing a Water Users Association. This study will be important to community at large and society. It encourages organizations, institutions, communities to collaborate and work together. This study will help water policy on

procedures, strategies of making information and resources available to the community.

CHAPTER 2

2. LITERATURE REVIEW

For this study, this chapter will include literature review about the establishment of Water Users Associations.

2.1. Introduction

FAO, (1976 p 1) explained that originally associations of irrigation water users are among the oldest institutions established by man and continue to be a useful means of developing and managing irrigation schemes. Seshoka et al, (2004 p 1) supported the above statement since water boards are still transformed into WUA for better participation in the management of the water resources. Also it provides a basis for improved and intergraded local management of water resources

Water Users' Associations in the rural areas are voluntary associations of farmers and farmers' groups with the role of joint operations on the irrigation and drainage networks, of water resources management and of executing hydraulic, reclamation, water conservation and other activities.

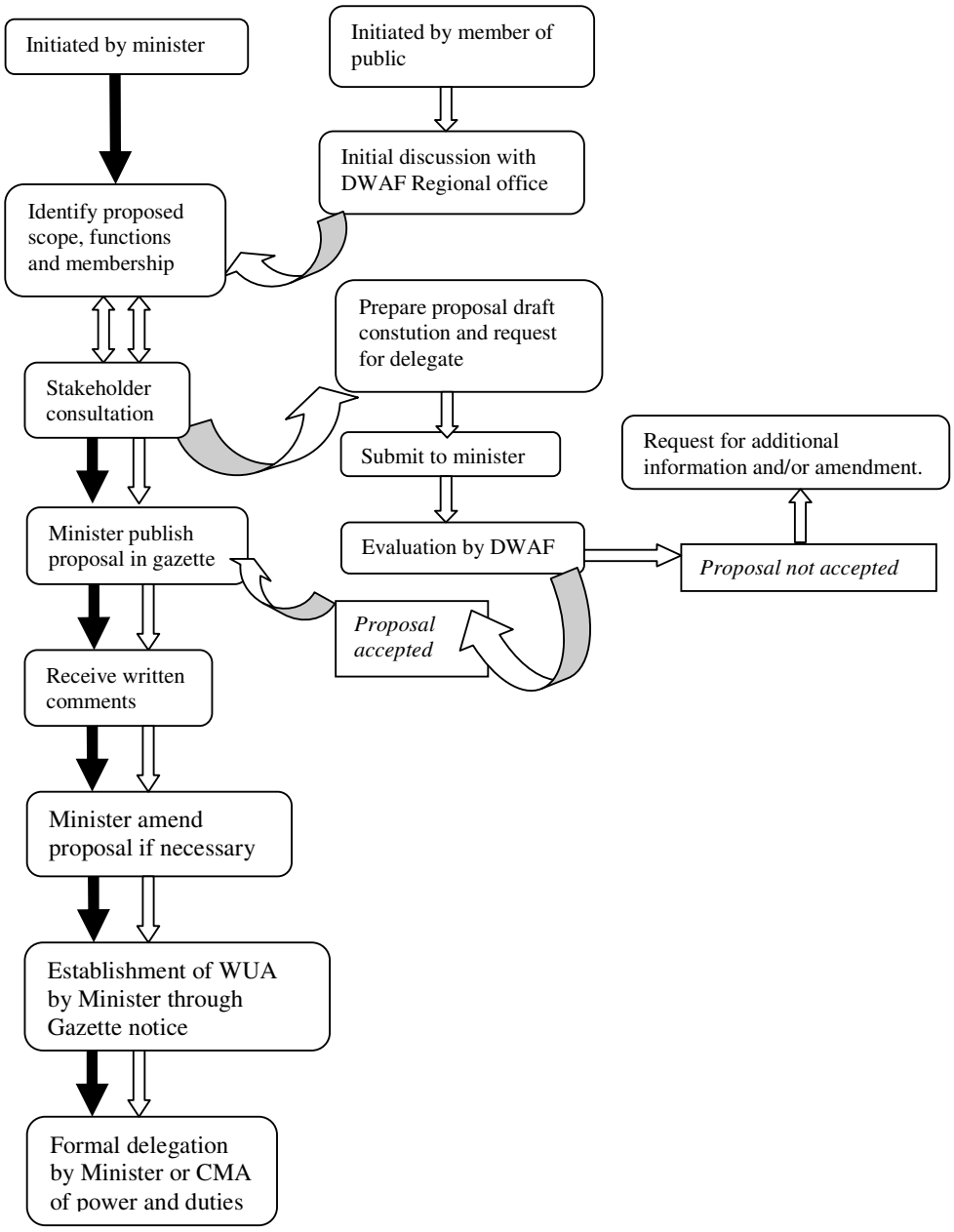
The creation of Water Users' Associations is justified by the need of the farmers and farmers' groups to exercise their right to the use of water as well as by the need of efficiently concentrating their efforts and means for joint actions aimed at the optimum utilization of water resources on irrigated, flood protected and reclaimed lands. Seshoka et al, (2004 p 1) emphasized that the members from the irrigation boards to WUA will understand the constraints and the opportunities of the transformation with regard to the goal of meeting historically disadvantaged individuals water related needs, to assess the role of these new WUAs with regard to

integrated local water resource management. Ga-Mampa farmers do have that interest of establishing water users associations voluntarily since they have the role of joint operation in irrigation, water management and in other related activities such as water conservation. In Ga-Mampa, the above duties were done by water committees. This is supported by Faysse (2004 p 2) who noted that duties are done by irrigation boards in Great Letaba and Olifants. Water Users' Associations are meant to act on behalf of their members, i.e. farmers and farmers' groups, in their relations with water management institutions, environmental and agro-industrial organizations and enterprises as well as local government authorities. They are able to conclude contracts for water supply, construction, repair and technical utilization of the irrigation network as well as other contracts and transactions, allowed by the existing legislation. Water Users' Associations can be established as specialized associations, performing functions related to water, or as multi-purpose associations, dealing with the implementation of multi-purpose tasks, related to the production of agricultural products and their processing, commercialization or other joint activities implemented by farmer groups. The by-laws of multi-purpose associations must reflect their functions, rights and duties in water related activities.

2.2. Steps for Formation of Water Users Associations

In South Africa, WUAs are due to fulfill specific requirements that are addressed during a registration process. DWAF (2002) developed a procedure for the establishment of WUAs as indicated in figure 1.

Figure 1: Establishment of Water users association



2.3. Types of associations and their establishment.

There are differences in the irrigation associations of the countries where they are institutionalized and even within a given country. Some of them, according to Burt & Styles, (1998 p 3) are modern and traditional. Brabben, (1999 p 2), describes modern associations as users associations bearing responsibility for repayment (Reimbursement) of the hydraulic works, their maintenance and the distribution of water to farmers. Traditional associations are described as WUAs with their main responsibility being the distribution of water among the farmers, the maintenance of canals within the boundaries of the area managed by the association (FAO, 1976 p 3).

An association can be established voluntarily by members or be imposed by an external agent. A certain evolution of the voluntary to the compulsory system can be noted, as the need for greater administrative control of the water resources appears parallel to a high demand (FAO, 1976 p 4). In the case of Ga-Mampa, the association was established voluntarily and it can be considered as traditional since there are bye-laws; it is responsible of the distribution of water amongst the farmers and maintenance of canal. Ferrand, (2003 p 137) indicated that Mantlhane, Fertilis and Mashushu schemes show a good example of traditional patterns of the scheme.

2.3.1. Modern associations

According to Brabben (1999 p 3) and FAO (1976 p 2), modern associations have important financial responsibilities, which generally include: repayment of the loan for the execution of the works, operation and maintenance costs, establishment of a reserve fund and administrative costs. These costs are normally recovered from the

members of the association by way of taxes and /or fees imposed on the land and/or water.

In general, the capital required for the hydraulic work is provided by the Government through national or international banking institutions. When the Government takes such initiative, it is unusual that it would claim from users the total payment of the amounts invested in the construction of the scheme. This type of association is generally voluntary, because the construction of the scheme stems from the desire of some interested individuals to obtain water to irrigate their land. A distinction should be made between voluntary creation by the whole community and the desire of a majority, which is imposed on a minority. In the USA, the establishment is voluntary, but when: (i) a majority of landowners whose lands constitute a major portion in value, or (ii) at least 500 electors, residents or proprietors owning at a minimum 20 percent of land value, have decided to establish a scheme, they can impose the formation of the district on the opposing minority. Once it is established, no member can leave the association without a previous and total renouncement of the utilization of water (FAO 1976 p 3). The same situation happened in Ga-Mampa where the establishment is voluntary, but when a majority of land owners whose lands constitute a major portion in value, at least 177 farmers owning 70% of land value, have decided to establish a WUA, no member can leave the association once it is established without a previous or total renouncement of the utilization of water.

However, there are some countries where the establishment of an association is compulsory, as is the case in Spain where any irrigation system having more than 20 owners or more than 200 ha must form an association. In some other countries, compulsory associations coexist with the voluntary ones, as in Italy (FAO, 1976 p 4).

Coexistence of both systems tends to indicate that the associations were originally of a voluntary nature but the need to accelerate and increase farmers' participation in the development of irrigated agriculture later caused the establishment of the compulsory system (FAO, 1976 p 4).

This coexistence of both systems might occur in Limpopo Province, since some of the associations in this Province were established by the state. Then such state-established associations collaborate with voluntary association established in order to increase farmer's participation in the development of irrigated agriculture.

2.3.2. Traditional associations

Traditional water users associations have much less financial responsibility because, in one way or another, the irrigation scheme infrastructure has been amortized in the past. Their responsibilities are generally limited to some maintenance work, which is often undertaken as communal work. In other cases, where operation and maintenance are undertaken by the board of directors, farmers are liable for the payment of the corresponding costs (Burt & Styles, 1998).

These associations were formed voluntarily. All farmers owning a plot of land at a certain distance from the water source undertake joint work to bring the water to their fields; by this mere fact, they become members of the association (FAO, 1976 p 5). Similarly, when there is work that is supposed to be done, all Ga-Mampa farmers (Mantlhane) having a plot must be involved. Groups of the community organized themselves in order to do maintenance work as long as that work involves the whole community. Group members will interact in the process of use and management of existing water committees (Aggarwal, 2000 p 89). Farmers should be able to render

their share of work, and in case of no participation estimated lost value should be repaid back with agricultural products or cash payment.

These traditional associations usually have two types of members: active and inactive. The active members are those who have met all the by-laws requirements to become full members and their contribution to the association is regularly provided through their personal work. Inactive members do not meet the established requisites, for instance, they do not own their land but are tenant farmers, or their plots are too small, etc. Inactive members do not have a right to vote but pay a contribution to the association in kind or cash for the water received (FAO, 1976 p 5).

Members in Ga-Mampa are mostly active, since everyone is committed to his/her plot's work, even the one having small plots, because they are looking for profit.

2.4. Managerial, regulations and legal perspectives

It should be noted that the nature of these associations is generally considered public, although it is difficult to ascertain the differences between public and private entities. By reason of their primary purpose - water distribution - which is basically public and the fact that they are often endowed with administrative characteristics pertaining to the State, like regulations, managerial or legal powers, etc., the opinion is strengthened that they are public entities (FAO, 1976 and Burt & Styles, 1998).

Irrigation schemes in Ga-Mampa are public and they are under the leadership of the Headman who represents the traditional authorities. They must have an agreement on those roles and regulations e.g. the bye-laws and constitution of Ga-Mampa schemes are drafted by the farmers themselves with the agreement of the extension officer and the Headman.

2.5. Water use from a property rights perspective

2.5.1. Past water policies and water rights

Thompson et al, (2001) in Perret, (2002 p 9) stated that the 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.

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 resources management was limited to irrigation related works. Post World War II industrial development in South Africa requires 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 principles in terms of "normal " flow and "private" water, which granted exclusive use but not ownership (Butterworth et al, 2001 p 14). 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 streams (Hamann & O'Riordan, 2000 p 27). Further more, much of South Africa's past water legislation had been largely oriented towards irrigated commercial agriculture (Gildenhuys, 1998 p 114). Despite certain legal restrictions, the plots owner could in effect do and take as much as he/she needed. In commercial agriculture areas, the irrigation boards that administered the allocation of water were generally heavily biased towards the needs of farmers. In theory, rural black communities and Small Irrigation Schemes 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 (Perret, 2002 p 8).

