Building a Wetland Management Game for Awareness Raising and Negotiation Support

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Acknowledgments

Acknowledging all the great people I met during my stay in South Africa would need a report on its own, so I will have to keep it brief for this time…

First, I think I have to thank my supervisor during this internship, Sylvie Morardet from Cemagref. Thanks for giving me the opportunity to work on a really interesting project in an amazing country, and for all your support on my job. What I discovered here will remain as a unique experience for me, and I hope to get the opportunity to come back there.

Then, when it comes to the people I met in South Africa, from a chronological point of view, I will thank the CRCE staff, Ernest, Koke, Tumelo, Shiba, Makgabe, Mashapa, our cleaning lady mother… for their welcoming and their good spirit no matter the time of the day. Masingi, you did not stay as long as I was hoping for, but I really enjoyed your views and your friendship. Thanks to Koke for the unforgettable trips to Mafefe, when we used to take our time to enjoy the journey… Tumelo, you also helped me a lot during my stay, and I had some nice time in Ga-Mampa talking with you about everything and nothing.

On the Ga-Mampa side, big thanks to Bernard who welcomed me warmly and introduced me to the village and its people. Without you, things would have been way more difficult! I will not mention the names of all the villagers who came to my meetings, but I really appreciated to have discussions with them. I hope my work will be helpful for their village!

And then, come all the other persons I had the opportunity to meet and who helped me a lot to feel comfortable every time. First would be Doctor Jo, who introduced me to South Africa and made me discover and understand a lot about this country. All my thoughts also go to your family, who welcomed me so nicely every time. I don't and I won't forget Gavin and Rika, second family and crazy fishing weekend organizers and braai masters! All my friendship goes as well to Alana and Britney, whom I enjoyed talking to.

And then, to all these people I met around the country, wherever, whenever, and who always welcomed warmly this Frenchy going around South Africa!

ABSTRACT

Wetlands are ecosystems of crucial importance as it supports specific flora and fauna. However, laws and public policies often tend to overlook their importance, threatening their conservation. This is especially true in developing countries when there is no strong will from governments. The WETwin project aims at enhancing the role of wetlands in an integrated water management context. One of the case studies of the project is located in Ga-Mampa, a small South African village. Role-playing games (RPGs) are emerging as a useful tool when it comes to natural resources management issues. They are able to integer the diversity of opinions among stakeholders, making them a sound support for discussions and decisions. Thus, the International Water Management Institute, partner of WETwin, and the Cemagref started developing their own role-playing game, called Wet-Wag. It aims at supporting negotiations and raising stakeholders' awareness on environmental issues.

A four months mission in South Africa was made to develop Wet-Wag further. The objectives were to learn about stakeholders' concerns so that the game can meet their expectations; to test the game and see what works and what is missing; and to include relevant elements that were missing (such as crops). A review of reports made on Ga-Mampa gave a first appraisal of the situation in the village. Ga-Mampa is described through its economic and environmental characteristics. We discover a poor village in a remote valley in North-Eastern South Africa. The wetland is getting more and more encroached through the years. Thus, local government and research institution began working together with the community to design a management plan for the wetland. Articles on RPGs were then studied to learn the important points to be considered in games. Many researchers used games to help in NRM processes. They use different levels of abstraction to simplify the reality of the situation and make it easier to understand. RPGs are often part of a collective process, where all the stakeholders are given the same importance and can have a say in things.

Participatory methods such as focus group discussions were conducted in the village to learn about farmers' concerns. Personal interviews were done with external stakeholders for the same purpose. The outcome is that farmers are especially worried about the poor irrigation scheme and the difficulty to sell their products. Administrative authorities are more concerned by environmental protection. New elements were thus designed in the game. A sheet was created to monitor the wetland health. Data for new crops were obtained through personal searches and 3 new crops were added in Wet-Wag. The new version of the game also offers participants to take collective decisions. However, the game is not complete. Recommendations are also made for the future use of the game.

List of abbreviations and acronyms

CDF: Community Development Forum

CRCE: Centre for Rural Community Empowerment

CNEARC: Centre National d'Etudes Agronomiques en Régions Chaudes

DWAF: Department of Water Affairs

ENITAB: Ecole Nationale d'Ingénieurs des Travaux Agricoles de Bordeaux

G-EAU: Gestion de l'Eau, Acteurs et Usages

GIS: Geographical Information System

IRC: Institut des Régions Chaudes

IWMI: International Water Management Institute

LDA: Limpopo Department of Agriculture

LEDET: Limpopo department of Economic Development, Environmental affairs and Tourism

NGO: Non-Governmental Organization

NRM: Natural Resources Management

PTO: Permit To Occupy

RPG: Role-Playing Game

SANBI: South African National Biodiversity Institute

UNDP: United Nations Development Programme

WAG: Water Allocation Game

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1 INTRODUCTION

Wetlands are ecosystems of crucial importance, as they are the support for specific plants and animal species and provide numerous services to the populations living next to them, ranging from water and plant collection to flow regulation and flood protection. However important they are, their fragility makes them especially sensitive to drivers of change and external pressures such as climate change and population growth. Moreover, wetlands generally fall in the gaps of the regulation, their dual nature both terrestrial and aquatic putting them at odds with traditional rules for river or land. As a consequence, new management solutions should be designed, involving the cooperation of all stakeholders, from the community level to the institutional level.

The WETwin project has the objective "to enhance the role of wetlands in basin-scale integrated water resources management with the aim of improving the community service functions while conserving good ecological status", as written in the project description[1]. This project gathers scientists with different backgrounds such as ecology, economy, hydrology or agriculture, from research institutions and consulting companies. As stated above, they try to facilitate the process of wetland conservation, integrating the views from stakeholders and enhancing the discussion between those different partners. WETwin studies wetlands all over the world, in both developing and developed countries. Those sites spread from Europe (Austria, Hungary), Mali (Inner Niger Delta), Uganda to Ecuador. A complete description of the project can be found on their website (see footnote n°1).

To meet the challenge of successfully integrating the diversity of viewpoints into management plans, researches were conducted to develop new tools for natural resources management (NRM) issues. Role-playing games (RPGs) are one of those tools used to enhance participation and discussion. They try to reconcile the "traditional" top-down or bottom-up approaches previously in use for NRM into a collective learning process where every stakeholder has a say in things (Barreteau et al., 2007a). The French research centre Cemagref, supported by the International Water Management Institute (IWMI) is currently developing its own model of RPG with the objective of providing an efficient support for awareness raising, negotiation and education. This RPG is called Wet-Wag and is based on the Water Allocation Game (WAG) also created by Cemagref under the supervision of Nils Ferrand. Wet-Wag reflects the case of a small wetland located in a South African village called Ga-Mampa. This place has been surveyed for years by IWMI and the Centre for Rural Community Empowerment (CRCE), an institution part of the University of Limpopo, in order to secure economic development while ensuring environmental conservation. Those objectives are also supported by the provincial government and Non-Governmental

[1] Description found on the internet site of the project: http://www.wetwin.net/about_introduction.html [retrieved on June 2, 2010]

Organizations (NGOs). All the stakeholders involved are aiming at designing a management plan for the wetland guaranteeing environmental protection and sustainable livelihoods for the villagers, though they have different priorities and means of action.

In order to improve the existing design of the game and to make it fit to the local situation in the village, I did a four months visit in South Africa to interview stakeholders and test the game. Various participatory methods were used to describe the socio-economic context and the environmental situation, while searches were done to add relevant elements to the game. The RPG would then be used during the discussion process between the various stakeholders, and could be a helpful tool in other contexts too, in other WETwin sites in developing countries.

The following report gives a description of the context, ranging from South Africa in general to the wetland itself. A review of literature on RPGs is then presented, before the description of the Wet-Wag game itself. The following part deals with the methods used during the internship to collect data from the stakeholders and get their views on the game, leading to improvements and changes in its design. The report ends with some recommendations for the future developments of Wet-Wag and its usefulness for other cases.

2 KEY FEATURES OF THE GA-MAMPA STUDY SITE

This part deals with the significant features of the village, going from its geographical situation to a description of the wetland. It is mostly based on previous reports made by former interns from IRC (Institut des Régions Chaudes, ex-CNEARC) Pierre Ferrand and Damien Chiron, as well as Younès Darradi from ENITAB (Ecole Nationale d'Ingénieurs des Travaux Agricoles de Bordeaux). IWMI also conducted studies to describe the site. The following sections contain only a part of all the data available on the location and socio-economic contexts. For further information, one should refer to the aforementioned reports.

2.1 Geographical features of the valley of Ga-Mampa

2.1.1 Location within South Africa and surroundings

The village of Ga-Mampa, named after the people living in the area, is located in the Limpopo province, the north-easternmost province of the Republic of South Africa, bordering Botswana, Zimbabwe and Mozambique. The country is composed of nine provinces, shown on the map thereafter:

Map 1: the nine provinces of South Africa and the neighbouring countries (Source: wikipédia[2])

Ga-Mampa is a rural village located in the Mafefe tribal area of the Lepelle-Nkumpi Local Municipality of Republic of South Africa. The Ga-Mampa valley covers a land area of about 5km², stretching along the Mohlapitsi River, while the settlements themselves are spread approximately mid-stream of the river course. Geographically, it is located on

[2] Wikipédia webpage on South Africa: http://en.wikipedia.org/wiki/South_Africa [retrieved on April 19th 2010]

coordinates 24° 7' 0" South; 30° 5' 0" East. The closest town to Ga-Mampa valley is Tzaneen, which is about 42km away, but road access is very poor. Ga-Mampa valley is about 120km (that is to say two and half hour drive) and 87km to Polokwane and Lebowakgomo, provincial and municipal capital respectively. The wetland is approximately 120 hectare with a catchment of approximately 40,000 hectare (Kotze, 2005). Map 2 displays the location of the valley within the province and an aerial picture of the village.

Map 2: The Limpopo province and its different districts displayed with different colours (source: http://www.limpopo.gov.za/about_otp/images/limpopo_map.jpg). Zoom: aerial picture of Ga-Mampa, the blue line representing the limits of the village and the yellow one the road crossing it (Source: Google Maps).

Ga-Mampa itself is composed of several distinct settlements spread along the valley, called (from south to north): Gemini, Manthlane, Ga-Moila (also known as Vallis), Mapagane (a.k.a. Fertilis), and Mashushu. The mountains surrounding the village were declared nature reserves in the 60's and 70's. They are called the Wolkberg Nature Reserve on the western side, and on the eastern side the Lekgalametse Nature Reserve. Villagers used to live in these areas, but were expropriated and relocated in Mashushu.

2.1.2 Climatic conditions in Limpopo and the village

Figure 1 shows the average climatic condition in this part of the province, taking its data from the climatic station of Polokwane. However, from a personal experience, conditions in the valley tend to be slightly different, usually experiencing hotter temperatures, fewer rainfall events but of stronger importance. This is just an appraisal of the situation and requires measurements to be proved.

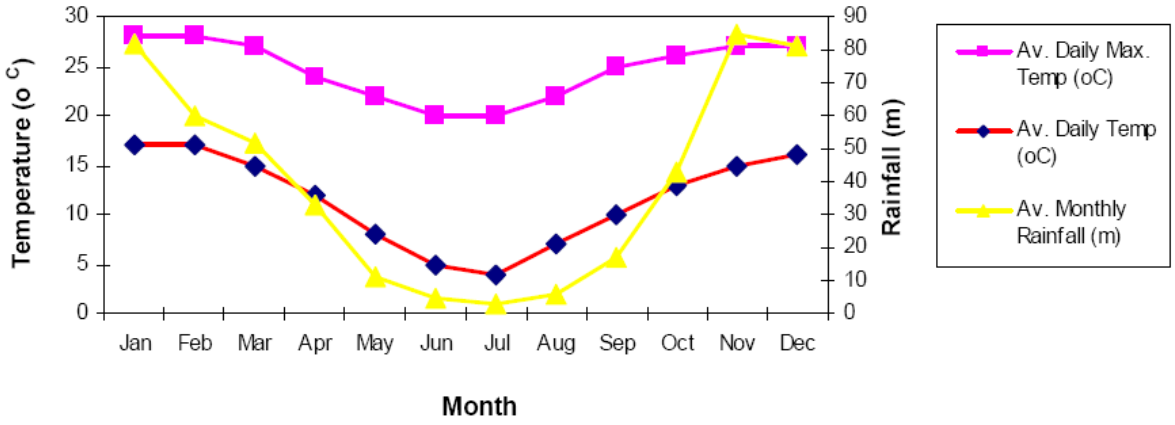


Figure 1: Average climatic conditions in the Capricorn District (data gathered from 1961 to 1990 by the South African Weather Service) (Source: Adekola, 2007)

A climatic year is composed of two very different seasons:

- Wet season, from October to March/April: this is the tropical summer, days are hot and rainfall abundant
- Dry season, from May to September, corresponding to the winter. Monthly rainfall is very low, and several weeks can go before rain falls again. Temperature also drops significantly.

As it often occurs in South Africa, evapotranspiration is higher than rainfall leading to bush vegetation (Darradi, 2005). Thus, crops require irrigation, but this can only be done during summertime. Indeed, the water intake in the river is not properly designed, and thus, when the river level lowers naturally during the winter, the irrigation scheme cannot provide enough water.

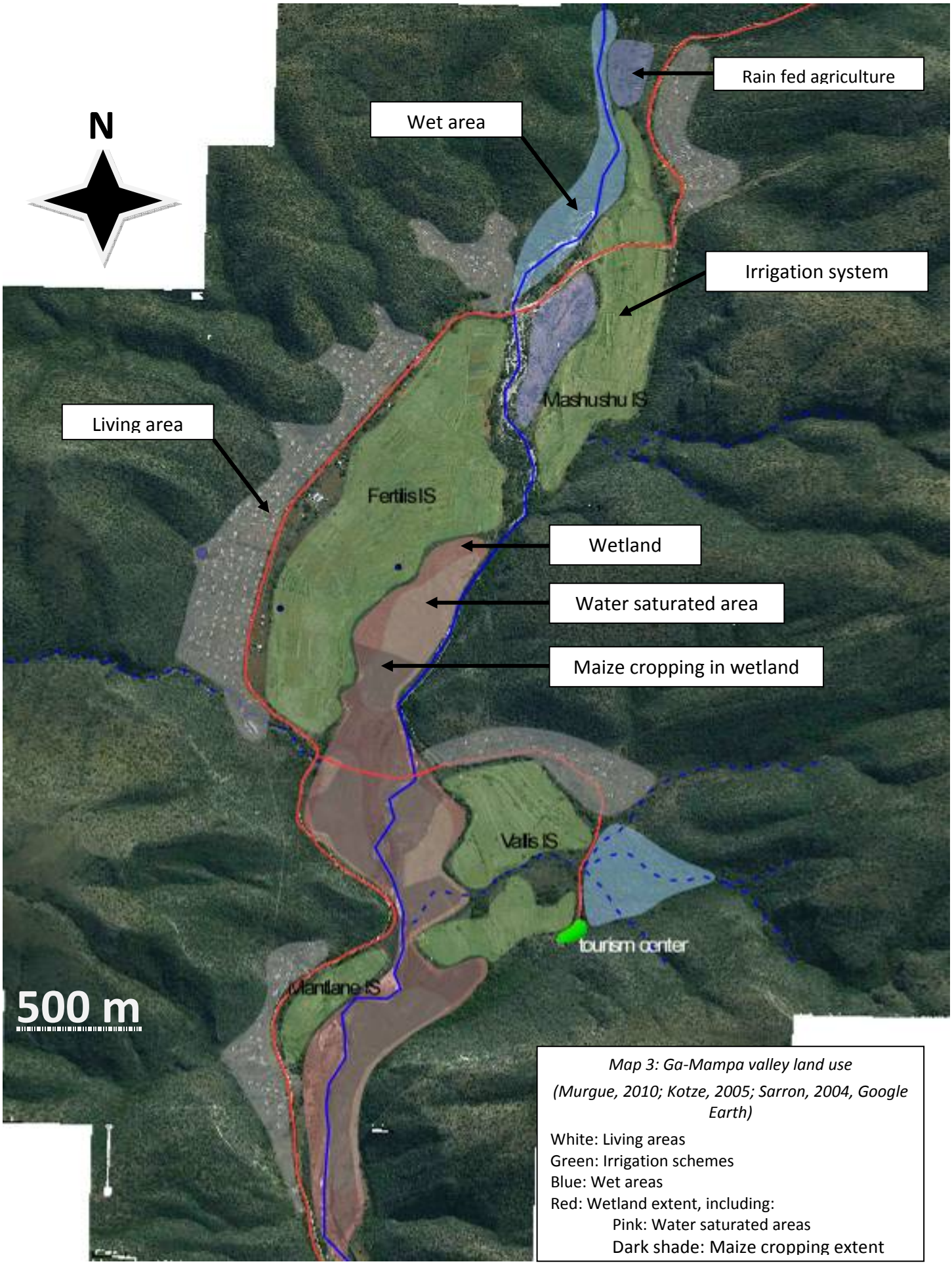
2.1.3 The Ga-Mampa wetland

Extended descriptions of the wetland were made by Donovan Kotze (2005) when he made his report on the assessment of the wetland health, and by Coralie Sarron (2005) and Mutsa Masiyandima (2006). The wetland occurs in the channelled valley bottom section of the Mohlapitsi River below the Wolkberg mountains. As already mentioned the valley is narrow and confined, with steep hill slopes on the edges of the valley bottom. The wetland is approximately 120 hectares in area. It occurs along the valley floor, extending about 4 – 5 km downstream on both sides of the river as well as within the riverbed in some sections. The maximum width is approximately of 500 meters.