2.5. 2. New Institution for water management

2.5.2.1. *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 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. The victory of democracy in 1994 demanded that national policy on water use and the water law be reviewed (Oosthuizen, 2002 and RSA NWA, 1998). 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 suitable and equitable manner for the benefit of all persons (DWAF, 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. Refer to the table below for the concept of "Reserve", and "Schedule 1" use.

Table 1: An overview of water use rights as determined by National Water Act of 1998

Water use right	Description
License	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. It does not guarantee water availability or quality to the licensed users. 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 Transfer of licenses is possible (water rights market) A use is regulated by a license when there is a high risk of unaccepted impact if not controlled (overuse, degradation …) A reserve must be determined for a water resource before any license can be issued. 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 area 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
General authorization	A general 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 interval s of not less than 2 years. It only applies to new water use that has taken place since October 1999. When the act was fully promulgated 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. 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…) General authorization users are usually not required to apply for licenses (except in water stressed situation), but they must be registered in most cases.
Existing lawful use	Existing uses correspond to authorizations that were granted from October 1996 to September 1998, just before the application of the national water Act. Existing lawful users are usually not required to apply for licenses (except in water stressed situations), but they must be registered.
Schedule 1	Schedule 1 uses of water have minimal or insignificant impact on water resources. They include amongst other uses" reasonable" garden watering and rainwater storage Schedule 1 users are not required to register, or to apply for licenses.
Reserve	The reserve is the only right to water in law. It is not water use right per se. It consists of 2 parts, i.e. the ecological reserve and the basic human needs reserve, which includes water for drinking, food preparation and personal hygiene. It specifies the quality and quantity 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.

2.5.2.2. 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 (Catchments 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 (Perret, 2002 p 9).

The core purpose of Catchments 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 Catchments 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 (DWAF, 2002).

2.5.3. Water works

2.5.3.1. Mashushu canal

From 1964 to 1990, Mashushu irrigation scheme was depended on this canal and scheme that time was divided into two parts; upper portion with 16 plots and the lower portion with 17 plots. There are three canals in Mashushu, namely; dithotwaneng, mashushu and ditshehleng. Committee of scheme was in charge of managing the use of water, digging canals and repairing canals by removing leaves and some stones in the canal. Canals are not cemented.

2.5.3.1. Fertilis canal

It is a long cemented main canal with eight secondary canals. It was made earlier before 1964. Farmers use tertiary canals to collect water from the secondary canal to their plots. Water committees were in charge of managing water.

2.5.3.1. Mantlhane canal

It is a main canal with 16 secondary canals, which take water straight to plots. There is no committee at all; everyone was in charge of managing water, operation and rehabilitation and digging of canals in collaboration with government, since the government was in charge of rehabilitation of the canals.

2.5.4. Water management at Capricorn district, Limpopo Province.

Operation of rehabilitation and digging of canals were done by farmers, but supervised by extension officers. Water bailiff was the one managing water that time. Water bailiff was under the control of department of agriculture in Lebowa-kgomo. The action of the local extension officers and of the water bailiff was strong at the creation of irrigation schemes, but decreased quickly. Extension officers focused their action on the agricultural production after having supervised the rehabilitation of the schemes, while water bailiff focus on drawing the overall rules for the water management and the distribution of water.

2.5.4.1. Access to water.

Farmers themselves were involved in rehabilitation of canals. The general rehabilitation started before 1960, where most of farmers did not participate, especially those who started farming later. They only took part in digging the main canal. Most farmers who got plots next to the canal are the once who took part in rehabilitation of the irrigation infrastructure.

2.5.4.2. Distribution of water

Principles for the distribution of water were introduced by water bailiff from department of agriculture and were based on division of the scheme into two, each part given the right to take water three days each week. This happen to Mashushu canals and Fertilis, while in Mantlhane a farmer can irrigate within a day. Monday to Wednesday, lower part of the scheme got access to water from canal 1, 2 and 3 and from Thursday, water was given to upper part of the canals. Finally, one Sunday out of each week was given either to upper or lower part

It is important to underline the fact that such overall principles represent the theoretical rules (or normative rules) for water management. Water bailiff was not in charge on water sharing. He was much more involved in designing a precise timetable for the distribution of the water (with water turns) in three schemes. Some contradictions occurred, because according to some of them, a kind of timetable for the distribution of water was set up each year in order to have access to water.

According to Ferrand, (2003 p105), there are two farmers who are still living who were involved in the first rehabilitation of second canal of Mashushu and also they were given the responsibility of "keeping the water turns" and point out a kind of social power directly linked to the seniority in the settlement. Pragmatic rules were the base of the organization responsible to distribute water in the irrigation scheme. I met those farmers and they are still cultivating maize. I have met those farmers and they are still involved when there is any rehabilitation some where around the canal. Normative and the pragmatic rules about the different operations in the irrigation scheme from 1964 to 2000 are indicated in table 2.

Table 2: Comparison between the normative and the pragmatic rules about the different operations in the irrigation scheme and kind of supervision organisations from 1964 to the middle 2000's.

Rules	**Access to water**	**Distribution of the water**	**Maintenance operations**	**Supervision organisation**
Normative / theoretical rules	Water linked to the land. Land given by State officers and traditional authorities (PTO).	From Monday to Wednesday for the lower part of the scheme. From Thursday to Saturday for the upper part of scheme. One Sunday out of 2 for each part.	Every farmer has to clean the portion of the canal parallel to his plot. Transport section of the canals were cleaned and maintained by collective work twice a year.	Local Extension Officers and Water bailiff from the Department of the Agriculture. Traditional authorities (Headman).
Pragmatic rules / farmers' practices.	Water linked to the land. Everyone with a plot inside the scheme should dig secondary or tertiary canals in order to get an access to water Rehabilitation of canals by government in Mantlhane scheme and RESIS project in Fertilis and Mashushu schemes, for better way of accessing water	"The one, who ploughs first, uses water first according to the part of the scheme." "If someone's plot was drying out, they agreed on night irrigation.	Maintenance, operations and management of canals were done voluntarily. Everyone must be involved in maintenance and operation	Informal social organisation amongst the farmers and volunteer action. Perhaps also social control. Water users association formed

All the above information concerning water management in Ga-Mampa is consistent to those of Ferrand, (2003, p136).

2.5.5. Maintenance operations

Three men from Mashushu scheme were in charge of supervising the following operations: Cleaning canals, rehabilitation or building a partition infrastructure; secondary canals and check register every day. Farmers were used to clean the canal twice a year: once before the mealie season (August to September) and once before planting wheat (April to May). Farmers established a rule that says every farmer had to clean the portion of the canal, which skirted his plots.

An extension officer implemented basic water management. Upper plots belong to the farmers who took part in rehabilitation of that canal (second canal of Mashushu). This place was the former plots for white farmers and the lower parts was the grazing lands for black labourers and that place was more stony and sloppy

2.6. Individual Farmer and farmer group duties and their rights.

Stein, (1997 p 3) described that the owner of the right to use an irrigated land plot is also the owner of the right to use water providing the quantitative limitations due to the availability of water in the river, the established consumption norms and the technical capacity of the irrigation system. The above point is also supported by Ferrand, (2003 p 153), because this happened in Limpopo province in different irrigation schemes e.g. Sepitsi irrigation scheme and in Ga-Mampa irrigation scheme. In case of transfer of the land use rights to other owners, regardless of the type of transfer (integration in cooperatives, inheritance or sale of the land use right for an irrigated plot) the water use right is also transferred to the new owner of the land-use right. In the case of Ga-Mampa schemes, farmers got the permission for land from the local authority (P.T.O).

Owners of irrigated land plots, having independent water intakes from a natural water source (river, spring, well, etc) have an individual right to use the water. This right is exercised by obtaining a license for the water use, in conformity with the existing regulations. Owners of irrigated land plots, located within the boundaries of an irrigation system with more than one water user, exercise their water rights by forming water users' associations or by establishing contractual relations with the owners of the irrigation systems. (Stein, 1997 p 3)

Stein, (1997 p 3) stated that all farmers, farmers' groups and other water users located within the boundaries of an irrigation system, have equal rights to water use and exercising the right of one water user should not prejudice the right of another water user. The volumes and time frame for the delivery of water to the members of the water users' associations are established and controlled by the water users' associations themselves. This information from Stein, (1997 p 3) contradicted with that one from Ferrand, (2003 p 153), since Ferrand (2003) shows that in Ga-Mampa in Mafefe ward, time table of sharing water amongst members of the schemes were controlled by water bailiff before, but now water committees were responsible for that. Faysse and Gumbo, (2004 p 45), shows that water in Hereford irrigation scheme still allocated by water bailiff and six workers who look after the canal. DWAF also have a responsibility for managing water allocation from the Loskop Dam and the Irrigation Boards manages water from the Hereford weir. Faysse and Gumbo (2004 p 45) stated that the irrigation board gets water from the Loskop Dam to the weir and that canal operates during specific periods. Owners of irrigated land plots, who are not members of the association, exercise their right by signing a contract for independent water delivery with the association

2. 6.1. Farmer's participation in irrigation

Meinzen-dick, (1997 p 106) noted that efforts to include farmer under Pakistan's On-farm water Management programs followed a different approach. The role for farmer participation was defined more narrowly by Byrnes, (1992) in Meinzen-dick, 1997 p 106), as to include only water course lining and water distribution. Farmers were required to form water users association (WUA) as specified in provincial ordinances, and to make cash and in-kind contribution as a condition for receiving assistance in lining. This top-down, conditionality approach to farmer participation has resulted in the formation of over 16,000 registered WUAs since its inception in 1981, but there has been little farmer participation after lining is completed. Currently, reforms are underway to transform the irrigation departments into financially autonomous public utilities at the canal command level, and to devolve irrigation system management responsibility up to the distributary level to farmers. It is unclear how this will be implemented, or how much this will build upon the watercourse-level (Meinzen-Dick, 1997 p 107)

2.6.2. Objectives of farmer participation in water management.

Pawer & Satara, (2002 p 18) list the objectives of farmers' participation as:

I. To initiate participation of farmers (who are the users of water supplied to the system) in water management, irrigation scheduling, distribution and maintenance of system at micro level so as-

- To improve irrigation as well as water use efficiency to optimal production per unit volume of water.

- To make best use of natural precipitation and ground water in conjunction with the canal water for increasing irrigation cropping intensity in the commands

II. To develop sense of economy in water use amongst the users.

III. To allow the users to have a choice in selecting crops, cropping sequence, timing and period as well as frequency of water supply depending upon the soil, climate and other infrastructure facilities and with an economic potential (markets, cold storage…).

IV. To delineate responsibility in the water distribution and in the maintenance of the system between the users and the government institutions for attaining high serviceable standard of the system.

V. To promote an efficient use of water by farmers through incentives whereby farmers are charged according to the way they use water.

VI. To entrust collective and community responsibility on the farmers to collect water fees and pay it back to government.

VII. To improve and sophisticate deliveries precisely as per crop needs by the departments at the supply points of the minor and thus reduce operation losses.

2.7. Operation and maintenance in Transferred Modules

Palacios, (1997 p 13) pointed out that the transfer program includes a period of shared management between CNA and the WUA. During the first phase, there is a parallel management of the works of the minor network of canals, drains, and roads, in which CNA and WUA staff jointly carry out Operation and Maintenance (O & M) so that the new staff receives on-the-job training in these activities. This shared O& M

generally lasts for about six months. After that, CNA staff is removed, and operation and maintenance of the minor network of canals, drains, and waterways are performed by the WUA.

In South Africa CNA is equivalent to CMA even if they are different here and there. In South Africa CMAs were established in order to manage, conserve, control and develop water resources at the board catchment level. Karar, (2003) in Faysse, (2004 on page 1) stated that CMA is responsible for developing its catchment management strategy and for organizing the funding of its implementation and also responsible for allocating water licenses.

2.8. Production, financial and economic activities of Water Users' Associations.

According to Stein (1997 p 7) the WUAs perform the following functions/duties:

a. Organize the inventory and record of irrigated and reclaimed lands of farmers and farmers' groups, members of the association, organization of the records and certification of irrigation networks, rural water supply systems, land resources and water management structures

b. Prepare, independently or on a contractual basis with water management authorities, economic plans of the association's water use, water allocation and scheduling between farmers and farmers' groups;

c. Are beneficiaries of the licenses for water use agreed on the existing regulations?

d. Conclude contracts with water management authorities for water delivery and restitution;

e. Prepare each year the list and estimation of the volume of work and of the costs of construction, maintenance, repair, cleaning and other activities of the irrigation network and organize their execution by their own means, by outside organizations or enterprises on a contractual basis or by hiring outside persons on the basis of a temporary labor agreement;

f. Organize the technical maintenance of the irrigation network, the hydraulic structures using their own means or by the water management authorities, on a contractual basis

g. Plan and execute actions for improving the technical condition of their irrigation network, in order to prevent adverse effects of water on the productivity of the irrigated and reclaimed lands of farmers and farmers' groups and to avoid the depletion of local irrigation and water supply sources;

h. Organize, using the own means or by attracting water management institutions, the recording and monitoring of the water quantities received, the distribution of the water among the farmers and farmers' groups, the evacuation of water from the low-lying areas and the water delivered to other water users, and installs, for this purpose, water metering devices;

i. Systematically prepare the reports on the national and operational utilization of water resources and of irrigated and reclaimed land, in accordance with the existing regulations;

j. Systematically interact on behalf of the water users with the local water management authorities on water issues, related to the compliance to the mutual obligations, included in the contracts for water delivery or for technical servicing of an irrigation network, on the operative adjustment of water delivery, on the settlement

of water disputes, on the prevention of violations of the legislation and on other issues;

k. Systematically interact with the local state administration, with the environmental, land management and other interested institutions on issues dealing with water and land;

l. Negotiate and sign contracts, agreements and transactions with state, commercial and other organizations and persons;

m. Organize activities at the expense of the association, and obtain credits and investment funds for the improvement of existing arable land or the development of new irrigated land in accordance with the development objectives of the farmers and farmers' groups, members of the association;

n. Act as a client of design, scientific research, construction and other types of activities, related to the technical rehabilitation of the irrigation network and the introduction of improved technologies for irrigation and water saving in agricultural production;

o. Protect the interests of the members of the association and assist them methodologically and technically in the implementation of water management related actions;

p. Perform other activities, provided for by the associations' by-laws and permitted by the existing legislation

Farmers and farmers' groups, members of a Water Users' Association, retain full financial and economic independence and are responsible only for obligations prescribed by the association's by-laws. In turn, Water Users' Associations are not

responsible for obligations not dealing with water, contracted by farmers or farmers' groups, members of the association (Stein, 1997 p 8).

The Water Users' Association exercises, as necessary, the right of operational management and economic control over the associations' property, consisting of irrigation infrastructure, machinery, devices, equipment and other material values, voluntarily transferred by farmers or farmers' groups or acquired at the expense of the associations' funds and intended for joint implementation of water management activities (Stein, 1997 p 8). The financial resources of the associations are mainly formed by contributions of every member (annual mandatory fees, in the amount approved by the general meeting of the members, consistent with the budget) as well as by credits from banks, investments, income from production, commercial activities and other income from water management activities, provided for in the by-laws. The water users' associations exercise the right to independently allocate these resources for the purposes indicated in its by-laws, including remuneration of personnel, contractual payments, property acquisition, payment of works and services, (Stein, 1997 p 8).

2.9. Organization of Water Users' Associations.

James, (2003) and Stein, (1997 p 9) noted that the basic form of ensuring the powers of the farmers and farmer groups and other members of the association is the general meeting of the members which: approves the by-laws, rules and regulations of the association; elects the board of the association and its chairman, agrees upon the persons to be appointed as hydro technicians and other specialists; prepares proposals on the principles of the associations activities, its reorganization and legislation;

approves the inclusion of new members; annually discusses the association's budget, the report of the activities of the association's board and of its chairman and, if necessary, reelects the board; approves the amount of the authorized funds and the amounts of the annual contribution of the association's members; approves decisions related to the mortgaging, sale or leasing of the association's property; approves and to the financial or legal interests of the farmers and farmers' groups which are members of the association (Stein, 1997 p 9).

2.10. Economic viability

The ability of Water Users Association to fund itself is vital to its existence. Sources of funding include water use charges (section of Act no: 57), subsidies or grants (section of Act no: 61), or other sources, which meet the requirements of the ACT (section of Act no: 61) (2) such as aid programmes or guaranteed sponsorship (DWAF, 2002).

The inability of a WUA to meet its financial obligations is an important consideration for intervention by the minister (section of Act no: 95) (3) (a) and may lead to non-establishment of WUA on those grounds (section of Act no: 96) (1) (d). In the case of Ga-Mampa, WUA is formed by the committee and is not yet registered.

2.10.1. Water use charges.

Water use charges are to be used to fund the direct and related costs of water resource management, development and use, and may also be used to achieve an equitable and efficient allocation of water. Faysse and Gumbo, (2004, p 18) provide us with the solutions of the problems such as grants that the Tafelkop farmers obtained from the

DWAF and the R6.5 million that the Premier of Mpumalanga provided to improve the Tafelkop irrigation system. This example shows that the department of Water affairs can provide some money in order to help irrigation schemes to achieve an equitable and efficient allocation of water.

A WUA may set water use charges to fund its operations (section of Act no: 57). These must be in accordance with the minister's pricing strategy. Once levied members are liable for payment (section of Act no: 59), the WUA is also authorized to take remedial action in the event of non-payment (O'Riordan et al, 1999). This has happened in Tafelkop around Groblerstal in Mpumalanga.

2.10.2. Operation of government works

Waterworks could be transferred to a WUA. A WUA could then cover its operating costs through the proceeds of operating such works.

Department of Water Affairs and Forestry (DWAF) is currently drawing up a policy document setting out the conditions under which government waterworks may be transferred to WUAs. Seshoka et al, (2004), already transformed Irrigation boards in Great Letaba and Olifants Water Users Associations. It means the policy has started to work.

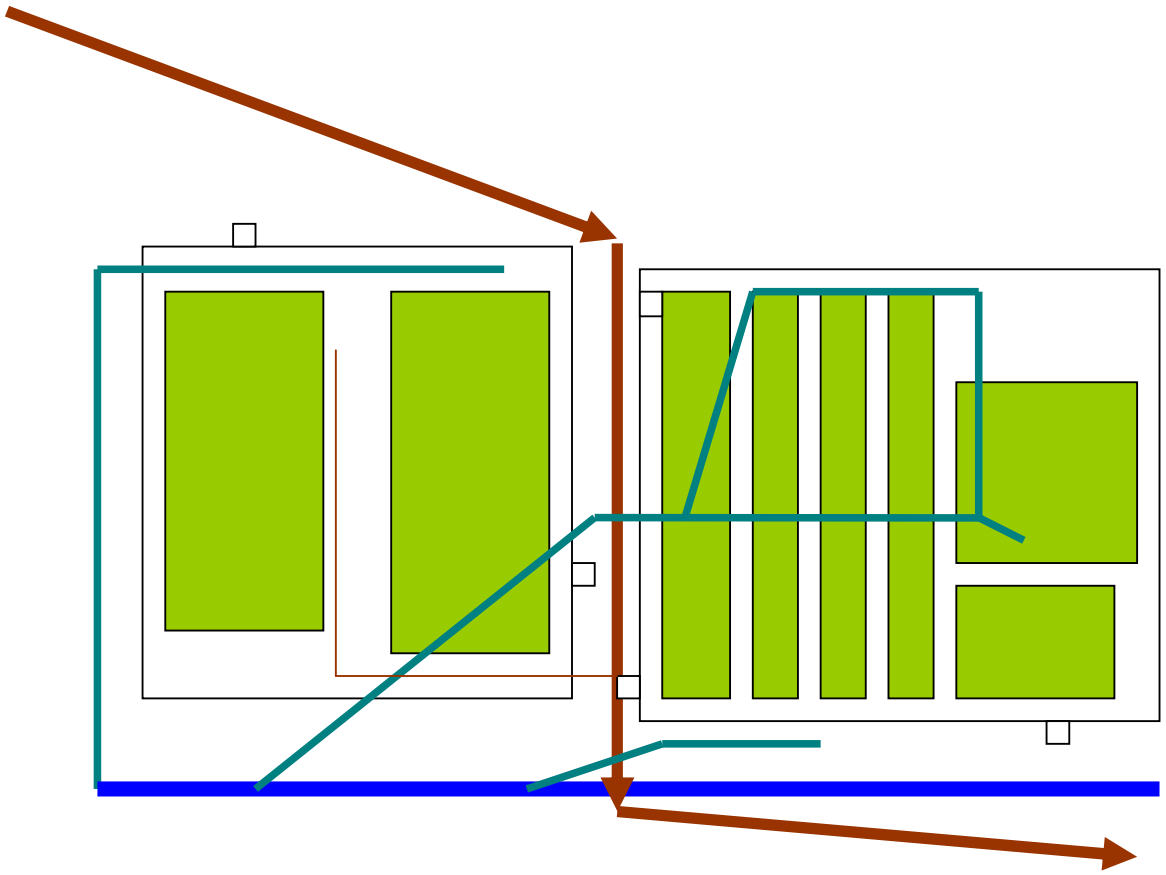
2.10. 2.1. Water works in operation

2.10.2.1.1. The canals

Seshoka et al, (2004 p 31) says that irrigation farmers can be grouped into pump and canal irrigation farmers. Pump irrigators abstract directly from rivers whereas canal

irrigators obtain water from the canals. In comparison with Ga-Mampa, people get water straight from the river through canals for irrigation, but for drinking water purposes water is pumped from the top of the mountains and people get that water through pipes. The above information is contrasted to that one in Umlazi River since they use that water from the river for irrigation and for drinking purposes. So they experienced many problems of diseases (diarrhea, scabies, and bilharzias, dysentery), because of water from the river. Faysse and Gumbo (2004 p 5) stated that the problem was solved by mobile clinics, which visited three centers such as Hopewell, Baynesflield estate in Piermaritzburg on a monthly basis. Few of Ga-Mampa farmers' use water from Mohlapitsi River for domestic use, but they have not yet experienced problems such as diseases. Cultivated land, main road, canals, gates, river and a fence were indicated in the structure of Mashushu scheme shown in figure 2.