The hydro-geomorphology of the wetland is described in detail in Kotze (2005). The soils in the wetland are a mix of fine-textured, poorly-drained areas away from the river channel, and less extensive sandy soils located close to the channel. The wetland is heavily utilized for agriculture and natural vegetation has been recessing for years due to human pressure. Drainage canals are a major feature of the croplands as the crops grown in the wetland (maize and coriander) do not perform well under saturated or flooded conditions.

The underground hydrology is not very well known, and, despite several studies, the nature of the water flows between the wetland and the Mohlapitsi River are not very clear. However, it is a well known fact that the river has a potential contribution of 10% of the Olifants River's flow, going up to 16% during the dry season. The Olifants River provides water to a number of industries (mines) and factories, and also crosses the Kruger National Park, one of the largest wildlife reserves in the country. Thus, the Mohlapitsi is of great importance to the region. Water quality in the river is good, relieving the Olifants from the pressure of industries.

Map 3 thereafter shows the wetland location and the land use currently observed in Ga-Mampa. This map was made by Clément Murgue, intern from IRC at Cemagref. One can see that most of the valley is currently under use. The slopes steepness makes them difficult to support new constructions or fields.



Map 3: Ga-Mampa valley land use

(Murgue, 2010; Kotze, 2005; Sarron, 2004, Google Earth)

White: Living areas
Green: Irrigation schemes
Blue: Wet areas
Red: Wetland extent, including:
Pink: Water saturated areas
Dark shade: Maize cropping extent

2.2 Social and economical appraisal of the valley

From an administrative point of view, the village of Ga-Mampa is part of the ward of Mafefe, in the Lepelle-Nkumpi Municipality, located in the Capricorn District of Limpopo. The municipal offices are located in Lebowakgomo. However, the village itself is ruled by "traditional authorities", referring to the Headman (*Induna*) operating at the village level, and being under the authority of a *Kgoshi*, based in Mafefe. The Headman is responsible for settling conflicts among people and is the keeper of the traditional habits. A community development forum (CDF) has been created in 1995 by the villagers themselves. It is composed of a board with a secretary and several forums dealing with specific matters such as irrigation, the wetland, health, education and so on. They are in charge of development projects. The secretary of the CDF can refer to the ward councillor, also based in Mafefe, who can then convey information and requests to the municipal offices in Lebowakgomo. All in all, two regulation systems exist in the village, one based on the traditional structure of the society (Headman), the other being the result of the democratic progress in the country.

Inhabitants in the valley are black Sepedi-speaking people. Sepedi (a.k.a Northern Sotho) is one of the eleven official languages in South Africa. Population statistics based on 2001 census figures provided by Statistics South Africa and compiled by Nathalie Tinguery (2005) reveal that in 2001, Mafefe ward 24 had a population of 9217 persons living in 1968 households with a population density of 223 people per km². However, it is difficult to assess the importance of Ga-Mampa in these figures. In her report, Tinguery reckoned that the whole Ga-Mampa valley accounted for 1679 persons (18% of the total in the ward) and 327 households (17% of the total in the ward). Later studies by Olalekan Adekola (2007) derived the total population from field study and gave a figure of 2364 persons in 394 households for the valley in 2007. This would mean an increase of 45% in a few years period, which is highly unlikely given the socio-economic features of the valley (AIDS, lack of space).

During the apartheid era, Ga-Mampa was part of the homeland of Lebowa, whose capital city was Lebowakgomo. This explains some of the key features of the village today. Homelands were places for black people, accounting for approximately 80% person of the population of South Africa, on only 20% of the territory. Currently, the area is still overpopulated and poverty alleviation is one of the main challenges. Poor infrastructures and public services (road access, healthcare) are holding back the development of the region. Ga-Mampa is approximately a 2 hours drive from Polokwane, as the last kilometres of the road are not tarred. This track then goes to Tzaneen, but only 4x4 vehicles can drive on this narrow and difficult path. The condition of the track is badly altered after each rainfall event, as puddles can last for weeks while heavy vehicles circulate. Few public transports (government buses, taxi to Lebowakgomo) serve the village. Telecommunications are almost non-existent, as there is only a public phone in bad condition and very scarce network for mobile phones, though many people own one. Most houses are connected to

the electricity, but water has to be taken from public taps and stored in the house. There are basic education facilities, going from pre-school (crèche) to a secondary school, but children have to leave the village if they want to attend higher education.

Agriculture is the main source of income and employment for most households, along with external sources of income such as social grants and remittances from family members working outside the village. A growing number of men are going to the neighbouring cities to find a job, while women stay in the village to take care of the family and crop in the fields. Though there are no data available on these topics, Darradi stated that unemployment is at a high level, and AIDS is taking a great toll on the workforce of the village (Darradi, 2005). A drop-in centre is managed by a group of women to take care of orphans.

2.3 Agriculture in the valley: irrigation and wetland cultivation

2.3.1 Agriculture overview

As shown above on figure 1, the climate divides the year in two very different seasons, which influences the crops planted in the fields. During the wet season, farmers mostly plant maize, which is the basis for meals in this area. Other crops used are pumpkin, often intercropped together with maize, sweet potatoes, tomatoes and groundnut. During the winter (dry season), main crops are cabbages, onions, coriander, beetroot and dry beans. Some perennial cultures can also be found as a complement on the border of the fields. This is the case of sugarcane, avocado trees, mango trees and pawpaw trees.

Agriculture is mainly subsistence agriculture, at a small-scale level. Farmers own rather small plots. According to Chiron (2005), the average plot size for a family is around 1ha. However, this assessment is only partial: some families also own a private garden next to the house, which is used for cropping (spices, vegetables, and maize). Masclet (2007) assessed the average size for homestead to be around 0,25ha. Moreover, some farmers own a plot in the irrigation scheme and the wetland, whereas others only have access to a field in the wetland. The common size for a plot in the wetland is around 0,75ha (Masclet, 2007). Land scarcity is becoming a constraint for the village.

Products are mostly for self consumption. Maize is sent to a milling company to be processed, and the flour is used to prepare the “pap”, a starch meal. A rather small part of the vegetables production is sold to local markets: tomatoes are found in tuck shops, sugar cane sticks are sold in the farmer’s house… The distance and the road bad condition hold back the development of agriculture and its access to the markets.

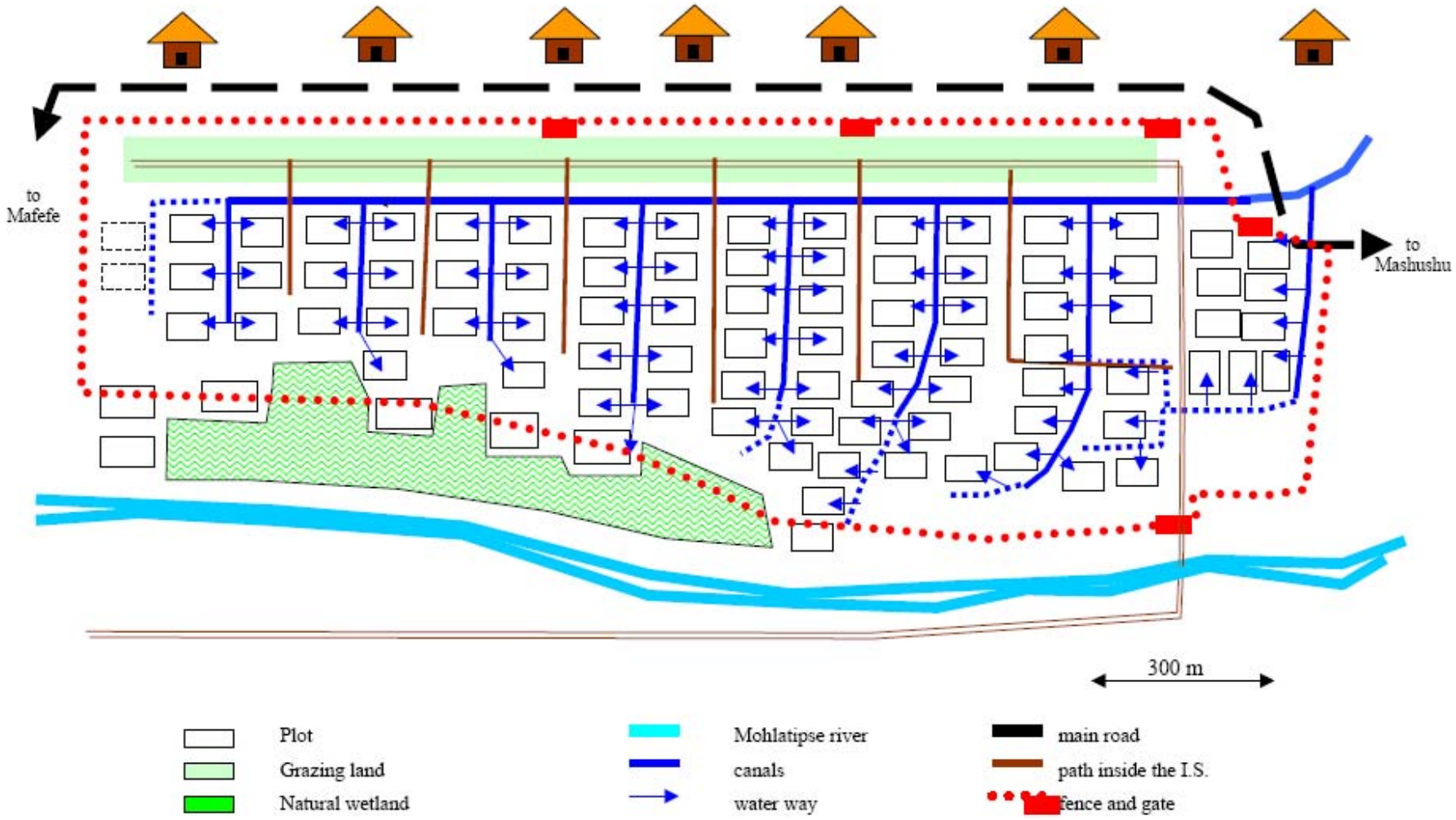
Agricultural equipment is quite poor in the village, but farmers have been using their techniques for decades and now they master them. They use donkeys to plough the soil, but

some also purchased tractors to work the soil and carry loads during the harvesting season. Lepelle-Nkumpi municipality used to help farmers to borrow or purchase tractors, but they withdrew their support while farmers reckon they suffer from a lack of such vehicles (Frank Mampa, *personal communication*). Otherwise, most of the equipment is composed of manual tools such as hand hoes and shovels, as described by Masclet (2007). He also described this material as old, but the situation varies depending on the household.

2.3.2 Cropping systems in the irrigation scheme and the wetland

Two systems of agriculture are found in the village (as rain fed agriculture is only on a small scale and was not considered during the study, it is not included here). The first one is also the oldest: irrigated fields. Government built four irrigation schemes in the 40's and 50's in Gemini, Vallis, Fertilis and Mashushu. The Gemini one, in very poor condition and no longer in use, was not studied but is similar to the other ones. They consist of an intake in the river made of gabions, a main canal (cemented in the case of Fertilis) driving the water from the river to a primary canal, then secondary canals between the fields and at last furrows distributing the water inside the field. A drawing made by Damien Chiron (Chiron, 2005) can be seen on the following page (figure 2), representing the basic organization of the irrigation system. The access to a plot is given through the use of a Permit To Occupy (PTO). It allows a farmer and his family to cultivate a plot in the irrigation scheme. PTOs cannot be sold to another farmer. Such permits are lifelong permits and were allocated in the 60's. Access to water is overlooked by the water committee within the CDF. Water is distributed to the different plots according to a rotation scheme, stating the days of the week when a farmer can open its furrows and irrigate his fields. However, some farmers mentioned that people can cheat and take some water at night. Water committee is in charge of enforcing this rotation and looking for cheaters.

However, the irrigation schemes are now in a very poor condition. Only the Fertilis one was built with cemented canals all along, the other ones include earth canal in the system. Due to lack of maintenance, those earth canals suffer from siltation and lost most of their efficiency. Moreover, the design of the canals was poorly done, and a number of leakages can be found along the way. Overall, water efficiency in the system is expected to be as little as 6% (Chiron, 2005). The irrigation scheme in Gemini is said to be not functional anymore, but it was not further investigated.



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igure 2: Drawing of the irrigation scheme of Fertilis (Source: D. Chiron, 2005)

In 2000, a major flood occurred in the region, and greatly damaged the canals and the water intake in the river. As a consequence, some farmers asked the permission to start cropping in the wetland, in spite of the South African laws identifying wetlands as sensitive areas and thus ensuring them a protection. PTOs could not be given, and farmers simply had to ask the Headman if they can have a piece of land in the wetland. This costs about 20 rands[3], and farmers receive an oral permission to start cropping. What was at first a move driven by the damages suffered by the irrigation scheme was amplified by the issue of population growth and land scarcity in the narrow valley, and within 10 years time, the natural part of the wetland declined dramatically. In his report, Kotze estimated that crops accounted for 65% of the 120ha, and five years after this figure should be over 80% (personal assessment derived from field observations). Figure 3 thereafter is a GIS map of the land use in the valley, and displays this tendency.