Figure 2: Mashushu scheme, 45 hectares for 76 farmers



3 Main canals

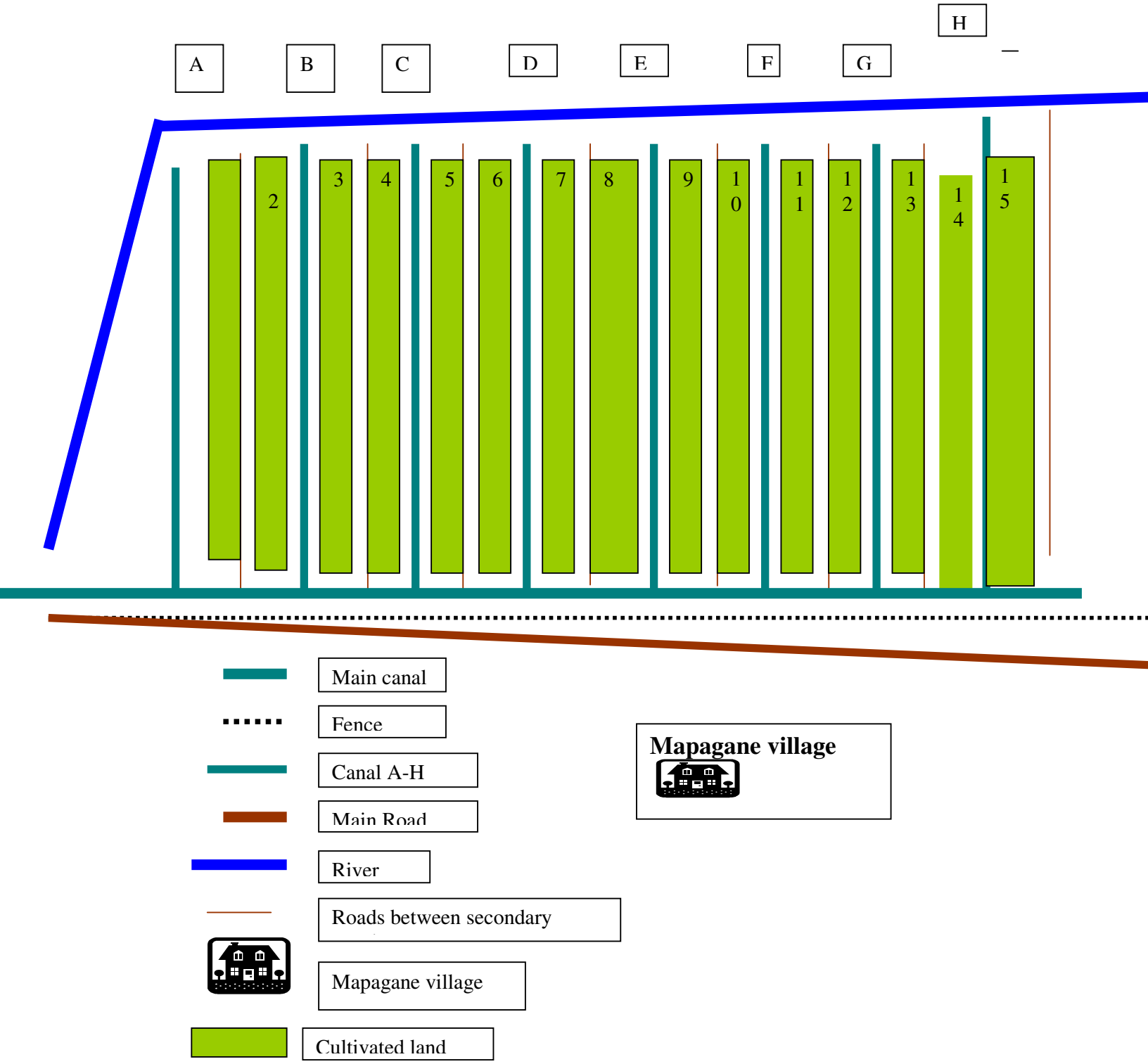
Mohlapitsi River

Main road

Cultivated land

Gate

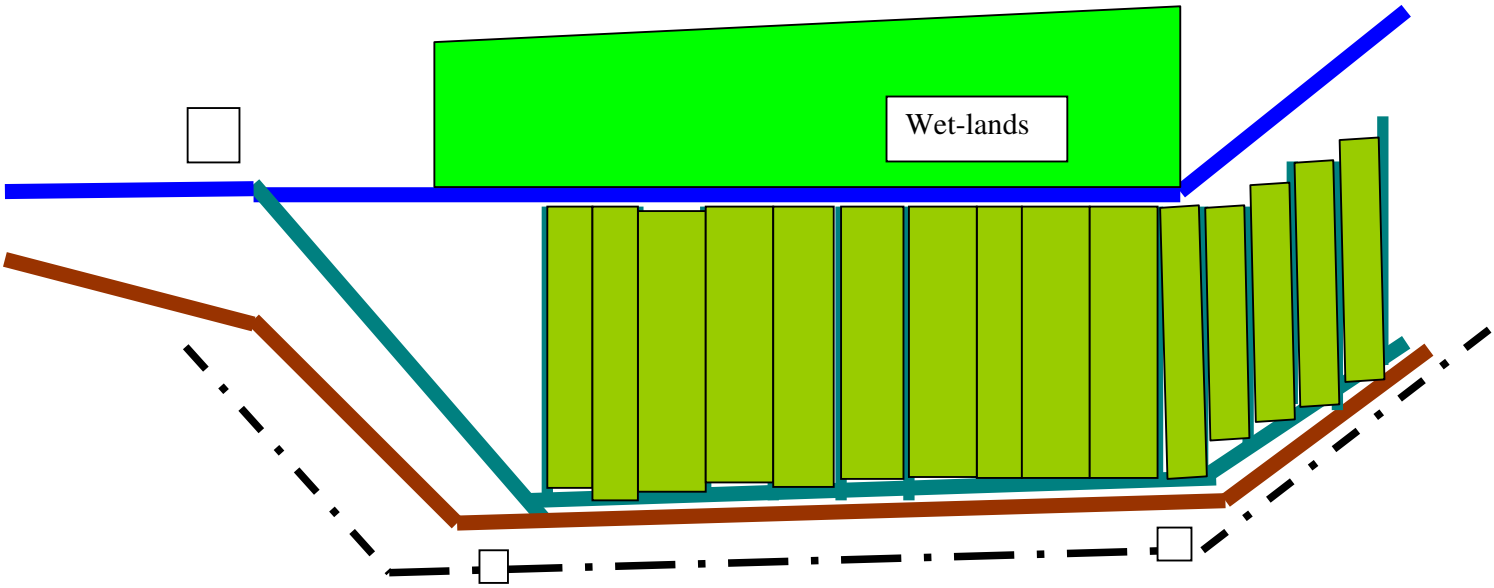
Figure 3: Fertilis (Mapagane) scheme, 92 hectares for 98 farmers



Canals, a fence, main road, river, a village, and cultivated land were indicated in the structure of Fertilis scheme shown in figure 3 Fertilis scheme as shown in figure 3 is huge. It is a scheme, which gets water from Mohlapitsi River through permanent cemented canals, which were damaged by the 1997, and 2000 floods. Fertilis scheme contains 88 plots. Previously Mashushu and fertilis were one big scheme but now are separated from each other. It has a big-cemented canal earlier before 1964 and it was destroyed by the floods. Fertilis after that has a new cemented main canal with eight secondary cemented canals. Fertilis main cemented canal is divided into two portions. First portion of the canal started at the beginning of a damaged old canal where a new one started. It has few leakages, which caused more loss of water in the canal. First part of a canal does not have a leakage, that's why water runs as fast as possible. At the middle of this canal, there were five leakages.

The second portion of a canal started near liquor restaurant in Marulatshiping. Water runs from that canal to secondary canals, which are in the scheme to the plots. Fertilis canal is longer and it has enough water for irrigation. It is near wetland where there is no necessity to irrigate.

Figure 4: Mantlhane scheme, 24 hectares for 16 farmers



Main canals

Secondary canals

Mohlapitsi River

Main road

Wet-lands

Cultivated land

Gates

Spines branches of trees fence

Mantlhane as shown in figure 4 is a small scheme consisting of 34 farmers and it gets water from Mohlapitsi River. The canal was not cemented, but people from government were busy rehabilitating that canal with cement. Mantlhane has main canal. Mantlhane scheme is divided into two parts, wetland part and irrigation scheme part. Mantlhane scheme does not have a committee at all, but every farmer was committed to community and scheme duties. Mantlhane farmers collaborated with each other; that's why they worked together without forming a committee.

Mantlhane scheme in Ga-Mampa, everyone is in charge of managing water, rehabilitation and digging of canals. All infrastructures were supervised by extension officer.

2.10. 3. Water management in Ga- Mampa irrigation schemes

According to my research, rehabilitation and digging of canals were done by farmers, but supervised by local extension officer. Water bailiff was the one managing water from 1964-1990. The role of local extension officer focused on the agricultural production and supervision of the rehabilitation of the schemes, while water bailiff focused on drawing the rules for water management and the distribution of water. Collaboration between extension officer and water bailiff was very strong. The relationship was weakened when the water bailiff was transferred to Lebowakgomo.

2.10.4. Direct financial assistance

Direct financial assistance can be provided by the Minister to achieve any purpose of the Act (section of Act no: 61). DWAF has not yet developed a general policy on

when such direct financial assistance is likely to be granted. However, a policy has been developed for financial assistance for irrigation development.

2.10.4.1. Policy on financial assistance for irrigation development:

Beneficiaries are limited to existing or new irrigators of the historically disadvantaged groups who are members of a WUA. The subsidy is payable to the WUA after the targeted irrigators have been established and constituted as members (DWAF, 2002a). The subsidy must be used by the WUA to directly subsidize the proportional capital cost share of the beneficiaries. This will lead to differential tariffs being imposed on them.

The maximum extent of the subsidy payable to a WUA for irrigation development will, subject to revision from time to time, be based on the lowest value of the proportional share (percentage of total annual water allocation) of the beneficiaries in the total subsidisable capital cost investment or R10 000 per scheduled hectare of the beneficiaries or R50 000 per scheduled member of the beneficiaries (DWAF, 2002).

The most important aspect of this policy is that the subsidy is only available for the capital cost of approved waterworks associated with the proposed new irrigation development (DWAF, 2002a). No subsidy is provided for the administrative and operating cost of a WUA. Therefore, the establishment of a WUA is only possible if members are able to pay for the operation and maintenance cost of any capital works and for the full administrative costs of the WUA.

This has always been a limiting factor in the ability to establish new irrigation board and will continue to be so in the case of establishing new WUAs.

2.11. Records, accounting and auditing.

Water users' associations will keep operational, accounting and statistical records and accounts for all production and other activities in accordance with the existing regulations for legal entities (Stein, 1997 p 11). Water users' associations will keep records and accounts for the utilization of water, irrigated and reclaimed lands in accordance with the provisions of the existing water, land, environmental protection and other legislation and regulations for legal entities and for water and land users (Stein, 1997 p 11).

2.12. Conditions that favour the conversion of water committee into WUAs

a) Understanding of the WUA

Farmers and the scheme committees understand the importance of forming a WUA, that's why they want to form WUA from their existing water committees

b) Improvement of resources

Forming WUA, farmers and committees themselves belief that, it will be easier for the resources to be improved and available.

c) Team-work

There will be a team-work of farmers with their neighbour's irrigation schemes. Forming an association, farmers will have a chance of sharing information with their neighbouring schemes.

d) To be represented

Through the formation of WUA, farmers will be represented, and through their participation, community will be promoted and they will have a chance of addressing their needs (Bandaragoda, 2006 p 16).

2.13. Summary of literature review

Literature review of this study consists of different topics related to establishment of WUAs. The first point was the introduction that explained the origin of the association of irrigation water users, the importance of establishing associations for water users and also shows the duties that WUAs have to do in collaboration with other institutions. There are procedures that must be followed for establishment of WUAs. Figure 3 shows the procedure drawn by department of Water Affairs and Forestry .An association must be authorized. The nature of association generally should be public or is generally considered public, since it uses primary purposes such as water distribution, which is basically public. Ga-Mampa communities were still under the traditional leadership. There are two different kinds of irrigation associations, namely traditional and modern associations. They differ, since one (modern) bear responsibility for repayment of hydraulic, maintenance and distribution of water while the other one (traditional) has a responsibility on maintenance of canals, distribution of water among farmers.

Farmers must have rights to use water for irrigation and water users must follow/consider the principles of the 1998 National Water Act and water policies. In 1910, the first water legislations were formed and are called the 1910 irrigation conservation of water act. After the Second World War, water legislation was

adjusted to the 1956 water Act. The act consolidated control, conservation and use of water for domestic, agriculture, industrial purposes and perpetuated the principles in terms of normal flow and private water, which granted exclusive use but not ownership. The past water legislation in South Africa was biased towards irrigated commercial agriculture. Previously, in South Africa, there were commercial farmers who used to irrigate and they were following ancient water policies. In 1998, DWAF decided to establish a new water institution with new principles and all water policies were reviewed. Government made sure that water is protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner.

Government (DWAF) drafted protective measures in the form of table to secure allocation for basic human needs, ecological and development purposes. On table 1, water use rights are shown including the following: Water license, general authorization, existing lawful use, schedule 1 and reserve. Since government reviewed National Water Act, it also decided to establish new management entities like CMAs and WUAs at regional and local levels in order to achieve the aims of the Act. CMAs were established in order to ensure sustainability of water use in their area of operation. CMAs were established in order to manage, conserve, control and develop water resources at the board catchments level. In Limpopo province, there are communities, which rely on water from the river such as Mohlapitsi, which takes water to Olifants river that collect water to Limpopo river in Zimbabwe. There are communities behind all mentioned rivers that depend on water from those rivers for domestic and irrigation use. Farmers around those rivers e.g. in Ga-Mampa gets plots from local authorities (P.T.O.). For irrigation purposes, farmers get water from the river through diversion channels and water bailiff was responsible for managing water distribution in collaboration with local extension officer.

CHAPTER 3

3. METHODOLOGY OF THE STUDY

This chapter describes the area of the study, methods used during research e.g. sample size, sample selection, research design, the process of the research e.g. development of research instrument, validity and Reliability, pilot testing and Data analysis.

3.1. Study area

The study was conducted in Ga-Mampa on the upper part of Mohlapitsi River, in Mafefe ward, which is located 120 km South East of Polokwane, Capricorn district, Limpopo Province in Republic of South Africa.

The three existing gravity irrigation schemes are Fertilis (92 hectares for 88 farmers), Mashushu (42 hectares for 45 farmers) and Mantlhane (30 hectares for 34 farmers). The irrigation schemes are small, operated and maintained by water users themselves and or representatives, as it is usually the case in the province (Bembridge, 2000). The river stream is permanent, but its flow fluctuates according to seasons. All three schemes receive water from Mohlapitsi River through diversion weirs. Due to 2000 floods, the riverbed is deeper and as a consequence, the water level is often too low reaching the water intakes.