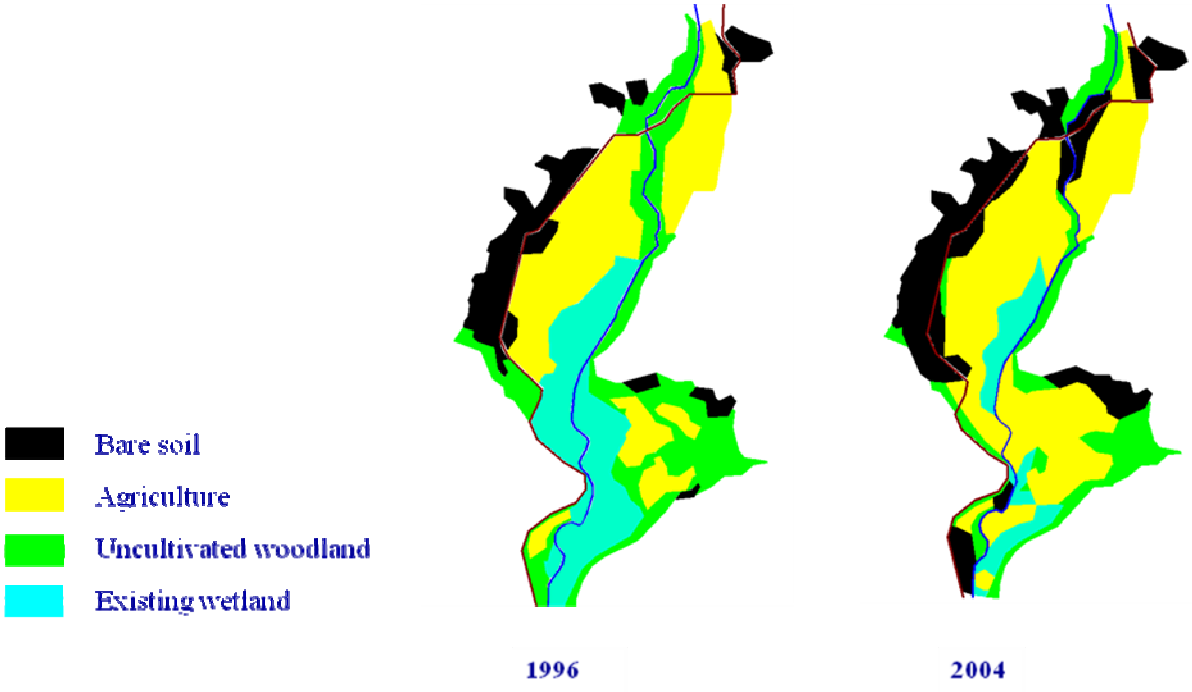

Figure 3: Land use change in the Ga-Mampa valley between 1996 and 2004 (Source: Sarron, 2005)

"Bare soil" refers to settlements and abandoned areas not cultivated. One can see that agriculture and settlements expanded dramatically, while wetland and woodland are left in few parts, the most difficult to reach.

When farmers moved from the irrigation scheme to the wetland, they had little knowledge on farming in those specific conditions, so they began using the same methods they applied in the irrigated plots. They dug drains and burnt natural vegetation, practices known to oxidize soil organic matter (SOM), thus provoking its depletion. Clearing of natural vegetation (reeds and sedges) also proves to be harmful, as it takes several years to recover

[3] The rand (ZAR) is the money unit in South Africa. In June 2010, 1 ZAR ≈ 0,10 €

after the wetland is left undisturbed. Families collect such plants for the making of crafts and roofing.

2.4 Stakeholders involved in the Ga-Mampa study site

IWMI started research in the village in 2005 and later on included this wetland as part of the WETwin project. As stated in the introduction, IWMI aims at developing a sustainable wetland management plan to protect the wetland ecosystem while guaranteeing a reasonable level of livelihoods for local households. Meanwhile, UNDP has recently provided funds for the community, carrying the same spirit of environment conservation and social concerns. IWMI made a stakeholder analysis at the beginning of the project to identify all the people and institutions concerned. Figure 4 below illustrates the various stakeholders and their inter-linkages, which are detailed after on.

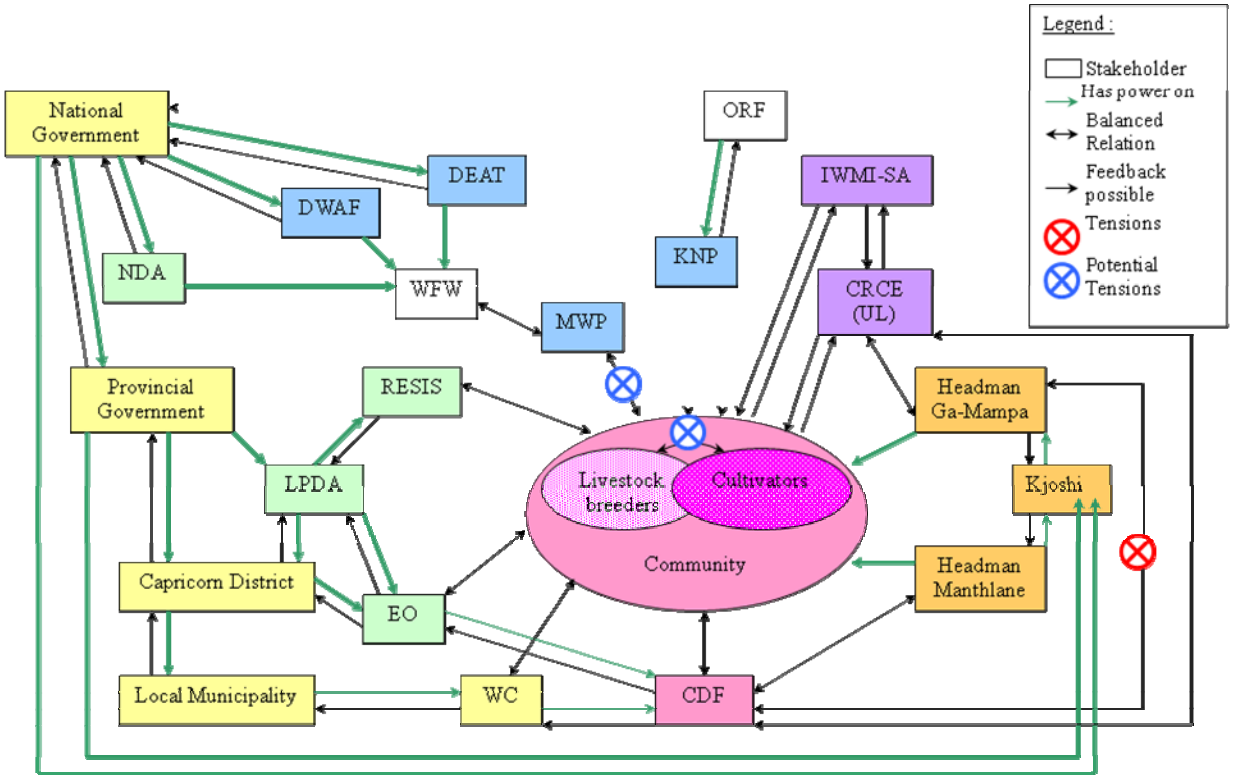

Figure 4: Stakeholders interactions in the Ga-Mampa project (Source: Y. Darradi, 2005)

Here is a brief description of each stakeholder presented in figure 4. In yellow colour:

- National government
- Provincial government of Limpopo
- Capricorn District Municipality

- Local Municipality of Lepelle-Nkumpi (offices for Agriculture, Environment and Tourism)
- Ward councillor (WC), government representative in the ward of Mafefe

In green colour, stakeholders linked with agriculture:

- National Department of Agriculture (NDA)
- Limpopo Department of Agriculture (LDA) and the Landcare programme, interested in soil and water conservation
- The extension officer (EO) working in Ga-Mampa, providing technical help
- The RESIS programme supporting rehabilitation of small irrigation schemes

In blue colour, stakeholders working with water and environmental conservation:

- Department of Water Affairs (DWAF), responsible for rivers' condition and water resources management at national and provincial levels
- Department of Environmental Affairs and Tourism (DEAT), in charge of the protection of natural ecosystems
- The Mondi Wetland Project (MWP), financing actions to protect wetlands
- The Kruger National Park (KNP), one of the largest and most visited wildlife reserves in South Africa

In purple, the research organizations:

- IWMI South Africa, an international research organization working for sustainable water management
- CRCE, an outreach institution aiming at facilitating empowerment process for rural communities, working at Ga-Mampa for 10 years. It is hosted by the University of Limpopo

The traditional authorities of the valley are presented in orange colour. In pink colour, the stakeholders within the community itself:

- CDF of Ga-Mampa and the Wetland Committee, representing the interests of the community
- Livestock owners and cultivators, representing the two kind of farmers in the village

At last, in white there is the Working For Wetlands (WFW) programme, a division of a more general programme called Working For Water and created by DWAF. WFW works specifically on wetland rehabilitation. The Olifants River Forum (ORF) is an association including the main water users of the Olifants River basin.

Three stakeholders were omitted in figure 4:

- Limpopo Department of Economic Development, Environment and Tourism (LEDET), in charge
- South African National Biodiversity Institute (SANBI), partner of the Working for Wetlands programme
- UNDP, financing conservation projects, now giving money to the CDF and the LDA to impulse projects

A large number of stakeholders are involved, and there are potential tensions among them. The CDF and the Headman, represent two sides of the authority on the Ga-Mampa valley. Since the creation of the CDF, the power of the Headman has been progressively eroding, thus leading to conflicts between them. Within the farmers, cultivators and livestock breeders have different interests. The former want grazing areas close to the village and were used to put their animals in the wetland, while the latter want to extend their fields and cannot tolerate the presence of cattle near their cultures. The last potential tension illustrated in figure 4 results from a misunderstanding between the Mondi Wetland Project and the community. When MWP became interested in the wetland in Ga-Mampa, the community thought they were going to expulse farmers from their plots, leading to tensions between MWP and the community.

The village of Ga-Mampa is a remote area located in a rural part of South Africa. Poor road infrastructures and network connection hamper its development and trading with neighbouring places. Agriculture is the main source of income for most households. Small-scale agriculture occurs in old irrigation schemes and, for ten years, in the wetland. Agriculture in the wetland was driven by population growth and the inadequacy of the irrigated fields. Most of the natural wetland has been cleared and burnt over the past years, and now it is dedicated to agricultural plots, thus depriving population from other services provided by wetlands (e.g. plant collection). As stakeholders (both external and internal) are now struggling to preserve the wetland, it is necessary to find tools for facilitating discussions among people with different interests. To find a balance between environmental protection and social well-being, the use of RPG in natural resource management has developed for years and many authors recommend it. The next part of this report will provide the reader with an overview of the developments in this area.

3 ROLE-PLAYING GAMES IN NATURAL RESOURCES MANAGEMENT CONTEXT

3.1 Overview of role-playing games

Various authors are working on role-playing game, and literature on this topic is quite abundant. The use of games to represent real-life situation is rather old, and find its origins in old German war games from the 19th century (Duke and Geurts, 2004). However, using games in natural resource management context is quite new, as one of the first games designed for this purpose was the *River Wadu Role-Playing Game* made by I.D. Carruthers in 1981 (Dionnet et al., 2006). Since then, the use of RPGs has been extending in several fields and for various purposes.

3.1.1 Definition and basics concepts of RPGs

RPGs are defined as "a goal-directed activity conducted within a framework of defined rules, involving characters who role-play" (Dionnet et al., 2008). Games are made for a specific purpose, in order to answer a scientific question or to solve a real-life dilemma. The purpose is known for the developer of the game and must be stated when it is used later on. Specific actions done in the game must fall within the limits set by the rules, defined by the game designer. Several degrees of strictness can be set, depending on the game: a RPG designed for creating management options will leave as much freedom as possible, while others will constraint the player according to a scenario. The last important feature is the use of pre-defined roles, putting some distance between the player's behaviour during the session and his (or her) real-life personality. The possibility to say "it was just a game" always exists (Barreteau et al., 2007a), stripping what happened during the game of any link with the real situation. This link is made during the debriefing step at the end of the session. The manager gets the participants' feedback of the session, and tries to make them project the results of the RPG to the real life. In the case of a game testing scenarios, players saw what the consequences of their decisions are, providing them with a basis for further discussions. For the manager, this step is the opportunity to see what the players thought of this experience and think on elements that could be improved in the RPG.

Games differ from simulation in several ways. A simulation represents the testing of the choices of participants through a model, which is nowadays often a computer-based model. Simulations try to grasp the complexity of reality, while games can offer a simplified image of it. Simulations need to be able to represent correctly situations from the past to be validated, and thus make predictions for the future (Meadows, 2001). On the other hand, games start from a given situation, which is almost always the present situation (or at least resembles it, due to simplification). This is due to human players interacting during a session of the game; they cannot stick to a scenario already written. However, Meadows (2001) pointed out that simulation and RPGs can work hand in hand. In his study, he used a game to

make people aware of the underlying composition and functioning of the model he used to make simulations at first. In this case, the game functions as a popularization for the simulation, it broadens the audience of the model to non-specialists.

Games vary a lot depending on the context. The support used can either be a classic board (*Water Allocation Game* of Nils Ferrand in 2005, *River Basin Game* by Lankford and Sokile in 2004) as in traditional party games, a computer (e.g. *BUTORSTAR*, developed by Mathevet et al., 2007), a video support (*VPA-KERALA*, developed by Witteveen and Enserink, 2007)… or a mix of several media. Most games are played with physical participants, but computer-based ones allow the use of artificial intelligence to create virtual players.

3.1.2 Interest of RPGs for environmental management

NRM issues often involve conflicting uses of a resource by several stakeholders, who hardly share a common vision regarding the resource. Interactions between stakeholders are especially difficult to represent in "traditional" simulation approaches based on computerized models. Thus, there is a need for a tool able to simplify the reality and allowing the discussion to focus on the main problems. The RPG is part of a collective learning process where stakeholders are also part of the modelling process and can influence its design and its use (Barreteau et al., 2007a, Lankford et al., 2004). This approach allows multiple exchanges, gaining insights from different points of views. Researchers benefit from stakeholder's field experience, while local stakeholders can take advantage of scientific expertise. Bots & Van Daalen (2007) also underline that RPGs are able to represent non-rational behaviours of human beings, something that cannot be done with classic computer models. Those special features of RPGs make them a useful tool for NRM contexts, where human interactions are complex and multiple.

Role-playing games can fulfil diverse functions according to the needs of the context. Bots & Van Daalen (2007) listed six different categories, but other authors give different ones:

- Research and analysis: the system cannot be studied or is difficult to study because of its complexity, and the game is used as a scientific experiment to generate data on this system
- Design and recommend: building scenarios and alternative solutions to a problem, and possibly trying to figure the consequences of these
- Provide strategic advice: advise on the efficient strategy to be followed, by looking at other players' reaction
- Mediate: players (potentially stakeholders of a real project) use the game as a virtual negotiation table. The environment of the game, different though similar to the real life, is expected to help raising fresh ideas
- Democratize: all the stakeholders are given the same importance during the process of the game, and all their views are equally considered

- Clarify values and arguments: compared with a real-life situation, the game allows the focus of the discussion to shift from political consideration to values and arguments

Role-playing allows participants to change their point of view on the subject of the game, and try to gain new insights of the situation. Endorsing news arguments, possibly arguments one used to dismiss in the real-life can make stakeholders grasp the diversity of viewpoints and the difficulty to balance them (Barreteau et al, 2007b; Bots & Van Daalen, 2007). Games provide a common experience for stakeholders, and they can refer to it in the future for their negotiations. It has even been reported in some cases that participants discovered stakeholders when playing a game. Bots also considers the environment of the game to be fruitful for discussions, as it removes some problems existing in the actual situation.

3.1.3 Building a functional RPG

Two phases are to be distinguished when designing a RPG, the first being the design of the game itself and the second the sequence of a session of the game (playing the game).

A RPG is designed for a specific purpose, as Bots and Van Daalen list it (see §3.1.2 above), thus one should state clearly at the beginning what are the objectives of the game: do we want to raise awareness on a specific issue? Do we want stakeholders to negotiate? Do we want stakeholders to develop their own scenarios for NRM? When those questions (and others) are answered and the purpose of the game is known, the medium of the game can be chosen. As mentioned in the previous section (3.1.1), various supports exist for games. Choosing one should not be overlooked, as it has consequences on the future use of the game itself. For example, a computer-based game in rural places could prevent some people from participating in sessions, as it requires a certain education. That is why Dionnet et al. (2008) underline that one should study the acceptability of a RPG by stakeholders.