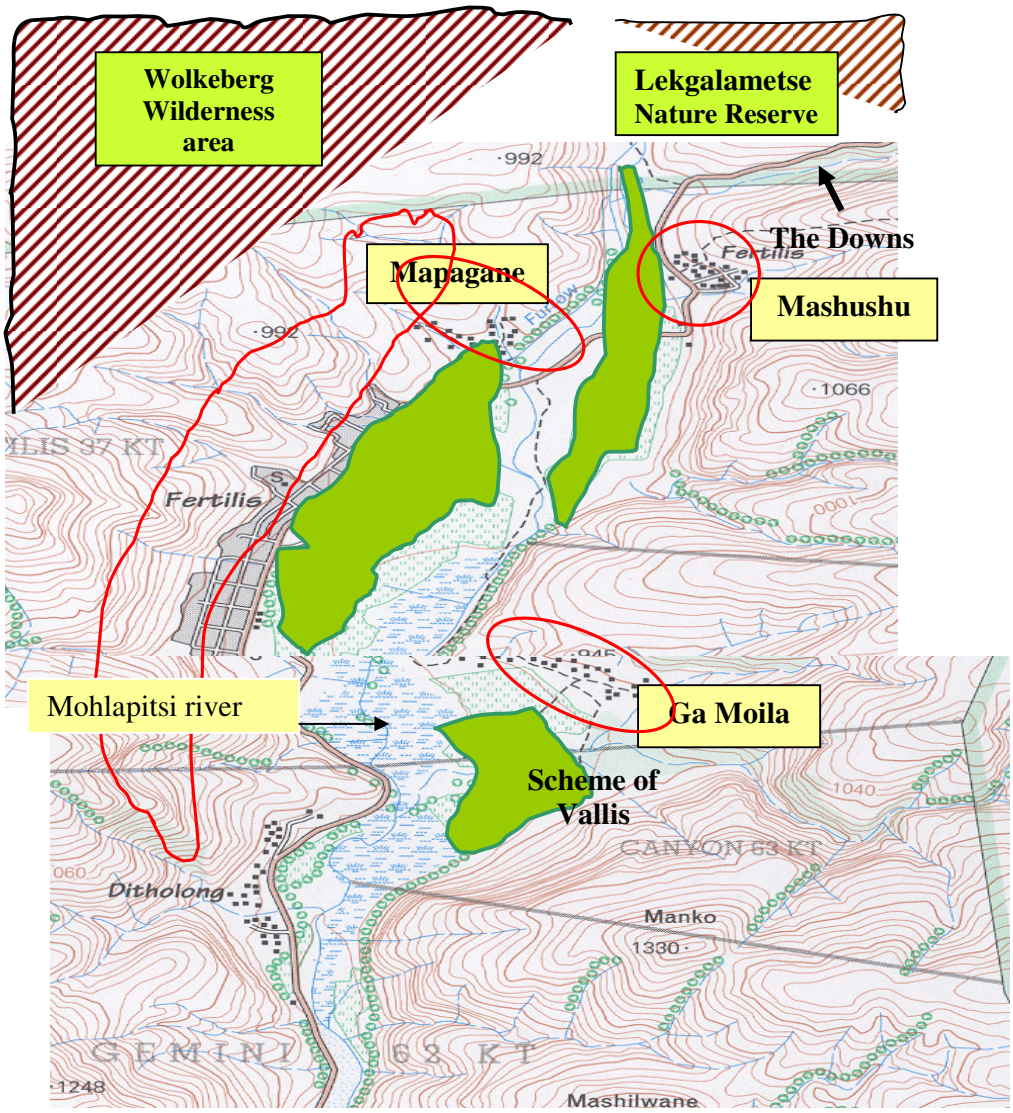
Mashushu has been chosen as a pilot village by the Limpopo Department of Agriculture (LDA) extension programme, Broadening Agricultural Service for Extension Delivery (BASED). Limpopo Department of Agriculture (LDA) has embarked on a programme of irrigation schemes revitalization (in 1998: “planning and implementation of irrigation scheme programme” in April 2000: “Water care programme”). The main programme objective is the transfer of irrigation schemes

ownership to the farmers. Actually the extremist climate condition (drought, floods) in the Limpopo province and the declining small- scale irrigation schemes lead to a master plan for the expansion of the programme to include all smallholder irrigation schemes in the Limpopo Province in partnership with IWMI, DWAF (Department of Water Affairs and Forestry). In September 2002, the master plan of the "Revitalization of Small Irrigation Scheme" RESIS was born which supposes to assist the community if beneficiaries are willing and committed to take ownership of the irrigation schemes". At the end of the RESIS project, 45 Small-scale Irrigation Schemes (SIS), 114 schemes supposed to be rehabilitated, that it represents around 1838ha.

Through Participatory Extension Approaches (PEA), it supported introduction and production of improved open pollinated varieties of maize seeds and improved rain-fed agriculture through farmers groups. Local extension officers, trained from BASED programme became engaged in development process facilitation in their working areas.

The topographical map of the study area is shown in Map 1 and Aerial photo in Map 2. Localization of Mashushu, Fertilis, Ga-Moila and Mantlhane schemes, Ga-Mampa valley, game reserve and Mohlapitsi River are also indicated in map 1.

Map 1: Ga-Mampa Valley, localisation of the irrigation schemes and creation of the Nature Reserves. Topographical map of the national geographic institute of S.A Ref: 23030'AA "The Downs". Topographical map of Ga-Mampa Valley



Legend alignment

Cultivated land

Villages

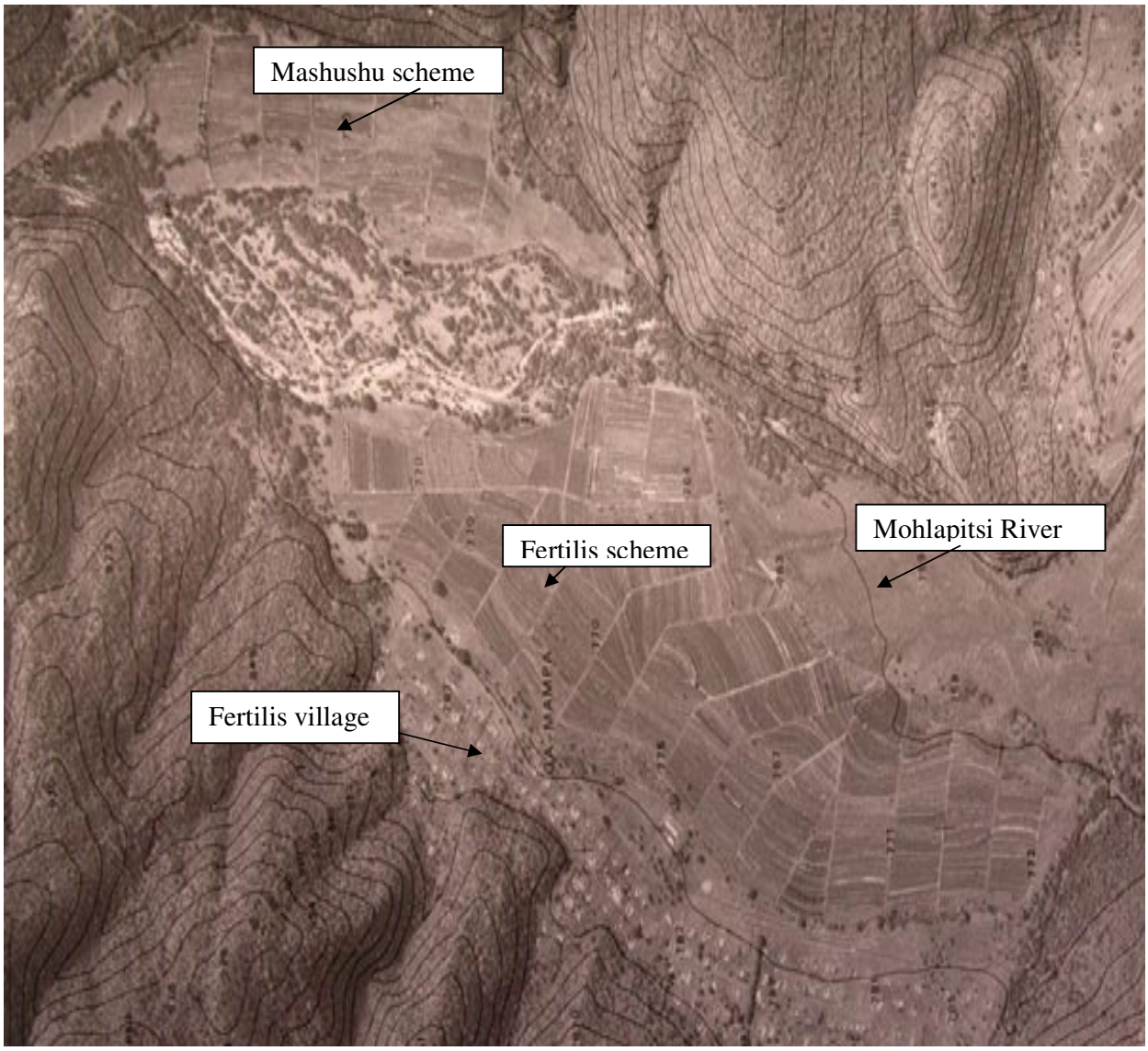
Mapagane village

Main road

Mohlapitsi River

The aerial photo (Map 2) shows the location of schemes, mountains, roads village and Mohlapitsi River.

Map 2: Aerial Photo for Mashushu and Fertilis Irrigation schemes



3.2. Action research process

The process of establishing Water Users Association is the direct output of a previous participatory action research process where farmers came to understand the importance of improving their organization to better benefit from available water. This research aimed at building on this process to go a step further towards the creation of a WUA as it is currently recommended in the government policy.

3.2.1. Institutional introductions

The Centre for Rural Community Empowerment (CRCE) introduced the researcher to the traditional authorities and to the various groups during a meeting in order to request permission to do research in the area. Introduction of the researcher to the community was done on 10/08/2005 and local extension officer facilitated a meeting. Then, public meetings were held between members of each of the schemes and local institutional stakeholders (Center for Rural Community Empowerment, Broadening Agricultural Service & Extension Delivery). Meetings focused on the steps of establishing Water Users Associations and the researcher gave an explanation about her research. Previous minutes were discussed informally during these meetings. My first observation after these first meetings was that the members were very positive and willing to explore how to establish Water Users Associations. During these meetings, they acknowledged that the way things were presently done through the water committees- was not entirely satisfactory and that there should be a better management of their water.

3.2.2. Identification of organizations

Twelve members of farmer's representatives together with other members of water committees from existing three schemes were visited and interviewed. Informal continuous discussions and advice concerning WUA were also occurring before and after meetings, a date for the next workshop was done by the stakeholder from Center for Rural Community Empowerment. The selection of farmer's representatives to participate in the core process with the researcher was done according to the size of the scheme: three members from existing water committee selected from Mantlhane and another three from Mashushu, and six members selected from the big scheme of Fertilis. Farmer representatives were attending all workshops focused on steps of establishing WUA. Representatives who participated in the workshops focussed on establishing WUAs are shown in table 3.

Table 3: Representatives from the three schemes, their number from each scheme, gender and age

Scheme	**Total**	**Gender**		**Age groups (years)**		
		M	**F**	**<35**	**35-60**	**>60**
Mashushu	3	1	2		3	
Fertilis	6	4	2		5	1
Mantlhane	3	1	2		3	
Total	12	6	6		11	1

Table 3 shows the number of farmer representatives from three irrigation schemes, three from Mashushu (one male and two females between thirty-five and sixty year old), three from Mantlhane (one male and two females between thirty-five and sixty years old), and six from Fertilis (Four males and two females between thirty-five and sixty and one above sixty). The total numbers of farmers' representatives from three different schemes were twelve. Six were men and another six were women.

According to table 3, middle age group are the one dominated too much on farming. They are all full time farmers. Some of those representatives started farming in 1969 and 0thers in 2002 after heavy floods. It means that the ones who started in 1969 have thirty-seven years experience in farming. They cultivate maize, groundnuts, sweet potatoes, Potatoes, cabbages, spinach and sugar cane. During winter, they cultivate vegetables like spinach, cabbages and coriander.