The second element designed is the roles for the players. The designer chooses who will be represented among the stakeholders of the project. The second question will be how many of each category will be represented. A game involving many players ensures a large participation from various stakeholders, but the session can become quite confused if not properly supervised. Then, a role needs to get assets and resources to play the game, in terms of money, fields owned, social position, etc… And at last, the definition of a role will be complete when each player knows what the actions he can undertake are. The definition of those actions greatly influences the timeframe of the game. If many actions have to be done during one round, it is expected that only few rounds will be played during a session.

Then, the question will be: what environment will be represented? Generally speaking, the starting point is a real-life situation that is more or less simplified to suit the purpose of the game. The *River Basin Game* of Lankford (2004) depicts a highly simplified

cultivated catchment, comprising only a riverbed and fields; while *BUTORSTAR* represents a virtual wetland with different land use and types of land ownership (Mathevet et al., 2007).

The last step corresponds to the second phase of the implementation of a RPG, when the focus shifts to the sequence of a session. There must be facilitators (or game managers) RPG to supervise players and to see to the proper progress of the game. The manager is the keeper of the rules and makes them explicit at the beginning of the session. He (or she) also has to keep the focus of the game, balancing the discussion among participants and the respect of the timeframe set before the session. Each step of the game has to be timed to ensure the proper progress of the session. The spatial setting of the room is also important, and there can be places for participants to discuss among themselves, in order to be not heard by the manager or other participants. The manager is also responsible for the debriefing of the session, when the discussion shifts from the game to the real-life situation which served as the basis for the RPG. The debriefing also proves to be helpful for designers as it allows a feedback on the experience. Before being functional, a game has to go through several tests to make changes that will shape it step by step, making it meaningful for the study case.

An interesting feature of RPGs is their flexibility. Authors agree upon the importance of this (Barreteau et al., 2007a, Dionnet et al., 2008, Bots & Van Daalen, 2007). The game designers have to choose a level of abstraction, which often depends on its purpose. Through simplification, one can make the issue more accessible to every stakeholder, while a higher level of complexity can prove useful for education. The designer, by setting the rules and the roles, can also influence the openness of the storyboard. For example, *ATOLLGAME* by Dray et al. (2007) allow players to create new rules as the session goes on. The more open the storyboard, the more personal input the players can give. This can help raising new ideas and concepts during the testing of a scenario. Designing a RPG has to be thought carefully according to the purpose of the game, and it can evolve according to participants responses during the sessions.

However, it has to be pointed out that the success of a RPG session depends greatly on logistics. Lankford & Watson (2007) underline that great care should be put to the organization of a gaming session, as the choice of time and place can deeply affect stakeholders' participation. Indeed, the facilitator should be aware of the schedule of each participant in order to find a time convenient for all the players. If the place is located in a remote area, transport may be provided for players who do not have access to a personal vehicle (e.g. farmers).

RPGs are considered a useful tool in the complex context of NRM. Several authors used it and gave recommendations on the designing process. It is widely regarded as

efficient for enhancing negotiation processes and facilitating communication among stakeholders.

3.2 Wet-Wag, a role-playing game for wetland management

3.2.1 Origins of Wet-Wag

As described in the previous part, RPGs are useful for environmental conservation issues, when the situation is complex and requires dealing with several stakeholders. This is the case of the Ga-Mampa wetland, threatened by human activity (agriculture). As presented in figure 4, many stakeholders are involved and they have very different views on what should happen to the wetland. Thus, IWMI, along with the support of Cemagref decided to set up a RPG designed for wetland issues, based on the Ga-Mampa case, but which could also be helpful in other case studies surveyed by the WETwin project.

Sylvie Morardet, senior economist at the joint research unit G-EAU, was in charge of designing. She based her work on WAT-A-GAME[4] (a.k.a. WAG), a game designed by fellow researchers Nils Ferrand, Géraldine Abrami, Stefano Farolfi from G-EAU joint research unit and Derick du Toit from the NGO AWARD. WAG's aim was to facilitate the negotiation process among various stakeholders in the Inkomati catchment. The Inkomati is a transboundary river basin flowing through South Africa, Swaziland and Mozambique. An extended description of this game can be found in Ferrand et al. (2009). To put it roughly, WAG represents a water catchment with different land plots managed by individual players. Players decide how they want to use their land and the amount of resources they take (including water). New rules, in the form of policies and laws, are set during the course of the session, and players have to adapt their behaviour. They can choose to cooperate with each other or not. The objective for each player is to maintain their land activity and livelihood to a viable level (Ferrand et al., 2009). WAG proved to be useful in the case of the Sand River catchment, a sub-catchment of the Inkomati river basin, in Eastern South Africa.

However, WAG fits large catchments and does not focus specifically on wetlands, though they can be part of the game. Thus, the concept of WAG was used as a starting point, but its elements were downscaled at village-level, and it was focused on wetland management.

3.2.2 Objectives, elements and rules of Wet-Wag

Wet-Wag is a board RPG aiming at facilitating the negotiation process in small-scale wetland conservation projects. It is also expected to help awareness rising, a key issue in NRM projects (Barreteau et al., 2007a). This makes Wet-Wag potentially useful for educational purposes.

[4] See the WAG webpage: http://sites.google.com/site/waghistory/?pli=1

The elements described thereafter were the ones given at the beginning of the study. Further changes will be described in part 5 of the present report. Main elements of the game consist of:

- 4 A3 boards representing different parts of the agricultural landscape around a village (irrigation scheme, natural wetland, cultivated wetland, grazing areas)
- 6 role cards (one for each player)
- 6 sets of action cards
- Action (crop, cattle or other action undertaken on a plot), revenue (money units or food units) and manpower tokens (images)
- Blue marbles and beads of different sizes standing for water units
- Money units in the form of bank notes

Wet-Wag represents a small rural village in a developing country. This village is located alongside a river, and therefore a wetland that is partly cultivated and partly natural. There is an irrigation scheme taking water from the river, and also grazing areas for cattle in nearby mountains. Figure 5 on the following page shows those four boards, divided into plots.

The roles represented in the game are those of farmers who have assets (resources) in the form of plots (either in the irrigation scheme or the cultivated wetland or both), manpower, cattle units and money, i.e. initial cash and money received from external income (social grants, members of the family working outside the village). But they also have needs in terms of money to run their households and food to feed their family. Assets and needs are represented on role cards, such as the one represented thereafter in figure 6. The diversity of roles reflects the reality in Ga-Mampa. Some farmers have plots in the irrigation scheme, while others are only wetland farmers; some own cattle, some do not and so on.

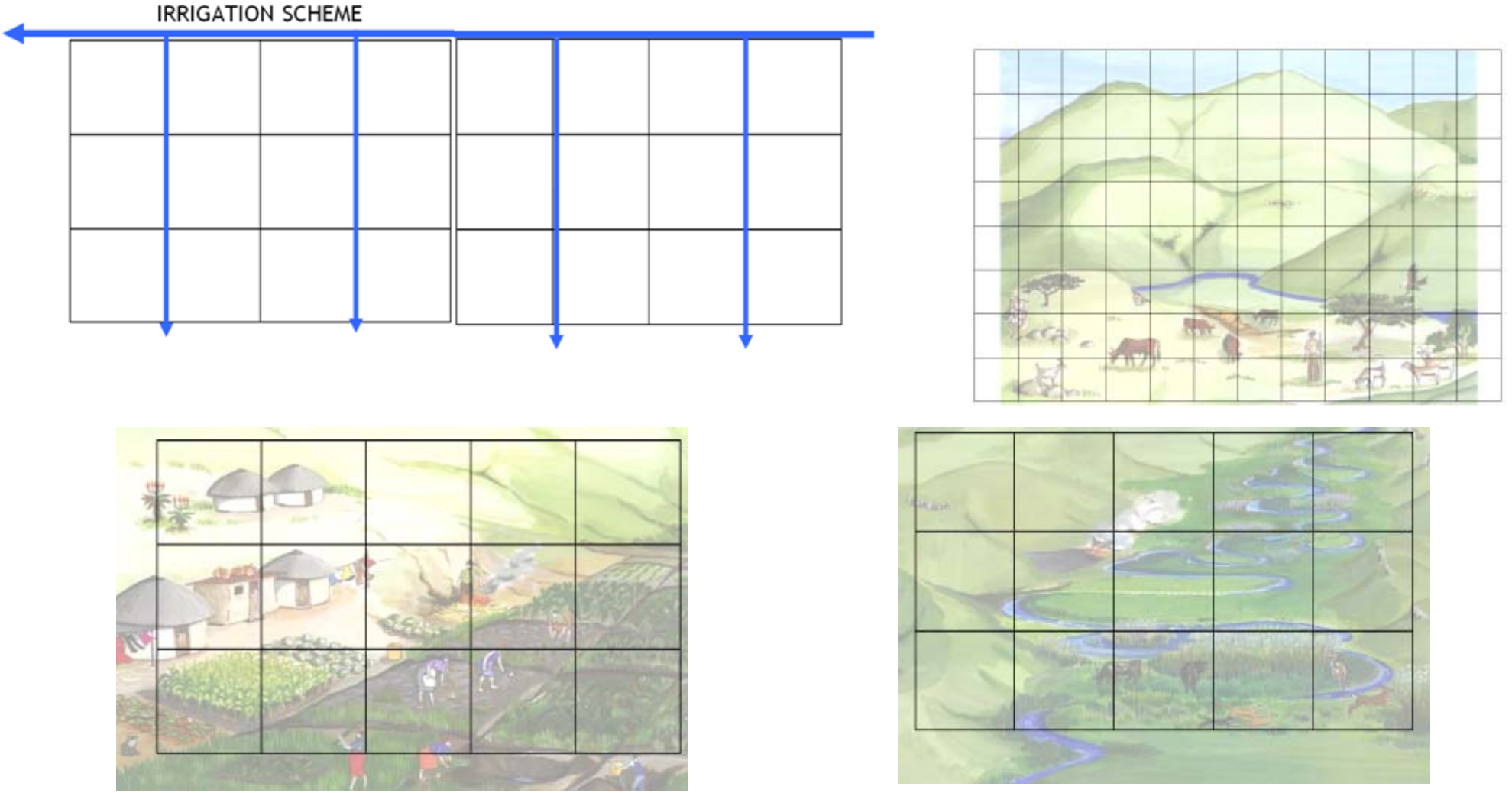

Figure 5: Game boards of Wet-Wag.

Clockwise from top left: the irrigation scheme, the grazing areas, the natural wetland and the cultivated wetland (Illustrations for the grazing areas and the wetland were taken from the Windows on our World: Wetlands game, developed by DWAF, the Department of Agriculture, the Wetland Alliance for Training, Education and Research, the Wildlife Environmental Society of South Africa, SANBI and the Mondi Wetlands Project)

IRR1	IRRIGATOR 1	Young irrigation farmers with small family and no cattle	
Resources		Irrigation plots: 7	Wetland plots: 1
		Manpower: 56 worker units	
		Cattle: 0 cattle units	
		Initial Cash: 106 money units	
		Seasonal external income: money units per season	
	People to feed: 112 people	Basic food needs: 9 food units per season Basic expenditures: 24 money units per season	

Figure 6: Role description card in Wet-Wag

Money unit is defined in such a way that players do not have to manipulate big quantities of bank notes. It is based on the smallest amount of cash that is exchanged during a game session. It was defined based on economic data collected on the Ga-Mampa case study by previous researches (e.g. food prices and average crop prices listed in Chiron (2005) and Adekola (2007)). Thus, some economic studies should be done before using the game in another context, to adapt prices level between each other.

Players can undertake actions on the plots they have been allocated. The game manager distributes at the beginning of the session a set of cards explaining which actions can be done, when they can be done, what are their requirements and their output (payoff). Figure 7 thereafter shows an example of such cards.

Coriander I Irrigation scheme  *Dry season* grow coriander in the irrigation scheme Seasonal activity	picture_activity
 Water wet season: 0 water units	 Water dry season: 2 water units
 Starting costs: 0 money units	 Running costs: 7 money units
 Labour at start: 0 worker units	 Seasonal labour: 2 worker units
Average yield: 5 T/plot	Average revenue: 19 money units

Figure 7: Example of action card in Wet-Wag

This is the activity card for coriander when it is grown in the irrigation scheme. As previous researches showed that some crops have different yields depending on whether they are cultivated in the irrigation scheme or the wetland, two cards were done.

Each round in the game represents a season: a wet season or a dry season. Thus, different kinds of activities are available to the players according to the season. During the wet season, the only crop farmers can grow is maize, whereas they have the choice among tomato, coriander, onion and cabbage during the dry season. They can also choose to harvest reeds and sedges in the natural wetland during the dry season.

The season also influences the amount of water received by farmers. Small beads and marbles represent water quantities that can be seen on figure 8.

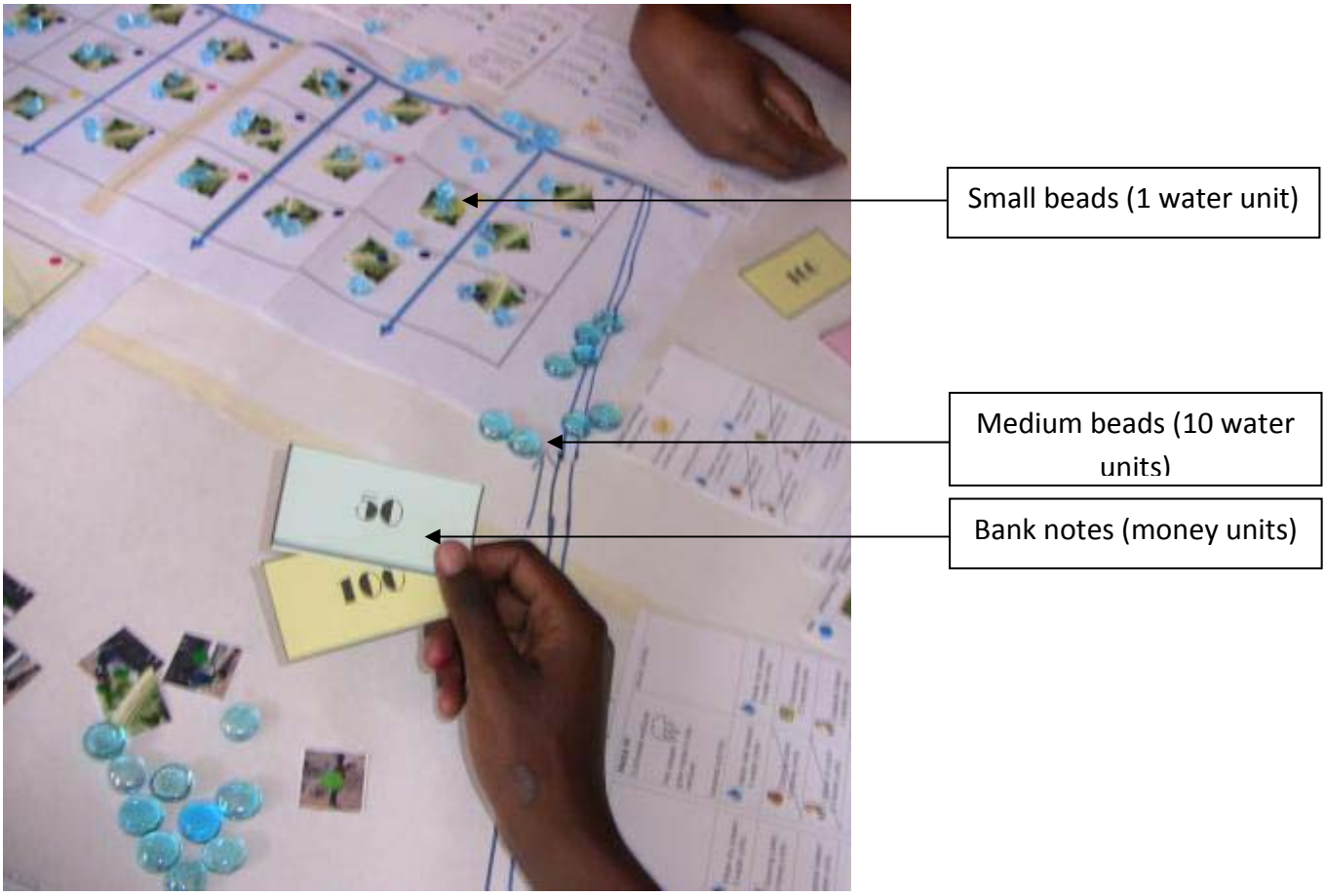

Figure 8: water units and money units during a game session (Source: F. Milhau, 2010)

Farmers receive water in three different ways:

- Water from irrigation scheme: 6 water units are available for each secondary canal in wet season, only 3 during dry season;
- Rainwater: only during wet season, the quantity (from 0 to 3 water units) depends on the weather of the year (very dry year, dry year, wet year, very wet year);
- Groundwater: the quantity of water supplied by groundwater is not really materialized in Wet-WAG. Groundwater is said to provide enough water for the crops in the wetland. It has no influence in the irrigation scheme.