During summer between October and January, they cultivate maize and the steps during cultivation are as follows:

Preparation of land with addition of fertilizers using a tractor, donkies or hoes and after a month they irrigate and start to cultivate followed by second irrigation. Some use eight rows in twelve rows during cultivation and after a month, they irrigate again. They irrigate thrice before harvesting, but during rainy season, there is no need for irrigation. Farmers use flood irrigation method.

Some of the farmers hire labourers during cultivation, removal of weeds and harvesting. Those labourers were paid R20.00 per day. They usually harvest after three months and after harvesting, farmers dry their products through the sun and after that they remove the seed from the cob. After preparation, they put the maize into the

sacs and transport to the agricultural offices around the community. Extension officer transport the sacs to the cooperative in order to sell them or to exchange with maize-meal. Mostly they do not want profit from the sacs of maize but for home-consumption.

Farmers' representatives were selected by the farmers themselves during the public meeting, which was held on 12/08/2005 whereby farmers from Mantlhane, Fertilis and Mashushu met together in order to select those who will be their representatives. During the meeting, Mantlhane and Mashushu farmers elected three representatives from each group, followed by Fertilis, which elected six. Meeting was held at agricultural Offices at Fertilis and the facilitator for that meeting was the researcher. All farmers' representatives were from the scheme committees (or water committee) who were responsible for water use, fertility management, management of the fence, and other duties of the scheme. They were selected according to their experience, level of production and regular attendance at meetings.

In view of the creation of the WUA, information about existing byelaws and committees were collected from those representatives and crosschecked with about forty-one farmers. Farmer's representatives crosschecked by reminding each other concerning the previous bye-laws that there were somewhere not used. So, they were discussing if ever they must continue using those previous bye-laws or not (this is an exchange of knowledge). Farmer's representatives were giving a feedback after each and every workshop to the farmers and discussed the feedback in order for the farmers to share their views, understanding and comments. The Chairperson of farmer's representatives facilitated meetings for feedback.

Farmers selected a gender-balanced committee as it is very often done nowadays without any external recommendation. They assumed that by doing so, the power of

men and women within the organization must be equal. This gender equality will reflect the views of all users. During various workshops, farmers were separated according to gender with three groups of males and three for females sharing same topics. Such method was proposed to allow each gender to openly express their priorities. This gender equality also will decrease the causes of conflicts amongst organization's members. The conflicts are brought about by gender inequality. This point is supported by Ferrand, (2003) who observed that women whose partners died were deprived of water by men who take women share to irrigate their plots. According to the above statement, previously farmers formed bye-laws, but they were not following them.

3.2.3. The Water Users Association emerging process

About five workshops were held on some of the main issues about the formation of water users association, management of the distribution of water in the scheme, and the emergence of WUA in the area. Workshops were organized for water committee's representatives (from three schemes) to discuss WUA with inputs from researcher and Center for Rural Community Empowerment. About five public meetings with all water users were held to feedback on the main outputs of the workshops. Processes for the establishment of Water users association were discussed during the workshop. After every workshop, participants received feedback on workshop resolutions.

3.3. Key informants: the members of water committees

The size is 12 members of water committees of between 35 to 60 years old, who represent three different schemes (Mantlhane, Mashushu and Fertilis). There were

farmers that were selected by their colleagues according to their experiences on production and they were full time farmers. Farmer's representatives have an experience of being members of water committee and they know all the challenges facing water use and also possible solutions for each and every question concerning water use.

3.4. Data analysis

Data collected was organized into themes formulated by the researcher.

The research is qualitative; it aims at documenting all the processes based on participatory approach where diagrams, maps, observation and flip charts were used for drafting diagrams and Maps. Data was in the form of written documents, observations, and transcript. Neuman, (1997) noted that the analysis proceeds by extracting themes or generalizations from evidence and organizing data to present a coherent, consistent picture. Workshops and meetings were held as follows:

3.4.1. Workshops

This section describes the way workshops were conducted

Workshop no 1: The establishment of Water Users Associations, their roles and their importance

Objective for that day was explanation on the establishment of Water Users Associations, their roles and their importance. Farmers were asked by the researcher if they understand anything or knew anything about the formation of WUAs. Farmers replied positively that WUAs is an association on water users who wish to undertake

water related activities for mutual interest. Farmers also understand the roles and the importance of establishing WUAs, that is why they accepted to establish WUAs at Ga-Mampa. They adopted all steps for formation of WUAs. Communities appreciated it.

Workshop no 2: The role-played by water committees in three schemes around Ga-Mampa area

Workshop was held on the role played by water committees in three schemes around Ga-Mampa area. Farmer's representatives themselves mentioned and recorded the roles that are supposed to be played by the water committees in the schemes. Farmer's representatives also mentioned the conditions that favour the water committees to be effective and efficient. All those roles and conditions are mentioned in the results. Short discussions on the roles and the conditions were held and farmer's representatives agreed that they should follow what they have mentioned. They decided that the feedback for that workshop should go back to the communities in order for the communities to make some additions or subtractions on what they have discussed.

Workshop no 3: The challenges that faced by farmers

The third workshop was based on the challenges that each and every farmer has to face when cultivating their plots in the irrigation scheme. They discussed the following:

- Fertility management
- Water use management

- Protective management

After discussion, they came up with an agreement that they should draft a constitution and bye-laws through those challenges.

Workshop no 4: The way of drafting a constitution and bye-laws

Farmer's representatives discussed the draft of a constitution and bye-laws. Those bye-laws and a constitution were drafted through recorded challenges that they have mentioned. Farmer's representatives took the feedback to the communities in order for them to make additions or subtractions on those bye-laws and a constitution. Committees together with a Headman agreed on those bye-laws and a constitution and also agreed that they should start to use those approved bye-laws and a drafted constitution.

3.4.2. Meetings

This section describes the way meetings were conducted

Meeting no 1: Introductions of student to the community

First meeting was held on introductions of student from the Center for Rural Community Empowerment by the headman to the communities. Communities were told about what students were going to do. The research was based on "from water committees to emergence of water users associations: case study of Mohlapitsi irrigation schemes at Ga-Mampa". Communities accepted and understood the nature of the research. The researcher was accommodated around that community. All participants of about forty-seven signed attendance list.

Meeting no 2: Explanation about t he researcher's studies

The second meeting was held on explanation on what student will research on. The researchers explained the steps of establishing a WUA and also explain about the roles and the importance of WUA to the communities. Communities understood and asked some questions here and there. Communities agreed, and understood about the establishment of WUAs and they promised that they will participate in each and every meeting or workshop. Chairperson (Extension Officer) for that meeting announced the date for the next meeting. Announcement was on water committees for three schemes to be available on the next meeting. Roll call was signed as usual.

Meetings no 3: Selection of the farmer's representatives

The third meeting was based on the selection of the farmer's representatives from water committees of three schemes. Mashushu and Mantlhane elected three members for each scheme who represented their schemes from existing water committees. These elections were done separately as follows: Mashushu was the first group to be visited, followed by Fertilis and the last group was Mantlhane. Fetilis farmers elected six members because their scheme is huge. For each and every meeting of each scheme, there were announcements for next meeting whereby all selected farmer's representatives should meet. Roll call was signed as usual.

Meeting no 4: Twelve Farmers's representatives

Fourth meeting was held and was based on all the representatives elected on previous meeting. Farmer's representatives met and discussed what they should do. The Chairperson (Mr. Malesa Hezekiah) of the meeting asked if ever they can elect the committee of the representatives on that day and they agreed on selection same time.

Four males and one female selected as a committee for farmer's representatives. Farmer's representatives committee will control the meetings and the workshops of the farmer's representatives only.

Meeting no 5: Final draft of a constitution and the bye-laws

Meeting on ratification of byelaws and a constitution were held whereby all bye-laws and a constitution were ratified, added and subtracted. Communities agreed that they should send the representatives and the researcher to the headman in order to submit a document for a constitution and bye-laws to be approved or not approved. Headman understood what was written in the document and decided to approve it. Headman and the communities agreed that they should follow those approved bye-laws.

Meeting no 6: Farmer to farmer exchange

Sixth meeting was based on farmer's exchange whereby farmers from four different schemes (Mashushu, Fertilis, Mantlhane and Ga-Moila) were visited by farmers from Ga-Mothiba. The objective for that day was exchange of knowledge about the rehabilitation of a fence around the schemes by farmers themselves without payment. Ga-Mothiba farmers explained about their starting and their ending point of building a new fence around their scheme. They started by cutting trees around their schemes. Secondly, they started to analyze their budget and arranged with the nearest supermarket for materials. The owner of supermarket sent people to deliver material (e.g. droppers, double wire, poles e.t.c.) needed for that new fence. Fence was built by the farmers themselves. They disciplined themselves by signing register everyday and if ever the person did not come, she/he was supposed to report or send someone to

represent him/her. They explained that registration worked rightly/correctly and they did not experience any problems. The only problem was that farmers firstly were promised payment according to that registration, but at the end this did not happen. This was difficult to some, but CRCE advisers tried to explain to them that, payment will not work; otherwise, they will have a shortage of money. According to them, there should be an agreement that CRCE should contribute 50% of payment and 50% contributed by the farmers themselves using their manpower. Finally, farmers accepted and forgot about the previous challenges. Also explained that the remaining money on their budget will buy a pumping machine because there is a shortage of water in that area. This encouraged farmers from Ga-Mampa since they have that wish of working like Ga-Mothiba farmers. Ga-Mampa farmers appreciated what has been done by Centre for Rural Community Empowerment on networking farmers.

CHAPTER 4

4. RESULTS

In this chapter, all steps followed by the researcher when establishing WUA are explained followed by the consequences of those steps. The study came up with the important roles played by water committees in small-scale irrigation schemes when establishing a Water Users Association. Farmer's representatives from the water committee in different schemes do not have experience about what they are supposed to do in relation to their positions as representatives. For example: being a chairperson does not mean you have to be a controller and other members should not have a say. So, they decided to attend the workshops on the role of water committees with the inputs from the researcher. Other members of water committees and twelve farmer's representatives held workshops and the workshops were facilitated by the chairperson of the farmer's representatives. Workshops came up with the conditions for involving existing water committees in facilitating the emergence of an effective and efficient WUA.

4.1. Steps followed by the researcher on forming WUA

There are two ways of forming a Water User Association. One way is through the state (e.g. Ministry) and the other way is through the public. WUA in Ga-Mampa were formed by farmers themselves and steps to form that WUA differ from that one formed through the state.

Research concerning the establishment of WUAs was done and the procedures followed by the researcher from University of Limpopo were as follows:

- Research on WUA Initiated by public members.

- Initial discussion between the supervisors and the researcher.
- Preparation of research proposal.
- Official meetings and workshops about the process of establishing WUA were held.
- Farmers from three different schemes selected their representatives from existing water committees to represent each scheme.
- Selection of the committee from farmer's representatives.
- It was proposed by the farmer's representatives to elect a committee of five leaders to perform the following roles: three males and two females

Chairperson (Fertilis scheme)

Deputy Chairperson (Fertilis scheme)

Secretary (Mashushu scheme)

Deputy Secretary (Fertilis scheme)

Treasurer (Mashushu scheme)

- Schemes representatives introduced to the community by the chairperson.

Workshops on role of the members of temporary WUA and the conditions that can make the water committees to be effective and efficient were held. Workshops came up with the conditions for involving existing water committees in facilitating the emergence of an effective and efficient WUA and also the role played by the water committees.

There were challenges when establishing WUA and Karar, (2003 p 4) came up with the challenges facing the establishment of water users association and are stated as follows:

- Equitable representation in its membership and management structures of all current and potential water users affected by the activities of the WUA;
- Sustainable and efficient service provision in response to the collective needs of its membership (Usually this entails fair and reliable water supply to its members;
- Effective interaction with other water management institutions and representation of the needs of its members at higher level decisions making structures;
- Performance of ancillary functions without jeopardizing its own sustainability and its basic relevance to its membership;
- Facilitation of support from other institutions to the benefit of its members, especially historically disadvantaged farmers and
- Encouragement and brokering of mentorship arrangements for historically disadvantaged farmers with established commercial farmers of the WUA.

Some of the above mentioned challenges are similar to those experienced by the researcher during the research process.

Equitable representation in its membership in establishing WUA in Ga-Mampa was done as follows:

Six men and six women (as their representatives) are responsible for management of structure of all current and potential water users affected by activities of WUA, since they established the WUA voluntarily. Their water supply are so reliable to its

members since they got water committee that transformed into WUA, which will be responsible to control water and they need sustainable and efficient service provision in response to the collective needs of its membership. It is thus why they established WUA. Farmers have effective interaction with International Water Management Institute through the researcher, since it supplied the researcher with funds for effective interaction. WUA in Ga-Mampa can be represented at high-level decision-making structure after being registered.