Water feeds the crops planted by each player on his/her plots. To get the optimum yield written on the action card, a player has to provide the number of water units indicated. The game also represents water losses due to the canal poor condition. At the beginning of the session, the game manager explains water circulation from the river to the irrigation scheme and makes clear that 90% of the water is lost through leakages and bad design of the canal. This is also based on Damien Chiron's measurements.

To sum up, the sequence of events during a session of the game is as follows:

- The game manager shows the different elements of the game and explains their use. The role cards and initial cash are distributed among players (NB: there can be more than 6 players, but in that case, 2 players would share a role).
- The manager explains water circulation.
- The season and the weather of the year are indicated.
- Players have to decide how they want to use their resources: they choose actions for their plots, where they put their cattle (natural wetland or grazing areas in the mountains), how they share their manpower out among the different activities. They also pay the starting costs for each activity.
- Once the activities are chosen, irrigation farmers have to decide how they are going to share irrigation water. Water is scarce (only 6 units per secondary canal, delivering water to 6 plots), thus they have to negotiate to agree on the sharing rule (an equal amount of water for each player or not).
- When the negotiation is over, the manager can distribute the payoff to each player according to the activities chosen and the amount of water received. An abacus was made to summarize the yield of each activity depending on the water received. Payoff can be food units to feed the household (maize is the only staple crop) or money units to run the household and pay running costs.
- Farmers pay for their basic expenditures and the basic food needs for the next season. If they do not have enough food, they can buy some from the game manager or from the other players.
- The games then moves to the next round.

Negotiations on water sharing can last for a long time and delay the whole session of the game, as they often raise harsh arguments among players.

Two kinds of rules can be distinguished. The first is the common set of rules, explained to all players at the beginning of the session. Those are the rules stating for example that a farmer can do only one activity per plot for example. But other rules can apply according to the needs of the game and the situation. Here are some examples: when the manager reckons the wetland is overused (too much cropping), he can decide to apply some penalties such as blocking some plots from being cultivated. The income for a crop can be lowered if too many players are planting this crop, to simulate market crisis. This illustrates the *plasticity* of RPGs. Wet-WAG uses a small set of rules, but depending on the situation, new rules can be included, either decided by the game manager or the players. The storyboard is open.

Literature on RPGs is quite abundant and shows various examples where this tool can be useful for NRM issues. Their aspect differing from “traditional” methods such as round

tables can prove to be more attractive for stakeholders, and their adaptability to various situations can prompt new ideas and a better framework for negotiation processes. Endorsing arguments one used to fight against can make stakeholders grasp the diversity of viewpoints and more willing to co-operate with each other. Wet-Wag has been designed bearing those concepts in mind. Its objectives are to facilitate the negotiation process to find a management plan for the sustainable use of wetlands in developing countries. This first version of the game was made by Dr Sylvie Morardet in France. To improve the game and make it suit stakeholders' expectations, a mission in South Africa was sponsored. The next part of the report will present the methods used on site to further develop Wet-Wag.

4 Developing Wet-WAG in South Africa

4.1 Objectives of the internship in South Africa

As mentioned before, Wet-Wag was first developed "*in vitro*" and tested with some researchers and thus needs improvements to suit the reality of Ga-Mampa. Improvements can be divided in two categories: improvements on the issues tackled by the game, and improvements of the game itself, its elements and its complexity. The objectives of the mission are summed up thereafter:

Part of the game to be addressed	**Objective**
Issues addressed	- Learn about stakeholder's concerns
Roles	- Find if the roles designed are relevant - Think of other roles to be added
Actions	- Know about usefulness to include manpower - Collect data on crops used in the village to offer a larger choice of actions - Add crops that could be suitable for wetland cultivation - Add forage crops and production of dairy goats - Create collective actions for the players (repairing the irrigation scheme) - New interactions between players (loan money or cattle...)
Design of the game	- The game needs to be simplified
Events in the game	- Include event cards that can impact on livelihoods

Table 1: Objectives of the internship in South Africa

Several participatory methods were used to learn about the important issues and constraints faced by the stakeholders; and additional search was done to add information to the game. Several sessions were organised to test the game, in France and South Africa to see how player react, and what elements are functioning well or not.

4.2 Description of the methods used during the internship

4.2.1 Review of the reports made on Ga-Mampa

As one can see in the second part of the present report, several reports were already made on Ga-Mampa by students and researchers. Those reports were often dealing with socio-economical aspects as well as agriculture. Indeed, Damien Chiron (2005) studied the socio-economic impact of the irrigated sector on farmers' livelihoods; Olalekan Adekola (2007) assessed the economic value of wetland services; Coralie Sarron (2005) studied the changes in the Mohlapitsi River hydrology triggered by wetland conversion... Thus, one can find a large number of data and information on the agricultural sector, hydrology and social aspects (revenue, demographics...) of the case study. The first step in internship was to take stock of this amount of information, and sort the ones helpful for improving the game.

As the one of the objectives of the study was to include in the game issues important to local stakeholders, the first move was to know about the potential constraints[5] farmers were facing. The idea was to draw a list of important problems and then discuss them with farmers to estimate their real importance, and thus the need to include them in the game. The final list included 6 constraints:

- **Conflicts between croppers and cattle grazing in the wetland**. As a matter of facts, several farmers complain about the presence of cattle coming into their plots and causing damages to their cultures (trampling and eating) and state it prevents them from developing further their agriculture.
- **Erosion of the banks of the Mohlapitsi River**. This issue arose in the past years. Farmers and external stakeholders mentioned it during interviews conducted during the internship, but they did not explain exactly why it is a constraint of importance. This would lead to degradation of the wetland and reduction of agricultural land.
- **Manpower**. This constraint was not listed in the reports, but it was nonetheless included, as it is part of the objectives of the internship to know whether or not it is worth including in the game.
- **Access to agricultural markets.** The poor condition of public services (absence of tarred road) in the valley hampers the potential selling of the farmers' production.

[5] The term of « constraint » is used to talk about something hampering the development of agriculture, from the farmers' point of view.

- **Access to land.** Because of the system of PTOs in the irrigation schemes, no land redistribution was done, while the population increased. Thus, young farmers cannot access land in the irrigation schemes and have to crop in the wetland.
- **Water scarcity in winter.** Few farmers can crop during the dry season in the irrigation scheme, because of the canals' poor condition. Thus it prevents them for a second harvest that could help improve their livelihoods.

Some other constraints were mentioned in the reports, but they were not included in the discussions, as they could have blurred the focus of those discussions (e.g. the depletion of medicinal plants due to wetland conversion to agriculture). Including too many constraints was expected to add confusion and be harmful to the proper understanding of the sessions. The criterion to exclude some constraints was the number of times they were mentioned in the various reports: a constraint mentioned in only one of the reports is expected to be more "transitory" or of lesser importance, as the villagers mentioned it only during one survey. This assessment can be discussed as it was also somehow subjective. In order to ensure the quality of the list, it was agreed upon by Dr. Sylvie Morardet and the intern and then presented to the CRCE team, who has a good knowledge of Ga-Mampa. Mr Letsoalo, Mr Mpahlele and two interns from the CRCE reckoned the list covered up important problems for the farmers.

Moreover, reading previous reports gave a good appraisal of the socio-economic situation of the village. This proved helpful to make a short typology of the farmers one can find in Ga-Mampa, based on their economic asset, the surface of land cultivated, the type of the agricultural surface (wetland, irrigation scheme or personal gardens) and the ownership of cattle. Such information was needed to establish pertinent roles for the game, in order to represent the diversity of farmers living in Ga-Mampa. Those socio-economic data were useful to check the pertinence of the roles designed in the first version of Wet-WAG.

4.2.2 Focus group discussions

Participatory methods are an approach aiming at incorporating the knowledge and opinions of rural people in the planning and management of development projects and programs (Barham and Sullivan, 2002). They include a wide range of methods, and several authors discussed the way researches have to be made to ensure a proper participation. Some of these methods were used in this study.

A focus group discussion (FGD) is a specific kind of discussion, differing from traditional roundtables because it includes a *focus* in its conception. Generally speaking, the facilitator (= the person carrying the discussion) will decide of the focus of the discussion beforehand: only some specific points of a global challenge will be included, in order to discuss the matter thoroughly with the participants. The participants can also be the subject of the focus, as the facilitator can decide to meet with groups composed according to age, gender, occupation or any other criterion that is relevant. The facilitator has to be aware of

the social relationships and interaction among the community he or she is working with. For example, gender can play an important role, as women can be afraid to speak if men are present in the group. Age can play a similar role in many rural communities, as elders are often more respected and their opinion is more valued than the youth. One should consider the time and location of the meeting (Barham and Sullivan, 2002). The facilitator must be adaptable, as an inconvenient choice of time can bias the participation. At last, language should be considered carefully, but this point will be discussed later.

When considering the Ga-Mampa case, the intended focus was on gender. Preliminary meetings made it clear that women were not at ease to talk when men are present in the same room and express their views. Age was also considered to be important, as it is linked with experience, and thus respect. However, it did not go according to the plan at first, as the invitations to attend the meeting were sent by Mr Mashabela, the field assistant of the CRCE in Ga-Mampa. It was not made clear with him at the beginning that great care should be put to the composition of the group, and the first meeting was attended by both men and women. Thus, this meeting served as an experiment, and participation only improved later when it was made clear that a group should contain either men or women. Mixed groups could not be split according to gender due to lack of facilitators able to conduct the meeting. Indeed, language was an issue to conduct the meetings. The choice of English would have made things easier for the facilitator, but it would have hampered farmers' participation a lot, as only few people in the village are comfortable with English. Thus, it was decided that the meetings would be held in Sepedi, the local language. A master student from CRCE, Tumelo Masilela, took on the part of chairing the discussion, while I only provided him with guidelines. At the same time, Mr Mashabela was translating to me in English the reactions of participants. This system was somehow complicated, but it allowed a proper understanding for the two facilitators.

The purpose of such discussions was:

1. To confirm the importance of the constraints on agriculture identified through literature review
2. To learn about other potential constraints on agriculture
3. To rank the constraints according to their importance for the farmers
4. To discuss their origins (causes) and potential solutions
5. To show the game to the farmers and get their opinions on it.

The guidelines made for the focus group discussions are presented in the appendices section. They were quite broad, as we wanted to get as much input as possible from the participants. We supposed that the knowledge acquired through the literature review could neglect or exaggerate the importance some points of the discussion, or that some points were outdated. Thus, we always tried to ask for villagers' advice and input, in order to update this knowledge and make it fit the current features of the village. This proved useful as it allowed the identification of several new points of importance. A stone ranking exercise

was used to rank the constraints. Some adjustments were made from one group discussion to the other, because participants had troubles at first to understand the functioning of this method.

The appendix section includes reports of the three focus group discussions, along with some comments made at the time of the report (see appendix n°3).

4.2.3 Interviews with external stakeholders

Focus group discussions are well-adapted to get advices from several participants at one time. They could be done in Ga-Mampa, as it was possible to invite farmers for a session, but this was way more difficult to do with external stakeholders. Indeed, they are often busy and difficult to reach, thus making it impossible to propose a meeting with all of them. The main stakeholders we wanted to contact were LDA, LEDET, DWAF, SANBI and Lepelle-Northern Waters, a water board interested in the water quality of the Mohlapitsi River. As a consequence, we had to rely on individual interviews.

The aim of those interviews was to get external stakeholders' views on the Ga-Mampa case. We wanted to know about their means of action (either financial, logistical...) and their priorities for the wetland management, from their organization's point of view (e.g. awareness creation, biodiversity protection, water quality...). Then, we presented Wet-WAG as it was done during the focus group discussions, and got their views on it: are they willing to play it, do they feel something is missing, what issues would they like to see the game tackle... Those interviews were intended to be brief, approximately one hour each. However, it was very difficult to contact the stakeholders, and to fit in their schedule. Thus, the only stakeholders interviewed were Mr Netshikovhela from LDA and Mr Masindi from LEDET. Reports of those interviews are included in the present document, in appendix n°4.

During the interviews, the game was presented to the various stakeholders of the project, though each time it was made clear that it is not completed yet. The purpose of the meetings was to help us improve the game, which in return should help to improve villagers' livelihoods or to meet external stakeholders' objectives. The game was not played, as we did not want to confuse people with several versions of Wet-Wag.

4.2.4 Game testing sessions

Thus, testing sessions were required to see how people react when they are playing Wet-WAG, where the shortcomings are and what elements are to be kept. Authors recommend the testing of the game at several stages of the designing process (Ferrand et al, 2009). The very first tests were conducted in France at the Cemagref, with the "community of practice" set up in Montpellier to pre-test participatory exercises that researchers or practitioners would like to undertake with real stakeholders. The debriefing is especially important at this stage, as this is the time when participants can react freely on the experience, and give valuable inputs for the designer. During the game itself, the questions

asked are of importance, as they can point out some elements which were not carefully thought. However, a RPG cannot be designed only on the basis of researchers' advices. When bringing and testing the game in South Africa, the guiding idea was to see how people who know the local situation would react, as their behaviour can be different from the one already observed with researchers playing the game.

Three testing sessions were conducted in South Africa, at different stages of the internship. The first one tested Wet-WAG as it was at the beginning of the internship. This session included 12 players, two for each role and took place at CRCE, University of Limpopo. Participants were students from CRCE, young farmers from the nearby village of Ga-Mothiba, another study site for CRCE, and two villagers from Ga-Mampa (including the field assistant, Mr Bernard Mashabela) and Philip Mosima, the extension officer. As expected, their behaviour differed somehow from researchers' reactions. The debriefing sheet used during the tests is presented in appendix.

A second session allowed a test of the first changes prompted by the first test session and the first focus group discussion. This time, 8 participants joined the session, from CRCE and Ga-Mothiba only. The last test made in South Africa took place in Ga-Mampa itself. The idea was to give a feedback to the villagers, so they could see what the discussions helped to construct. This also shed a new light on the game, as they had different reactions from participants in previous sessions. The version of Wet-WAG tested in the villages is the last to date, including all the changes made during the internship. However, some changes can still happen.

The reports on each session of Wet-Wag conducted in South Africa are included in the appendices (appendix n°5).