General challenges were that every farmer wants to be a representative, even if she/he doesn't have qualities and the problem was that most of them thought that the institution (Center for Rural Community Empowerment from University of Limpopo) will give them money. In addition, farmers did not want to be represented by the person who does not respect himself or herself.

The other problem was that NGOs are not working together as partners and this can be solved easily by working together, since they do the same development. If you are a visitor; people within the community think that you will give them a gift or a job e.g. Government project which is Revitalization of Small Irrigation Scheme (RESIS) introduced into the community and members of that project explained that they have 1.2 million rand that should be used for maintenance of the scheme, then people within the community started to focus on that project hoping that they will get money.

4.2. Roles played by Water Committees in Mashushu, Mantlhane and Fertilis schemes.

In the 2 and 4 workshops (page 58-59 of methodology) facilitated by the researcher and the chairperson of the farmers representatives, participants determined the different roles performed by water committees. The group of farmer's representatives and water committees themselves through their experience discussed questions and suggestions concerning the roles played by water committees.

Members of schemes were expecting different roles from existing water committees. Water committee's members must know their roles before they are selected and they must have an interest in what they are going to do. The following points describe the roles that must be played by the water committees.

- To ensure cohesiveness
- To ensure unity and teamwork
- Water use management
- To allocate water in the whole scheme
- To prevent conflicts between water users during the process of water sharing.
- Infrastructure management
- They ensure farmers maintain canals by removing the weeds and stones.
- They ensure farmers repair water leakages when canals are broken.
- To make sure that farmers rehabilitate the canal if it is broken.

The study proposed how a WUA's constitution and byelaws could be adapted and established by existing groups (as water committees) who are interested in

establishing a WUA. It was adopted since, the committee and other farmers recommended and facilitated the drafting of bye-laws and the constitution

During workshop number three attended by twelve representatives and the community, members discussed three main challenges that each and every farmer has to face when cultivating a plot located on the irrigation scheme. These challenges are:

- Fertility management: fertility is quite poor and the yields are very low due to a lack of proper management on this issue; trials done by some individuals with the BASED/LDA support show tremendous yield increase when manure or fertilizers are applied.

- Water use management: in spite of the recent rehabilitation of the intakes on the 3 schemes, water is not enough to allow farmers to have any reliable production during winter time. Many reasons may be advanced for the water scarcity but water management (waste of water, water sharing etc.) is definitely an issue to be addressed.

- Scheme protection management: Cattle, donkeys, goats and some wild animals (monkeys, pigs,…) freely access the scheme during winter season and hamper agricultural development during that season.

 Twelve farmer's representatives came up with the strategies of drafting byelaws and the constitution.

Table 4 refers to what the farmers wish to implement according to the arranged categories mentioned on the table.

Table 4: Challenges to address when drafting a constitution and bye-laws.

Challenges	Males members	Female members
1. Fertility management	**Training in compost preparation** Preparation of compost To analyse soil in order to determine appropriate fertilizers.	**Farmer's needs** To do soil tests and with the results to prepare soil with fertilizers suitable for that soil Training for making compost and soil testing
Fertility management	**Who can do it:** Farmers themselves	**Who can do it:** Farmers in collaboration with extension officers
2. Water use management • **Water supply management**	**Farmer's needs** To use furrow irrigation for maize, ground nuts and dry beans. To use flood irrigation for coriander and wheat. Water must be shared on a daily basis. More water is to be conveyed through the canal.	**Farmer's needs** Water must be shared on a daily basis. To use furrow irrigation rather than flood irrigation Training of the water committee is to be done. Canal must be wider and deeper to convey more water
• **Water use management**	**Who can do it:** Water committees.	**Who can do it:** Water committee. If someone steals someone's water, she/he must be fined R50.00 by water committee in consultation with a Headman.
3. Scheme protection management	**Farmer's needs** Farmers will donate R2.00 or R3.00 for a person who is going to manage a fence. Fertilis scheme has eight sub canals and farmers want to group themselves in order to manage a canal according to the division of secondary canals. When a person has been proven to have stolen a fence, it is difficult to enforce the fine system (shame, fear feelings). Fence poles should be marked in order to decrease stealing rate. Fence must be high enough to ensure that they protect against cattle.	**Farmer's needs** To protect their schemes with fence. If someone cuts a fence, that person must be arrested and fined about R100.00 by selected rangers. If someone jumps a fence, he/she must be fined R50.00. New fence is needed. Commitment to repair fence Fence must be high enough to prevent cattle to jump into the schemes. Kraals must be rehabilitated to prevent animals from damaging scheme fences.

Ga- Mampa community held a workshop concerning challenges they have in the irrigation scheme. The workshop was facilitated by the researcher and the extension officer. Farmers were separated according to gender during the workshop into three

groups of males and three groups of females. During the workshop, participants were divided into three groups based on gender to discuss the same topic. This method was proposed to allow each gender to openly express their priorities. The key questions for that day were as follows:

(a) Name the challenges faced by farmers in the irrigation schemes? Challenges faced by farmers in the irrigation schemes are as follows:

- Water use management
- Fertility management
- Protective management

(b) Can you please discuss those challenges? Challenges were discussed in table 4

Up to so far, schemes do have water committees responsible for controlling water. Also fence committees are responsible for managing the fence.

Through discussions during workshops, farmers delegates drafted bye-laws from their past practices and experience.

4.3. The following conditions which favour the evolvement of water committees into effective and efficient Water Users Associations have been listed by farmer's representatives.

- Must meet regularly and communicate with each other.

Meetings or short discussions must be held regularly so that farmers will have a say. Meeting regularly will make farmers to communicate without fear from other farmers.

- Must collaborate with each other at work and participate in meetings.

Farmers must work together without any problems, helping each other and farmers should have a say so that the committee will be able to make decisions.

- Must contribute financially towards canal and fence management e.g. community can agree on monthly payment (collection of a certain amount of money for repairing canals and fences)

If the community agreed on monthly payment for repairing canals and fences, farmers should stick to the agreement without any complains. Fines for those who do not want to pay should work.

- Must encourage each other to be committed to his/her work.

Farmers should know their goal and they should be committed on what they are doing. Also, they should help each other, encouraging and recruiting others by giving them knowledge about what they know on schemes e.g. encouraging other farmers from other schemes to work together.

- Must understand the objectives of the committee and to be committed to it.

Committee members must know their roles as a committee. For example: the chairperson should know the duties that she/he is supposed to do.

- Must understand and accept the benefits flowing from their memberships. Committee members should encourage other farmers to come with their decision, resolutions or suggestions on challenges or what they want to be solved.

- Must understand and be committed to the objectives of the scheme.

Farmers who are involved in farming, should know and respect the objectives of the scheme, their constitution and also follow the byelaws

4.4. Farmers' committees and farmer's representatives recommended the following:

4.4.1. By-laws for Mashushu, Mantlhane and Fertilis schemes

Since farmers within the community agreed on using the mentioned challenges (fertility management, water management and Protection management) to form byelaws, then they agreed on drafting the byelaws. Some of the drafted byelaws were used before, but they were ignored. The previous recommendations are to be translated into byelaws as summarized below:

- Overall Supervision by a committee

- Water must be controlled by water committee.

- Water must be shared on a daily basis.

- Members group themselves into small groups of two to three in order to manage the existing eight canals.

- Enforcement by a fine system

- If someone has stolen someone's water, she/he must be fined R50.00, since they agreed that a farmer must use water at a time of his/her turn).

- Member's participation in maintenance works

- If a farmer did not report his/her absence, then he/she must pay R300.00 if ever she/he did not get involved on building/ rehabilitating a canal

- If a person uses water although she/he didn't pay R300.00 then the Headman will sentence him/her.

- If farmers are busy working on a canal and a farmer is absent, but reported their absentees, then he/she should pay a fine of about R10.00

- A fence sub-committee

- A fence committee must control fences.

- If there is a loss of one fence pole or the pole is about to fall due to decay, it must be replaced by the farmers themselves.

- If someone cuts a fence, that person must be arrested and fined R100.00

- If someone jumps over a fence he/she must be fined R50.00.

- If there are animals getting inside the schemes, fines must be paid by the animals' owner per head as follows:

  - Head of Cattle – R50.00

  - Head of donkey – R30.00

  - Head of goat – R25.00

- The above byelaws now exist in three schemes (Mashushu, Mantlhane and Fertilis) and they are approved by the local authorities around Ga-Mampa and everyone must follow these byelaws. There are no different byelaws in the three schemes. The role of the committees is to enforce these by-laws. The above byelaws were submitted to the local authorities and are now being enforced.

Farmers were given feedback on the drafted byelaws and agreed to implement them. As far as the enforcement of the fining system is concerned, the following case occurred during the study. A farmer from Fertilis was fined because she stole somebody's water. The water committee invited the suspect for a hearing, but she refused to attend. The water committee took her to the Headman and she finally was fined R100.00, which she paid. This example tends to show that social pressure is

now efficient and the newly established byelaws are accepted and can contribute to lower the misuse of water.

Concerning rehabilitation of canals and fences, a LDA supported a project Revitalization of Small-Scale Irrigation Scheme (RESIS) which has just started in the area. The support staff currently trains the irrigation committees.

To provide learning experience on fence management, four farmers exchange programmes were organized with Ga-Mothiba farmers who recently collectively constructed a new fence around a 25 ha plot.

These exchanges were beneficial to Ga-Mampa farmers because it made it easier for them to construct a new fence. Ga-Mampa farmers after an explanation from Ga-Mothiba farmers, have an interest in protecting that fence.

The constitution is still pending, since communities and an extension officer do not know what it is, because they usually take byelaws as a constitution.

4.5. Constitution for a common WUA (Mashushu, Mantlhane and Fertilis)

Establishing a constitution appeared to be more difficult and remote from the people's concern. The process to agree on a constitution for the association has been postponed due to the government supported project (RESIS) that started to operate in the area during the study. This important and ambitious project shares a similar aim with what the Ga-Mampa farmers were aiming at. It is therefore important to join forces and foresee how the first steps of WUA building can be strengthened by this governmental initiative.

At this stage, community and CRCE started to focus on the members of the association and what would be its roles and functions. The board is the executive

body of the association. It carries out the task recommended and approved by general assembly (communities). In Ga-Mampa, this body is called Ga-Mampa Water Users Association Board. The board consists of Chairperson, Deputy Chairperson, secretary, Deputy Secretary, treasurer and other seven additional members.

The functions and responsibilities of the board differ considerably according to the types of association. Ga-Mampa board is a body, which controls the maintenance, administration and operation of the irrigation system. A chairperson of the board is appointed and he/she is in charge of the implementation of the decisions taken by the board.

Whether the board chose to execute tasks by itself or to delegate them to other people, it generally has to undertake the following: operating the irrigation network, contracting personnel to execute the work, collect water fees, negotiating credits for the execution of work, issuing shares to raise capital, convening the general assembly and all other functions inherent in the adequate administration of the system.

The WUA at Ga-Mampa is still temporary, because it is not yet registered, but DWAF pre-requisites of registering WUA are as follows:

- Minutes for previous meetings.
- Attendance lists for previous meetings and workshops.
- Name of schemes representatives.
- By-laws and constitution of irrigation schemes.

Steps followed to form WUA in Ga-Mampa at Mafefe ward are not exactly the same as those of DWAF, since DWAF has a long process of establishing WUA. The difference is that, according to DWAF, proposals must be submitted to the ministry in order to analyze them. Proposals should be evaluated by the department of water

Affairs itself before approval. If it's approved, it will be published in government gazette. Written comments are allowed and Minister amend proposal if necessary.

In South Africa, at Thabina (Tzaneen), there was a WUA formed by the state but the community not government selected members of that WUA. In Ga-Mampa the community recommended and facilitated the formation of WUA. In Thabina, only one community from that area were responsible, while in Ga-Mampa, all communities in that area took part.

Thabina is top-down approach. Unfortunately, because of lack of management that WUA has collapsed. So, the convention of committees into WUA done by Thabina, as related to the one on this study there is a difference because Thabina WUAs was formed by the state.

The difference between the water committees and a new WUA is that water committee is a traditional social management of water and they use byelaws and constitution drafted by themselves.