4.2.5 Additional data collection

An important point we wanted to raise during the internship was the question of wetland cultivation. It was clear from Kotze's report on wetland health (2005) that maize cultivation was definitely not adapted to the specific conditions of this ecosystem. Literature on the subject is scarce, and most organizations working on wetlands are focused on wetland conservation, and thus are not willing to give hints about crops fitting wetland conditions. The Cemagref database for scientific articles, Scopus, was used, but it did not yield any result. In the end, we had to rely on information given by the extension officer in Ga-Mampa, Mr Philip Mosima. We tried also to contact wetland specialists to check this information and possibly get new ideas. The persons contacted were Donovan Kotze[6], from the CEAD (Centre for Environment, Agriculture and Development) at the University of

[6] Donovan Kotze's contact on the CEAD webpage: http://www.cead.org.za/About/Staff/index.asp?Login_ID=24 [retrieved on June 15th, 2010]

KwaZulu-Natal, and Edward Chuma[7] a process facilitator for Picoteam, a consultant company. Both worked on the Ga-Mampa case, and have a useful experience on wetlands.

Mr Philip Mosima also provided information on crops used in the village. He was able to give updated prices for the crops that were already included in the game, so we could check the pertinence of the prices listed by Damien Chiron a few years ago. He could also establish a list of the most important crops used in the village, and give a rough estimate of their water requirements.

Researches were also done to assess the cost of the reparation of the irrigation scheme. We wanted to include this option in the collective decision farmers can choose during the game. The cost assessment is based on a report made by Munyai Malaka Engineers, a consulting company specialized in engineering (now merged with a similar company, Vela VKE[8]). This report written by Chris Stimie investigated the possible options to build a new irrigation scheme for the downstream village of Gemini. Those options ranged from earth canals and furrows to sprinklers and water pumps. The report included a cost analysis for each option, an estimate of the gain in water efficiency and recommendations for the best system. His analysis served as a basis for the rough estimate we wanted to make for an action card to be included in the game. Costs and prices were updated with the inflation rate of South Africa for construction materials and electricity, available on the website of Statistics South Africa[9].

Some objectives included at first for the internship were left out after some research. This is the case of dairy goats and forage crops. Wet-WAG was considered to be complex enough, so those new elements were not added in the end. This choice was in line with authors' recommendations on designing a game: a good metaphor for a RPG is a balance between the complexity of reality (people do own dairy goats in Ga-Mampa) and the necessary simplification (dairy goats have little influence on wetland management; they can be seen as part of the generic "cattle").

Several methods were used to get valid information to develop the game. Desktop study (literature review) gave a first approach to the situation in the village. The outcome of the review of the reports and documentation available on Ga-Mampa fed the participative methods used later in the village. Participative methods were used to validate or not this outcome, and also brought new information. This information was processed in the office to be incorporated in the game. This two-ways approach was necessary and gave a diversity of inputs from various stakeholders.

[7] Edward Chuma's contact on the Picoteam webpage: http://www.picoteam.org/team_unterlage/chuma.html [retrieved on June 15th, 2010]
[8] Vela VKE's official website and contact: http://www.velavke.co.za/index.htm [retrieved on March 28th, 2010]
[9] Statistics South Africa Online: http://www.statssa.gov.za/ [retrieved on April 20th, 2010]

5 Results, modifications of the game and way forward

5.1 Modifications and new elements for Wet-Wag

5.1.1 The issues to be tackled by the game

This question was addressed through the FGDs with farmers and the interviews with external stakeholders. All in all, farmers were receptive to two problems: the poor condition of the irrigation scheme and the lack of access to the local markets. Those issues are given a high importance, as they are the ones holding back agriculture development and lowering their incomes. Farmers reckon they would be able to solve other problems, such as the lack of tractors, if they had more money. This does not mean the other constraints discussed are not important, but those two ones are of higher importance. On the other hand, manpower is rarely seen to be an issue for farmers; they can have workers when they need it, even during periods of intensive work such as the harvesting. Access to the land is also in the same category, but one can notice a bias here. We only interviewed farmers, thus persons already cultivating land. It would have been useful to get other villagers' views on this matter, to know if they experience difficulties if they want to start cropping. The issue of education was raised by farmers themselves. At last, the erosion of the banks of the Mohlapitsi is always present, though never being perceived as something very important.

Things look different from the LDA and LEDET points of view. Unsurprisingly, they both rank environmental conservation as their top priority. The wetland has to be protected from further encroachment. According to them, there is also a problem of education and awareness on wetland and land conservation issues.

There are few common issues mentioned by both external stakeholders and the community. They listed problems of education and awareness rising as an obstacle in the project. Obviously, as it is discussed in the third section of this report, a RPG could be of great help in this area. It presents in a simple way the problems faced when cultivating a wetland, and also gives some hints on how to solve them. During the testing sessions, players often mentioned that they learnt about wetland issues, which means Wet-Wag fulfils successfully this objective. However, the problems of rehabilitation of the irrigation scheme, access to the market and environment protection were not really tackled in the first version of Wet-Wag. Thus, new elements were designed.

The problem of the irrigation scheme is already tackled by Wet-Wag. Indeed, when a season is played, there are always harsh arguments over water sharing in the irrigation system. In winter, only every second plot can have a water unit, which is way too scarce to develop a proper cultivation. Obviously, farmers already know about it, but it could help external stakeholders to understand the urge for a better system. Thus, a new feature has been developed for the game. It is a card representing a collective decision to build a new irrigation system. This card is presented in figure 9 below.

REHABILITATION OF THE IRRIGATION SCHEME		Build concrete lined canals in the whole irrigation scheme, with short furrows	
Cost	Construction activities (including new gabion weir in the river and fixing the different canals)	1900	
	Maintenance work made by farmers	0	
Gain	Improved water efficiency 6% → 40%		For each secondary canal : 40
			For each secondary canal : 16

Figure 9: Decision card "Rehabilitation of the irrigation scheme"

This card offers players the possibility to save some money in order to pay for the rehabilitation of the irrigation scheme of the game. The main features would be building a new intake of water in the river and cementing every canal in the system. The economic data are based on Chris Stimie's report (2005) investigating the different options for the rehabilitation of the Gemini scheme. Due to the similarities between the different systems, his figures were considered to be valid for our theoretical irrigation scheme in Wet-Wag. The values were updated with the inflation rate, as mentioned in section 4.2.5. The water efficiency improvement is also derived from Mr. Stimie's report. He reckoned the efficiency could be as high as 54% with such cemented canals. We considered this value to be an optimum, and due to problems with the maintenance, the efficiency could be in fact slightly lower. Anyway, we can reasonably say the water efficiency would rise from 6% to 40% in the game. This figure could also be true in the reality if all the canals were cemented, the slope was better designed and the maintenance was more effective. One can see that this increase would solve water shortages during the winter. Each plot would get at least two units of water during winter, thus allowing players to plant more crops in the irrigation scheme.

A second card was designed simultaneously. During a focus group discussion, some farmers mentioned they would like to use sprinklers for irrigation rather than their traditional gravity system. Thus, we thought it could be interesting to offer players the choice between the two systems. This second card can be seen in figure 10.

<table>
<tr><td colspan="2">BUILDING OF A NEW IRRIGATION SYSTEM (SPRINKLERS)</td><td colspan="4">Create a new irrigation system pumping water from the river</td></tr>
<tr><td rowspan="2">Cost</td><td>Construction activities
(installation of a pumping station, pipe supplies)</td><td colspan="4">Total:
1650</td></tr>
<tr><td>Maintenance work and running costs</td><td colspan="4">Per season:
100</td></tr>
<tr><td rowspan="4">Gain</td><td rowspan="4">Improved water efficiency
6% → 50%
(over 3 seasons)</td><td rowspan="2"></td><td colspan="3">For each secondary canal :</td></tr>
<tr><td>1st season
20</td><td>2nd season
30</td><td>3rd season
50</td></tr>
<tr><td rowspan="2"></td><td colspan="3">For each secondary canal :</td></tr>
<tr><td>1st season
9</td><td>2nd season
13</td><td>3rd season
22</td></tr>
</table>

Figure 10: Decision card "Building a new irrigation system"

This card presents the same features as the previous one, and was designed according to the same process. Activities would include the installation of a pumping station and installation of pipes to carry water under pressure. Unlike the previous system, this one would require external maintenance and running costs (electricity). The figure included in the card is a very rough assumption and requires further studies to be more realistic. This time, Chris Stimie estimated the water efficiency could reach 70%. However, this system requires heavy maintenance, and is new for the farmers, thus there would be a period of adaptation. In the game, this is represented as a progressive improvement of the water efficiency: the first season, efficiency would rise to 20%, then 30% and at last 50%. This time again, we considered that 70% is a theoretical value that could not be reached.

How are these cards used during the game, and what is their interest? These decisions can be proposed by the manager to the players during the course of the game, after one or two seasons. Players need to realize how scarce the water is in Wet-Wag first. Then, they can decide to save some money, and to contribute to the cost of the system. The mode of the contribution has to be decided among players: who will participate (every player, only irrigation farmers), how much will each farmer give… There are several interests. As the game is a representation of the reality, external stakeholders would realize the need for a better irrigation system in Ga-Mampa. Then, it allows farmers and/or representatives from the administration to discuss which option would be better, whether rehabilitating the existing one or building a new one with pumps. Discussions during the game and the debriefing will provide room for players to think on this issue and help them make decisions about Ga-Mampa.

Coming to the issue of access to the markets, nothing was formally designed. Wet-Wag underlines this problem during the session, as the manager can decide to lower the income of each crop. Indeed, if he (or she) reckons there is too much of one crop (e.g. tomatoes on 20 plots), he can say that this is too much for the small market of the village in the game. Thus, prices will be lowered of one level, according to the abacus of production and revenue. This can lead to discussion among players on how they can try to make arrangements among them to overcome this. An example of such discussion can be found in the report of the game session of April 9th (appendix 3).

The last issue of importance mentioned during the interviews was the protection of the environment. LDA and LEDET are especially interested in this issue. The version of Wet-Wag described in section 3.2 does not include environmental aspects. It is mostly a socio-economic game. Blocking some plots when the manager reckoned the wetland was overused was the only environmental consequence included in the game. This needed to be put in a more formal way. The choice settled on a monitoring sheet recording how the wetland was used during a round (a season), giving a score in relation to this use. This sheet, called “wetland health record” is presented in box 1.

Wetland health record

How to use this tool:

For each season, the game manager writes down the number of plots used in the wetland for each of the mentioned land use.

Then, the game manager multiplies the number of plots used for each action with the score of this action. The result is the « action score ». If the « action score » is lower than 5, it is lowered to 0.

Finally, the three « action scores » are added to get the « wetland score » for the season.

- if the wetland score of the season is lower than 30, the wetland health improves of one level
- if the wetland seasonal score is comprised between 30 and 50, the wetland health stays at its previous level
- if the wetland seasonal score is higher than 50, the wetland health degrades of one level

The condition at the beginning of the session should be “baseline condition”, though this could be adapted to suit the local realities.

Action	**Crop (Maize, Tomato...)** **3 points**		**Cattle** **2 points**		**Plant harvesting (reeds, sedges)** **1 point**		
	Number of plots	Action score culture	Number of plots	Action score cattle	Number of plots	Action score harvesting	Wetland score
Example	*4*	*12*	*7*	*14*	*3*	*0*	*26*
Season 1							
Season 2							
Season 3							
Season 4							
Season 5							

Box 1: the wetland health record monitoring sheet

The scores are arbitrary, but reflect the magnitude of the impact of each type of use. They are based on Donovan Kotze’s report on the Ga-Mampa wetland, as well as on the

WET-Health document (Macfarlane et al., 2008).The limits set for the wetland score were also roughly derived from the same documents. A wetland score of 30 represents around one third of the plots cultivated along with some cattle, which is not expected to excess the carrying capacity of the ecosystem. Five conditions for the wetland were described along with their consequences to reflect the wetland score (see box 2).

The various wetland conditions and their consequences

Wetland condition	Description of the wetland condition	Consequences
Highly degraded	– Over-working of the soil is depleting the soil organic matter – Erosion is rapidly degrading the banks of the river and the plots – Removal of indigenous vegetation causes large losses of species – Draining of the soil deeply affects the groundwater level	– All crops yields or revenues are lowered by one level on the production table compared to the baseline condition – Reeds and sedges can be harvested on 5 plots only – 2 more plots are unusable in the cultivated wetland
Degraded	– Erosion is occurring at a small extent – Over-working of the soil is affecting the soil organic matter – Indigenous vegetation tends to disappear	– Reeds and sedges can be harvested on 10 plots only – 3 plots in the cultivated wetland are unusable due to lack of organic matter – Water quality is degrading and the municipality gives a fee of 10 money units to each farmer
Baseline condition	– Cropping systems tend to overpower natural vegetation – Hydrology is slightly affected	– None, yields and water requirements are at the starting level
Upgraded	– A right balance is found between cropping and preservation of undisturbed patches – Soils are improving their water content	– Yields and revenues are increased by one level compared to the baseline condition
Highly upgraded	– Natural vegetation is dramatically expanding throughout the wetland – Soil organic matter is at its highest – Fauna benefits from large undisturbed areas – Soils have a high water content	– Reeds and sedges can be harvested in the formerly cultivated part of the wetland – As water quality has improved, the municipality accepts to help funding collective investments

Box 2: wetland conditions designed for Wet-Wag

The consequences are a transposition to the game of real life consequences listed in WET-health (Macfarlane et al., 2008). They are supposed to make players aware of the environmental consequences of their actions. Of course, the time scale has been reduced to fit the game. Soil organic matter depletion does not occur in a season (6 months) but over the course of several years. Among the consequences, some are the result of personal thoughts. As an example, the fine of 10 money units for poor water quality is not planned by the Municipality or other stakeholders. If this tool is to be reused in the future, this will require confirmation by an external stakeholder to strengthen the link between the game and the reality.

This tool can be used to start some discussion with the players during the debriefing of the session. This was done during the last session in Ga-Mampa, on May 11th (see the report in appendix n°5). It made farmers aware of some of the consequences of over-cropping and they started discussing how to control what farmers are doing in the wetland.

5.1.2 The roles in Wet-Wag: relevance and additions

The review of reports cleared the ground for this theme, and was completed during the testing sessions and the FGDs. Masclet (2007) presented some elements to establish a typology of farmers. The elements used in Wet-Wag to differentiate farmers were the following:

- Access to the land (irrigation scheme and/or wetland)
- Number of cattle
- Basic food needs (related to the family size)
- Basic expenditures (also related to the family size, but also to the external incomes provided by family members working outside the village and social grants)

According to Sébastien Masclet's classification, three groups can be differentiated if looking at the access to the land: farmers with only plots in the irrigation scheme, farmers only present in the wetland, and farmers with plots in both. The former category has the highest total surface. This differs from Wet-Wag, where there are only two categories: wetland farmers and farmers in the wetland and the irrigation scheme. However, it was later confirmed during informal discussions in Ga-Mampa that now, most families who crop in the irrigation scheme also crop in the wetland. This is the result of demographic pressure.

Masclet's typology was used to confirm the design of the roles made in the first version of Wet-Wag[10]: heterogeneous access to the land, possession of cattle and incomes. During the meetings in Ga-Mampa, roles were presented and great care was used to explain the differences between each. Every time, participants agreed and confirmed that the

[10] The designation "first version of Wet-Wag" refers to the version of the game presented in section 3.2, though it is not the very first version of the game.

diversity of roles resembles what exists in Ga-Mampa. There was no significant category of household overlooked during the designing process.

The second aspect of the searches on roles was the addition of external roles. For the time being, farmers are the only stakeholders represented. The external role would be the one of a regulator, in charge if keeping some rules respected. It would represent the interest of the other stakeholders, such the Department of Environment, the Department of Water Affairs or the Municipality. Such an external role would have a sheet explaining his part: what his interests are, which rules he is supposed to enforce…

Such a role was not implemented in the game. There were discussions about the usefulness and the interest for the game to include a regulator. The game manager plays the regulator in the current version of the game, but it could be interesting to make someone else play this role. This is discussed in the "Way forward" paragraph of the current chapter.