New WUAs is an association linked to the state in order to have a say. It is thus why committees from Ga Mampa accepted to form a WUA.

4.6. Summary of the results

Steps followed by the researcher on forming WUA were similar to the ones used by Seshoka et al, (2004) during the transformation of irrigation boards into WUAs in South Africa. The difference was that the boards transformed were from the government water schemes and Taung irrigation scheme managed by DWAF. This study identified the roles played by water committee as described by the farmers and according to Seshoka et al, (2004 p 54) the existing committees were not effective,

efficient and they totally do not know their roles. The other difference was the criteria on selection of the representatives. The criteria used for selection of the representatives from this study were experiences on production and they were full time farmers, while in Taung the criteria used was a person's ability to speak English.

The factors that contribute to success of water committee as determined by farmers differ from that mentioned by Faysse, (2004 p 23). Fassey, (2004 p 23) mentioned that the importance factor is a need of external monitoring and enforcement in WUA in order to ensure factors that lead to a success of water committees.

The objective number three was addressed on 4.4, where farmers and other local organizations recommended on the byelaws and constitution. Byelaws and a constitution for the organization mostly were different, because they were drafted depending on the situations and the conditions of the organization. There is one thing common when drafting a constitution. It should be flexible. This is supported by Fassey (2004 p 23) that they may also be a need for flexibility in the future and the constitution of WUAs should state the strategic plan that can change the composition of the members of the committee in the future. So that it is not necessary to go through a lengthy process of modifying the constitution later.

CHAPTER 5

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. Summary

In Ga-Mampa valley, the process of establishing a WUA started voluntarily, since water users expressed their will to be united and to work together. Farmers agreed that establishing a WUA would benefit them and address their needs. They wanted to achieve their objectives at the ward level, because working together using similar bye-laws under a common constitution will facilitate the enforcement of the byelaws. The WUA is to provide a unique forum for the communities to collaborate with each other and to realize their unity. Through the WUA, they will encourage each other and it will be easier to achieve the control of the proper use of water. Furthermore, such functioning will cover all three schemes. The idea of establishing a WUA based on recognized committees is to combine local recognition and legitimacy with official registration and legality, both aspects being necessary to ensure that the WUA will be effective and efficient. One can expect that:

i. WUA provides a mechanism through which a CMA or Ministry can devolve the implementation aspects of the Catchment Management Strategies to the local level.

ii. Farmers may want to formally establish their rights to water.

iii. Legal status of some kind may be needed in order for the WUA to be eligible for loans. Farmers might want legal status to be able to enter into and enforce contracts or receive assets. These observations are consistent with those of Perret, (2002 p 4).

Three different neighboring schemes have formed a WUA. Based on that, the temporary board members were elected in order to represent the water users. WUA will consist of all water users in the existing schemes. 12 members (six men and six

women) from existing water committees from the three different schemes were selected to lead the transformation process. They were selected as their representatives and the criteria for the selection were based on their farming systems, their experience and their attendance to the scheme meetings.

Selection criteria show that people recognized that when the person wants to achieve something, he/she is supposed to be committed on whatever she/he is doing. The former existing committees accepted the new temporary committee as their representatives that had been selected by the farmers themselves. One might see that the steps taken to establish the new organization truly respect the people's will, even if one could have preferred to see a different social composition.

The objective number one was addressed on 4.2, where the roles played by water committees in Mashushu, Mantlhane and Fertilis were identified. The local organizations themselves (e.g. water committees, farmers representatives) agreed to follow the roles drafted about their duties.

The objective number two was addressed on 4.3, where farmers representatives identified the conditions that favour the water users association to be effective and efficient. The objective number three was addressed on 4.4, where farmers and other local organizations recommended on the bye laws and a constitution. The above mentioned objectives were summarized in the summary of the results.

5.2. Conclusions

From the results of the study in chapter 4, the following conclusions were reached:

The results of the study show that in Ga-Mampa area, there has been a strong willingness on the local organizations to form WUA. The success on establishing

WUA was shown by the changes introduced during the process. The changes introduced have been characterized by a role played by the local organizations, their representatives, researcher and the community as a whole. The changes came after initiation of establishment of WUA addressed on 4.1.

The establishment of WUA addressed on 4.1, shows clearly that the local organization, have the abilities and willingness (their expressed demand) to take over responsibility from the government for water resource management. The above information is true because water committees accepted and agreed to change their behaviours for better way of achieving their goals. It means that, this study encourages changes through iterative bottom-up long-term process (approach).

The establishment of WUA in Ga-Mampa was done, where everyone in the community had a say at a certain time. However, it is also obvious that many functions have to be performed accurately and the process was focused on a tailored training programme. Then, people's hope was that their elected representatives will efficiently manage water for the benefit of each and everyone. The information can be true, because those representatives attended workshops on the duties they were supposed to perform; it means they already know what they should do.

The roles played by water committees and the conditions, which favour the evolvement of water committees into WUA, were mentioned in the results. Water committees in smallholder irrigation agreed to perform those roles and to follow the approved conditions that favour water committees to be effective and efficient. There is a relationship between water committee and their roles in irrigation schemes. The relationship is that water committees should be committed to their work, because everything is in their hands e.g. supervision, enforcement of byelaws, and participation of the farmers in the workshops, meetings and works.

The relationship between water committee and the conditions that favour water committee to be efficient and effective is that they should be committed in organizing or arranging meetings and workshops. Again they should recruit and encourage farmers to contribute money to repair irrigation scheme e.g. monthly payment for repairing canals and fence.

Through a regular consultative process, leaders will have to learn to be accountable to their members who will confirm their support through regular elections as defined in the constitution. All workshops and meetings held on steps for establishment of Water Users Association encouraged farmers from three different schemes to work together. The interesting part from this research is that all three schemes started to use drafted byelaws approved by the local authorities.

5.3. Recommendations

The following recommendations are made based on the results and conclusions of the study. They are targeted to the main categories of stakeholders.

5.3.1. Farmers:

Most of the farmers are still confusing the byelaws and the constitution. They do not know exactly the difference between the two and also the need for drafting a constitution. Farmers that were selected in the steering committee should be made aware of what is expected from them. Being a member of a committee does not mean that you control other farmers, but that you lead that group according to the agreed constitution and bye-laws. The researcher observed that most of the local organization's chairpersons were not aware of roles they were expected to play. They

thought that their decision-making were always final with no moral accountability to their fellow farmers. This can be solved by proper training of the farmers on what they should expect from their committees as well as mentoring the elected leaders.

During the transformation process of water committee into a WUA, farmers must be aware of the criteria on selecting representatives, they must be hard workers and they should have played an instrumental role during preliminary steps of establishing the WUA.

5.1.2. Village Extension Officer

Extension officers need to be trained on how to support a group to draft their byelaws and be familiarized with various models of constitution. It is crucial that they can disseminate this knowledge to the farmers in an effective way: Participatory Approaches can be used to ensure that the group owns the process that is facilitated by the extension officer.

Extension officer must be aware of and follow the protocol of the different phases of establishing WUA. Due to changes in the policy, she/he should be timely updated (Knowing each and every step on process of establishing WUAs).

5.1.3. Other stakeholders: professionals and researchers from Government, NGOs, research institutions

Government should hold workshops, and training modules related to the roles played by water committees in their irrigation schemes. The more committee members from existing local organizations (e.g.: water, fence and scheme) are trained, the more they will be encouraged to work effectively and efficiently.

Government and other stakeholders such as NGOs, research Institutions, must collaborate with each other in order to show people within the communities that they share a common vision of rural development.

Researchers must be keen on documenting the current processes of transformation of water committees into WUA. Such documentation will be detrimental when scaling up the experience: farmers must see how they can benefit when they address their local needs. This will encourage other neighbouring committees in the Limpopo province to form WUA. People will look at the advantages of transforming water committee into WUAs.

Government officials must be conscious that a favourable policy is a crucial condition for conversion of water committee to WUAs. A policy that is based on the recognition that existing local organizations when they are committed to their work can achieve the mission of the organization. A conducive policy encourages members of the organization to refine their vision and become more united. So, a clear policy must state the conditions for conversion of water committees to WUAs to help the organization to achieve their goals.

There is a need for partnership towards the development of rural communities. Government should encourage farmers from local communities who manage an irrigation scheme but who have not yet established WUAs that they still have a chance of grouping themselves with neighboring schemes in order to form viable Water Users associations.

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APPENDIX 1

QUESTIONNAIRES (PHASE 1)

SECTION A

Instructions: supply the correct information to the following general information.

A. General information about interview of a farmer

1. Full Name:

2. Surname:

3. Sex (Use crosses only X)

a) Male

b) Female

4. Residential address:

5. Age:

a) Between 25-30

b) Between 30-35

c) Between 35-40

d) Between 40- 45

e) Between 45-50

f) Between 50-55

g) Over 60

6. Occupation:

a) Full time

b) Part time

c) Other.

SECTION B

INTERVIEWS SCHEDULE

Interviews were conducted using of closed or open-ended questions. Questionnaires were divided into categories: The common good (what people share in common), the rules and practices, the governance.

What is the common good? What are the collective constraints?

-Access to irrigated water: canal maintenance and water availability

-Protection of the scheme: fencing

What are the basic regulations?

How were those rules edicted?

-Access to land

-Access to water

How are the agreed rules enforced?

-On the paper and in the reality?

The governance

How is the existing governance system work?

Who are the key leaders?

When did it start?

How did it become legitimous for the farmer (is its authority recognized? yes)

What are the present challenges?

SECTION C

SECOND QUESTIONNAIRES: ABOUT THEIR COMMON GOODS, WATER DISTRIBUTION, OPERATION AND MAINTENANCE.

A. The common good

1) What is the common good in the three different schemes?

2) If there is any, mention them.

3) If they are the same, do you have that interest of working together?

4) How did you organize yourselves?

5) Did you try to organize yourselves? How?

6) Did your organization in succeed?

7) What are the felt collective constraints?

B. Access to irrigate schemes: Canal maintenance and water availability

8) What are the problems encountered on canal maintenance and availability?

9) How did you manage to solve those problems?

10) How many did you manage to solve?

11) Who manage your water?

12) What strategies did you use to solve those problems?

13) How do you distribute water in your plots?

14) How many liters do you usually use for one plot?

15) What strategies did you use for irrigation?

B. Protection of the scheme: fence

16) Do you have a fence?

17) When did you fence your schemes?

18) Are there any problems that have you encountered concerning fencing?

19) How did you manage to solve those problems?

20) How many problems have you already solved?

21) What are you doing with the animals when you get them in the scheme?

22) How much fines/penalty do people pay per head of cattle, donkies and goats?

C. The roles and practices

23) What are the basic regulations?

24) Formal or protoformal and effective?

25) Where are the differences?

26) How were those rules addicted?

D. Access to land

27) To whom did you ask for land?

28) Did you pay anything to get that land?

29) What encourages you to find some plots?

30) When did you find your plots?

31) How many bumpers per plot do you have?

E. Access to water

32) Where do you get water?

33) How did you collect water from the river?

34) Who controls water allocation?

35) What types of canals are those?

36) What are you doing about uncemented canals?

37) How did you manage uncemented canals?

38) When did you clean your canals?

39) How did you distribute water in your plots?

40) How many litres per day did you use to irrigate one plot?

41) Which strategies did you use for irrigation?

42) How are the agreed rules enforced?

43) Do you have byelaws that you are going to use or any constitution?

44) How did you establish your byelaws or a constitution to control access to water?

45) Who established these by-laws?

46) Are those bye-laws on paper and in reality?

F. Practices

47) What are you cultivating in the field?

48) What steps did you follow to cultivate till harvesting?

49) How many times did you irrigate till harvesting time?

50) What did you use for ploughing?

51) How much did it cost per bumper?

52) When did you start to remove weeds in the field after cultivating?

53) Who is going to help you when removing weeds?

54) How much did you pay labours?

55) If it is rain season, how many times do you irrigate?

56) After how long did you harvest?

57) What are you going to do with your products? Did you sell?

58) Where did you sell them? And how much?

59) Did you get any profit from that?

G. The Governance

60) How is the existing governance system working?

61) How many members do belong to that group?

62) Who are the key leaders?

63) What criteria did you use to select those leaders?

64) What are the responsibilities of that group?

65) What are the roles played by that group?

66) What conditions those favours that group to be effective and efficient?

67) How many times do you meet on one month?

68) When did it start?

69) How did it became ligitimous for the farmers (Its authority is recognized?)