5.1.3 Developing new actions for the game

A major objective for the game was to include more crops to diversify the choices of farmers. This was done through the reading of reports, especially Damien Chiron's one, and researches on site at Ga-Mampa. Other crops used in the village were identified:

- Dry beans during the dry season, cultivated in the irrigation scheme
- Groundnuts, wet season, irrigation scheme and wetland
- Sweet potatoes, wet season, only in the irrigation scheme
- Pumpkins, associated with maize in the wetland
- Wheat, a dry season crop for the irrigation scheme
- Sugar cane, planted on the border of the fields
- Also mango trees, avocados and pawpaw

It would be difficult to include all those crops in the game, as it would add too much confusion. We decided to choose only new crops with different characteristics (water requirements, yield) from the ones already present. Moreover, it was agreed that perennial crops such as sugar cane (not perennial in itself, but permanently present) and trees were either too marginal or difficult to play in the game. Then, the last criterion applied was the extent of each crop to identify the most important ones. At last, the three crops chosen were the dry beans, the groundnuts and the sweet potatoes. It was really important to include new wet season crops. At the same time, onions were removed from the list of crops present in Wet-Wag, as it had characteristics close to the cabbage. Thus, the list of crops available in the RPG is:

Wet season	Dry season
- Maize (only food crop) - Sweet potatoes - Groundnuts	- Tomatoes - Cabbages - Dry beans - Coriander + Harvesting of reeds and sedges

Mr Philip Mosima, the extension officer of Ga-Mampa, was able to give figures for the prices of every crop, according to the market prices of 2009. On the other hand, he was unable to give exact figures regarding water requirements. He provided relative figures, comparing crops to each other ("Sweet potatoes require two times more water than maize"). Given his experience, we considered these data to be valid in the context of the game, where we simplify the reality.

Another important point for the game was the introduction of new crops that suit wetland conditions. This part proved to be really difficult, because of the lack of literature already mentioned. Several leads can be followed. The first one is the plantation of rice. Techniques have been developed to lower rice's water requirements, and it does not need to be flooded. One of these techniques is the System of Rice Intensification (SRI), already successfully tested in Eastern Asia and Africa[11]. Moreover, it does not require tillage, which is harmful for the soil in the wetland. However, rice is not a very common crop in South Africa, though it is widely cultivated in Zimbabwe. Thus, farmers could be ill-disposed toward this new cereal ("cultural" shock). Rice also requires a lot of processing, which is not mastered in this part of the country. Donovan Kotze, ecologist specialized in wetlands, mentioned that *Colocasia Esculenta* has a high tolerance to waterlogging, but requires deep tillage… It was also difficult to find data on their water requirement and yield. Resulting from all those difficulties, it was not possible to include any new crop suitable for wetland conditions. Further investigation is needed.

5.1.4 Simplification and changes in the design of the game

Overall, the game is often perceived as being quite complex to understand at the beginning. Participants have to become familiar with this new tool, and there is a lot of information (rules, elements) to be learnt. Thus, the game has to be kept as simple as possible, and each element not fully relevant for the purpose of the game must be removed. As mentioned above, manpower was not considered to be a constraint of importance for the farmers. Thus, we took the decision to remove it from the game. This triggered a series of changes on action and role cards. Participants were often taken aback by the cards designed in the first version of Wet-Wag. They had troubles understanding which information was useful, and where they could find the right indication (e.g. where the crop can be grown). Drawing consequences from game sessions, new role cards and action cards were designed. They are presented respectively in figures 11 and 12 on the next pages.

[11] The SRI project homepage: http://ciifad.cornell.edu/sri/index.html [last retrieved on June 16th, 2010]

IRR1	IRRIGATOR 1	Young irrigation farmers with small family and no cattle	
Resources		Irrigation plots: 7 Wetland plots: 1	
		Manpower: 56 worker units	
		Cattle: 0 cattle units	
		Initial Cash: 106 money units	
		Seasonal external income: money units per season	
	People to feed: 112 people	Basic food needs: 9 food units per season Basic expenditures: 24 money units per season	

ID	Irrigator 1	Young irrigation farmers with small family and no cattle
Resources		Irrigation plots: 7 Wetland plots: 1
		Cattle: 0 cattle units Grazing needs: 0 plots in summer 0 plots in winter
		Initial Cash: 106 money unit
Needs	Basic food needs: **9** food units Basic expenditures: **24** money units	

Figure 11: Comparison between the old role card for irrigator 1 (top) and the old one (bottom)

Coriander I Irrigation scheme *Dry season* grow coriander in the irrigation scheme Seasonal activity	picture_activity
Water wet season: 0 water units	Water dry season: 2 water units
Starting costs: 0 money units	Running costs: 7 money units
Labour at start: 0 worker units	Seasonal labour: 2 worker units
Average yield: 5 T/plot	Average revenue: 19 money units

Coriander 	Dry season 
Irrigation scheme 	
	Water dry season: **2**
	Average revenue: **12**

Figure 12: Comparison between the old action card for coriander (left) and the new one (right)

Regarding the role cards, information were put in two distinct categories: the resources of the role and its needs. Manpower is not used anymore, so it was deleted from the card. The external income of the player was merged with its basic expenditures, in order to limit the exchanges of money at the end of a round. The term “number of people to feed” was also removed, as it increased the confusion. At the beginning, a role was supposed to be a group of farmers sharing similar socio-economic characteristics instead of one farmer. However, participants had troubles understanding this, so it was decided to say a role equals a farmer.

Many changes were done to the action cards. First, the amount of text was reduced as much as possible. Text was replaced with pictures, in order to facilitate the understanding for every participant. Manpower was removed there again. The running and starting costs were also removed, and directly included in the crop revenue. This also limits the number of money exchanges at the end of a round. The season when the crop can be grown was put forward. Indeed, some participants did not understand at first that some crops can only be grown during a specific season. The same thing was done with the place where the crop can be planted. Images were used to make the links between what appears on the card and the board clear. There are several empty boxes in the new card. It was decided that when information was not relevant (e.g. water needs during the dry season for a crop growing in wet season), it was better to leave an empty box rather than a 0 that would confuse participants. Other cards would present different empty spaces, as illustrated in figure 13.

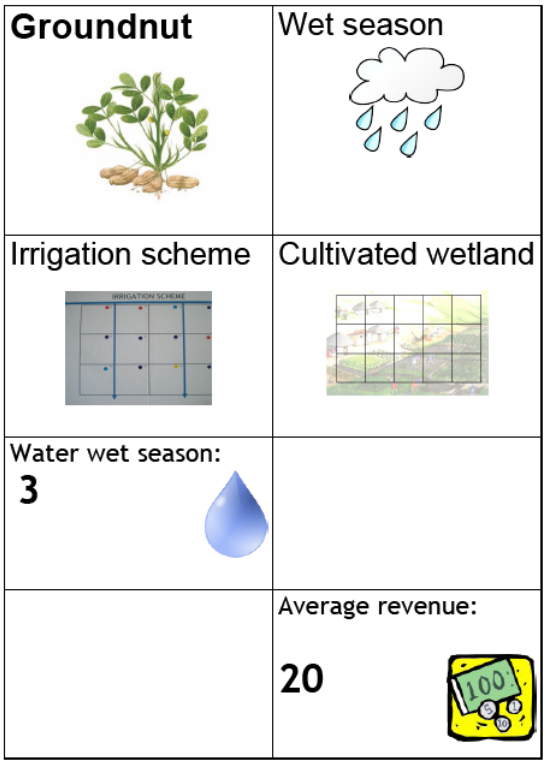

Figure 13: Groundnut action card

Overall, those new cards were well received during the tests of the game.

5.1.5 Event cards

Some events are likely to affect livelihoods in Ga-Mampa. The first we could mention would be the floods, as everybody remembers the one that occurred in 2000 and which damaged the irrigation scheme. Mr Netshikovhela confirmed that floods are common events in the region, and a major one can happen every ten or twenty years. One of the services provided by wetlands is a "protection" against floods. If they are in good condition, they can act as a sponge, and thus lower the extent of flooding. As the Ga-Mampa wetland is considered to be damaged (Kotze, 2005), new floods could have dramatic impact on livelihoods, destroying the numerous plots along the river. Thus, an event card could be designed to represent what would happen to the village if a flood were to happen. However, further data from what happened in 2000 would be useful to learn about floods in the area. Then, a card could be designed to give a description of the event and its consequences.

Two other events can be considered, given the inputs from the discussions in Ga-Mampa and the local situation. The first one is the construction of a proper road to the village. This would open new possibilities for farmers to sell their products to the local markets, making transportation easier. In the game, we can think this would increase the income for the farmers and stop the limits for cultivating one crop. However, discussions about this road are going on for years, and the provincial government does not seem ready to start the road works. Such an event card could make external stakeholders realize the need for this road.

The other major opportunity for Ga-Mampa is the tourism. A tourism centre was built around 2007 by the Lepelle-Nkumpi Municipality, but has never been used. It is slowly degrading. However, one can imagine what could happen if the centre would actually open. This could represent a new source of income for households, selling products and participating in activities (guided hikes, catering...). Once again, further information is needed to assess the potential of the tourism sector in the village and draw consequences for livelihoods.

5.2 Feedback on the methods used

Several methods were used during the mission, mixing participatory methods such as focus groups and interviews with desktop work and literature reviews. The two methods are complimentary, and they should feed each other: the outcome of the literature review has to be confronted with the reality of the village, while the results of discussions with stakeholders must be put in a more formal way to be included in the game. From this point of view, the methods used proved to give interesting results.

However, participatory methods could have been more developed. It was difficult to meet with every external stakeholder. The representatives from LDA and LEDET were quite helpful and easy to contact, but others were difficult to reach, and thus were not interviewed, whereas their expertise was sought. On the other hand, it was quite easy to organize focus group discussions in the village, considered the problems of communication between the CRCE and the Ga-Mampa valley. Farmers gave helpful details on their livelihoods and the problems they face daily when cultivating. The main problem was to focus the composition of the group. As we had to rely on the field assistant to send the invitations, we often found ourselves with groups of mixed gender and age. This hampered the participation sometimes, especially when there was an important member of the community, such as the secretary of the CDF. Other participants then tended to be quiet.

The game sessions were successful from my point of view. We were able to identify the strong points and the shortcomings of the game, and the repeated sessions at regular intervals allowed us to test the different new elements we progressively introduced. The feedback obtained during the debriefing then hinted if we were moving in the right direction or not. However, greater care should have been put into the logistics of each session: transport for the participants, material available, setting a schedule and sticking to it... The context of the mission, in a developing country, made it sometimes more difficult to organize a session properly.

5.3 Way forward and recommendations

Some elements that could be developed in the near future have already been mentioned in the present report. Interviews with external stakeholders could help to shape a regulator role for the game. This role would be described on a specific sheet, and would endorse the competences of various administrators. Regarding the negotiations on water sharing in the irrigation scheme, he could play the part of the Headman or the water committee and ease the process, setting rules or taking sides when a conflict starts. On the other hand, he could also enforce regulations on cropping in wetlands, as the LDA and LEDET should do it. The choice of the player for such a role would be of critical importance. It requires an ingenious person who has enough authority to be respected by other players. He (or she) must know how to adapt him or herself to the situation, and can also decide to try new rules, and see how they influence the game. On the other hand, if the regulator is given too precise guidelines, it tends to close the storyboard of the game. One of the interests of Wet-Wag is that it leaves a lot of room for discussions among players. They can agree collectively on common rules, and an external regulator should not overweight the other players.

Event cards can be an interesting thing to develop, as they some events are likely to happen and can have important consequences for the design of management plans. However, designing such cards requires further information on those events, as mentioned in paragraph 5.1.5.

The game was tested with several participants, but, unfortunately, it was not possible to try it with both external stakeholders and farmers. This next step has to be carefully planned, given the conditions of the project. Indeed, as Ga-Mampa is quite difficult to reach, it means that transportation has to be provided for external stakeholders coming to the village. A first step could be to test the game with only external stakeholders and see how they react. This would give helpful information for further sessions, and would also show their willingness to play Wet-Wag.

The main challenge faced now is the one of using again the game in the process of designing a wetland management plan. The objective of my mission was to develop the game, but it was not really implemented in the process. Now that other stakeholders continue their work or start working on the Ga-Mampa case, nobody is left in South Africa who knows how to play the game (meaning nobody involved in the process of developing a management plan, Tumelo Masilela knows Wet-Wag and would be able to play it). Wet-Wag proved to be useful for raising awareness on environmental issues, and triggered interesting discussions among participants. Those discussions were the first steps of actions that could solve some issues such as the water sharing in the irrigation scheme or the lack of access to the markets. From my point of view, this potential should be reused later in the process if the stakeholders are willing to commit themselves. As Mischack Masindi often mentioned it, a gap exists between the generations in Ga-Mampa, and the younger ones are more open and receptive. Wet-Wag could be used as an educational tool in schools, in order to raise youth's awareness on environmental issues.

The last step of the way forward is the extension of Wet-Wag to other case studies. It is difficult for me to judge, as I have never seen the other sites studied by the WETwin project and I do not know about their socio-economic context. However, I do think Wet-Wag could be useful for educational purposes in several similar contexts. The game is abstract enough to be adapted to other cases or understood by external participants. Data collection would be required to make the RPG fit to the new context (e.g. include the crops used in the region, design new roles), but the main elements (boards, rules, sequence of events during a round) would remain the same. Wet-Wag fits small-scale wetlands, and I am not convinced it could be upscaled to larger cases, such as the Niger Delta in Mali.

CONCLUSION

The wetland in Ga-Mampa is threatened by human activity. In the last ten years, the natural vegetation has been receding to occupy as little as less than 20% of the wetland area. Agriculture is the main pressure on this land. Moreover, the agricultural practices prove to be harmful for the wetland health and are degrading the soil organic matter. As a consequence, there is a need for a coordinated action from the people interested in the wetland: farmers on the one hand; and on the other hand the provincial government, research organizations and NGOs. The Wet-Wag game created by Cemagref aims at providing the basis for discussions among stakeholders, and raising their awareness on each other's problems.

The purpose of the mission in South Africa was to develop Wet-Wag. This carried out using several methods to take into account inputs from every stakeholder. Participatory methods such as collective discussions were conducted in Ga-Mampa, and representatives from the provincial government were also interviewed. Every participant of the project was given the opportunity to express him or herself, though it was not possible to get comments and advices from all of them. These methods were completed by a review of reports made on the Ga-Mampa study site and additional data collection to get a comprehensive vision of the situation in the village. In the meantime, literature on RPGs was also studied to get knowledge on designing such tools. Experiences from other cases gave new ideas and helped us to include the stakeholders' views in the game.

New elements have been designed to reflect those views in Wet-Wag. The focus of the game shifted from a socio-economic one to a broader approach including environmental concerns. The design of the game was also simplified to make its understanding easier for every participant. Three sessions of the game were conducted to see how South African participant react. Overall, the game was well received though some participants expressed their scepticism at the beginning. There were positive comments. Playing the game helps to raise issues (e.g. water shortages, market access) and make participants discuss about those issues and how they can solve them. We can consider that the game fulfils its educational and negotiation support basis.

Further investigations are required to improve Wet-Wag, as some elements were not designed during the mission. Wet-Wag could take into account some events that are likely to affect significantly the livelihoods in Ga-Mampa. Moreover, a specific role for a regulator should be designed to relieve the game manager from some of its duties and to help starting new discussions on regulation aspects. A more comprehensive study of the regulations existing on wetlands in South Africa would be of interest.

The problem faced at the end of the mission is the way forward for Wet-Wag. The game proved to be helpful in several ways, and thus should not be forgotten when it comes to the designing of a management plan for the wetland. New sessions of the game should be conducted along with external stakeholders, who were not given the opportunity to try Wet-Wag. We would then know if they are willing to play the game and use it.

Wet-Wag could also be used in other contexts. It has been shown that it is a useful educational tool. Some data collection would make it fit to another wetland context. It can raise people's awareness on environmental issues faced in developing countries, and so take decisions beforehand to prevent environment degradation.

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APPENDICES

APPENDIX 1: Guidelines for focus group discussion in Ga-Mampa

Groups: 4/5 persons at one time, facilitated by myself and field assistant (and CRCE student if possible)

Groups identified according to: gender, location of plots (wetland or irrigation scheme), type of activity (croppers, livestock owners), age (?)

Objectives: identify main concerns about agriculture in the wetland and/or the irrigation scheme (livestock conflicts, access to the land, access to the water must be tackled during the discussion)

get their views on matters about wetland protection

get their opinion on the game as it is designed now

Focus on constraints on their livelihoods and on the development of their agriculture. The points identified so far that could be of interest for the game are the following:

- Conflicts between croppers and cattle grazing: what would be the use of fencing? Are there other places to put livestock safely?
- Erosion of the banks: to what extent is it important?
- Manpower: is manpower (for cropping and/or livestock keeping) a constraint in the village? Are there manpower limitations for all households in general or for some households at some specific periods or for some specific activities?
- Access to the market: can farmers sell their production easily? Who buys their products? What improvements they see for this situation (upgrading of the road access to Tzaneen)?
- Access to the land: how many farmers are excluded from the irrigation scheme? Would it be possible to expand the irrigation scheme? Would it be possible to share the land available in the IS so people cropping in the wetland would have access to it?
- Water scarcity in winter: reparation of the canal to give more water for croppers so they can have cash crops in this season? What are the reasons for not cropping in the wetland during the dry season?

We should not propose more constraints, because we have to deal with time limitation.

General direction:

First part: identification of concerns and proposed solutions

- Introduction, presentation the context.
  We are developing a game as a tool for environmental and social management in this area. We believe this tool is efficient to raise issues and make people discuss about it. I will present this game in detail a little later. First, I am currently collecting data and views about the situation here in the village. We would like to do some focus group study to gather information to help us collect some data and learn about important

concerns for your community. Then, we will present you the game we are developing and ask about your views, if you find it useful, if you find some things are missing...

Tumelo, student at the University of Limpopo and Bernard Mashabela will be assisting me in facilitating these discussions, which will be carried out in the local language.

Our target audience for this study is the rural households who are the water users as well as other stakeholders like DWAF, Municipality and department of agriculture. There will be different focus group discussions which will be carried out in the next weeks, as well as some personal interviews with members of the community. Today, we will work in a small group, and all group members will have a chance to talk.

The results of this research will be used to facilitate discussion between the community and policy-makers and help them discuss feasible solutions to protect the wetland while providing sustainable livelihoods for the community.

Does anybody have any question about the objectives of this meeting, or what will be discussed? If anybody has a question, please feel free to ask, it is important that people understand the same things and participate in the discussion.

- So far, we have identified some constraints (write them on the flipchart in English and Sepedi, try to illustrate with drawings). We will ask you to rank them (use stones or beads from the game), one after the other. Each farmer comes, and puts beads on the different constraints. The more beads he uses, the more the constraint is perceived as important. Facilitators take note on the number of beads used for each constraint, then remove the beads and a second farmer comes.

After all the farmers have done it, we display the results on the flipchart and start discussing.

- What are the causes of those constraints? Try to raise the questions mentioned in the description of the constraints.

- What solutions do they see for these constraints? Who could implement those solutions, or help them to implement?

Problems	Causes	Who is responsible?	What solutions?

Have a short break (10 min)

Second part: presentation of the game and their advice on it.

- Present the whole game: boards, players and roles, crops, water circulation. Present the water cycle in the wetland.

Make people touch it and have a close look. Recapitulate on a board what are the main elements to refer back to it later. Precise the expected outcome of the game: a discussion on matters that affect the community and possible solutions. Are there any questions on the general understanding of the game? Is the game easy to understand?

- General opinion: do you think it can be useful and help you? Do you feel something has been completely overlooked or forgotten? Can you relate this game to your daily life?

Opinion on some points: are the roles relevant and do they correspond to real situations? We have designed different farmers corresponding to different social categories. Are they realistic?

Who has a control over the wetland?

APPENDIX 2: Debriefing sheet for the Wet-Wag testing sessions

	fully agree Ke a dumela	**rather agree** Ke dumela gannyane	**rather disagree** Ke gana gannyane	**fully disagree** Ke a gana
It was funny E be e le segisa				
Rules were clear Melao e be e le bonolo				
It was interesting E be e le bose				
It was too long E be e le e telele				
I learnt about wetland issues Ke e thutile ka ditlhohlo tsa mahlaka				
It was too abstract E be e le bothata go e bapetsa le seemo sa nnete				
It may be useful for teaching E ka ba le mohola ge e ka rutwa batho				
It may be useful for decision making E ka thusa go tsea dipheto				
Can be played with policy-makers E ka bapalwa le ba balaodi				
Can be played with people from Ga-Mampa E ka bapalwa le bakgathatema ba Ga-Mampa				

What was good? Ke eng seo se bego se le se sebotse? 	**What was not good?** Ke eng seo se bego se le se sempe? 

APPENDIX 3: Reports on the focus group discussions

Report on the Focus Group Discussion held at the Community Center in Ga-Mampa (24/03/2010)

Participants (in brackets, the village of origin):
Mohlatlole Elias (Ga-Mampa), Monnye Jim (Ga-Mampa), Rapulane Jacob (Ga-Mampa), Seshane Z.S. (Ga-Moila), Mashlterey Daniel (Vallis/Ga-Moila), Mampa Maggie (Ga-Mampa), Mampa Mmabatho (Ga-Mampa), Mampa Frank (Ga-Mampa), Mashabela Bernard (Ga-Mampa), Mahlatllole Gloria (Ga-Mampa)

Facilitators:
Masilela Tumelo (CRCE/UL), Milhau François (Cemagref/CRCE)
Bernard Mashabela also facilitated some parts of the discussion, providing some translations and explanations for other participants.

Objectives of the discussion:
The focus group discussion was conducted in order to get information on the constraints borne by farmers in the valley and to get their views on the role playing game developed jointly by Cemagref and IWMI-SA.
The invitations were sent by Bernard Mashabela, the field assistant for the CRCE.

Description:
The meeting started at 9:30 at the Center for the Community Development Forum recently built, with most of the participants, though a couple of them arrived later, after the introduction made by the facilitators.
The expected guidelines were the following:

- Welcoming, presentation of participants and facilitators, presentation of the aim of the discussion
- Presentation of the existing constraints on agriculture and livelihoods identified through the reports already made by students in the village
- Ranking of the constraints according to their importance, and discussion on their causes
- Collective thinking by participants about the possible solutions they could see for these constraints and who are the stakeholders that could help them to implement those solutions
- Break
- Presentation of the game developed so far (rules, participants, roles, elements)
- Discussion on its usefulness, its accuracy

- Other matters forgotten
- Closure of the meeting

However, due to time limitation and unexpected changes in the foreseen methods to be used during the meeting (lack of a flipchart), we had to stretch the schedule and limit some periods of discussion, notably point number 4.

The meeting was conducted in Sepedi by Tumelo, with assistance from Bernard where necessary, and Tumelo provided François with the necessary translation. François' role was to give the orientation of the meeting and make the presentation of the Wet-Wag game.

After the introduction, the constraints identified through the reading of reports made on the Ga-Mampa site were presented. There were six:

- Conflicts between croppers and livestock owners because of animals grazing the cultures
- Soil erosion in the wetland
- Manpower limitations for some activities
- Access to the local markets for farmers who want to sell their products
- Access to the land for the different farmers: has everybody access to the wetland and/or the irrigation scheme?
- Water scarcity in winter, preventing farmers from cropping during the dry season

Some clarifications were required to explain what was meant. Farmers agreed that each constraint exists, but their importance varies. The different problems were written on one sheet of paper for each and displayed on the walls of community center.

Then, participants were asked if some constraints of importance had been overlooked.
They mentioned four problems:

- soils are waterlogged in the wetland during the summer (rainy) season
- shortage of tractors
- in the Fertilis irrigation scheme, the furrows are too small, thus leading to shortages of water throughout the season
- in the Valis irrigation scheme, farmers claimed to have almost no access to water at all, as the canals are not cemented and there is no proper weir in the river to divert water

Those constraints were included in the ensuing discussion, with the last two problems mentioned by participants aggregated in one, mentioned as “Revitalization of the irrigation schemes”.
All in all, nine constraints were to be ranked and discussed.

The next step was to rank the different constraints according to their importance. The stone ranking method was used: participants were asked to come one after the other and to put some stones on each constraints displayed on the table. They could use three stones for

each, 0 stone meaning that the constraint had no importance for their agriculture or livelihoods, 3 stones meaning that it is a very important matter limiting them.
Each time a farmer put stones, the number was written down, and at the end the cumulated score was determined for each constraint, giving a ranking shown below in table 1.
The ranking was displayed on the wall. However, participants did not agree with this, and argued they did not understand properly the aim of the exercise. Thus, it was decided to allow them to discuss the ranking again and make up a new one. After some discussion, they agreed and the result is displayed in table 2.

Rank	**Constraint name**
1	Shortage of tractors
2	Conflict croppers/livestock
3	Water scarcity in winter
-	Access to the local markets
5	Revitalization of the irrigation system
6	Soil erosion
7	Soils waterlogged in summer
8	Access to the land
9	Manpower limitation

Table 1: ranking obtained after the stone ranking exercise

Rank	**Constraint name**
1	Revitalization of the irrigation system
2	Access to the local markets
-	Access to the land
4	Conflict croppers/livestock
-	Shortage of tractors
6	Soil erosion
7	Manpower limitation
8	Soils waterlogged in summer
9	Water scarcity in winter

Table 2: ranking obtained after discussion between participants

It is noticeable that the two ranking differ in numerous occasions. However, with the exception of “access to the land”, the two ranking show a group of constraints that are not perceived as important, whatever their exact rank. This was confirmed during the discussion for the second ranking, participants agreed to state that the last 3 constrains in this exercise are not of importance.
The discussion was carried with the second ranking, which suited more the participants.

Then, the participants had to list the causes of those constraints, and express some solutions that could help them to reduce the pressure of the constraints:

Constraint	Causes	Possible mitigation measures	Stakeholders who could be helpful
Revitalization of the irrigation system	• System too old now • Floods of 2000 brought sediments in the furrows and obstructed them • Weir in the river is not properly designed • Canals in Vallis and Mashushu are not cemented	• Widening of the furrows and the canals • Strong maintenance	
Access to the land	• Farmers with plots on the irrigation scheme have also plots in the wetland, so there is not enough land for everybody • People are moving to the wetland to get more water and promise to leave when the irrigation system will be revitalized	• Give access to the arable land that is not occupied yet	• Headmen
Access to the local markets	• Poor infrastructures, notably roads • Village located far away from possible markets (Tzaneen) • Farmers are not trained to produce food that meets expected quality standards	• Workshops to train farmers on how to produce high quality products • Tarring of the roads	• Municipality, IWMI
Conflicts between croppers and livetock	• No place is really safe for the cattle or the goats : if they are brought to the mountains, they come back to the village to get water	• Proper fencing of the irrigation system and the wetland	
Shortage of tractors	• Government redeemed the tractors that they gave to the village • Cost of new material too high for farmers • Reparation of tractors is also costly in terms of time • Now, tractors come from Mafefe, which is far away	• Stakeholders should facilitate investments by raising funds	• IWMI, municipality, department of agriculture
Erosion	• Heavy rains erode the soil • Cattle coming to the river also causes erosion	• Put gabions on the banks • Cementing of the banks • plant trees and grass (vetiver grass) along the banks	

Table 3 : list of causes and possible mitigation measures foreseen for the different constraints

Because of time limitations, the last three constraints listed as “less important” by the farmers were not discussed.

The next step was to introduce the Wet-Wag role playing game to the farmers.

The board of the game was displayed on a wall, and the components of the game were described, as well as its objectives (facilitate discussion and decision-making process with the different stakeholders). The main rules were explained, and the different actions that take place during one round (one season) were also developed.

People understood well the idea of the game, though one participant said that it may not be easy for everybody to understand it.

The discussion was then oriented towards the usefulness of the game and participants' opinion.

Participants could link easily the game with their daily lives and the situation in Ga-Mampa, despite of the differences between the game and the reality. The roles designed correspond to the reality of Ga-Mampa were considered to be relevant. It seems that no social category was completely overlooked.

Some participants said that the scenarios for water sharing are different from what is done in the village, as farmers decide on days when some fields will be flooded. It was explained that the game was a simplification, and at the scale of the season, we consider the total quantity of water received over the season.

When they were asked about the usefulness of the game, participants expressed some skepticism. They are used to workshops and “traditional” meetings with the other stakeholders, and they estimate that those methods already gave some results, so they do not see why this new method could be interesting.

They also expressed their need for action now, as they think it is a long time that workshops and meetings are held, but they see little changes in their daily lives. Facilitators underlined that the game will be included in the more general decision making process, and is designed to facilitate the discussion between stakeholders to raise issues and test scenarios.

Lessons learnt

→ Farmers are the best source to describe their current situations, constraints and problems; it is essential to complete the overview from secondary literature with some discussion to update those data. This experience was learnt when farmers' constraints were presented.

→ Female farmers' participation is limited when they are with male farmers. Hence François initially suggested farmers should be split into males and females, but this could not be done because of the limited number of facilitators : only Tumelo could speak Sepedi and chair the meeting.

→ The use of visual supports, sheets to write things and display on the walls is very interesting and helpful to conduct the discussion.

Comments

→ The visit was a success and it went according to the expected guidelines, though some changes had to be inserted, except the demand for catering since it was unknown and unexpected prior the visit.

→ Farmers' participation is tremendous, but at some point one can say it is for sale since they expect catering from every meeting, discussion or workshop that they participate in, irrespective of the length of the event. At some point, they can propel facilitators to shorten the discussion.

→ Unavailability of flip charts hampered the facilitation process, even though we managed with the use of exam pad pages.

Recommendations

→ In order to get full attention and participation of farmers, financial provisions should be made to ensure that catering is made available to farmers during meetings, interviews, workshops or discussions.

→ CRCE interns should be given allowance when they go to spend at least a night at pilot sites.

→ To ensure that female farmers also participate in discussions, farmers should be split according to their gender.

Report on the Focus Group Discussion held at the Community Center in Ga-Mampa (30/03/2010)

Participants:
Albert Mampa, Arron Mahlatsi, Jackson Mohlatlole, Onica Mampa, Anna Mashabela, Sina Zwane, Anah Sefala, Josephine Selane (Home-based care)
All the participants came from Ga-Mampa and are farmers, both in the irrigation scheme or the wetland, except otherwise noted.

Facilitators:
Mashabela Bernard (CRCE/UL), Masilela Tumelo (CRCE/UL), Milhau François (Cemagref/CRCE)

Objectives of the discussion:
The focus group discussion was conducted in order to get information on the constraints borne by farmers in the valley and to get their views on the role playing game developed jointly by Cemagref and IWMI-SA.
The invitations were sent by Bernard Mashabela, the field assistant for the CRCE.

Description:
The meeting started at 14:30 at the Center for the Community Development Forum. It was intended to have people from Mashushu participating in the meeting, but this could not be achieved. According to Bernard, scheduling a meeting in the afternoon is not good, farmers can be tired and decline the invitation. One of the participants had to leave a short while after the meeting started, due to sickness.
Like the previous meeting, it was not possible to make a separation between man and women. However, this time there were 6 women and only two men, and they participated much more in the discussion.

The guidelines were the following:

- Welcoming, presentation of participants and facilitators
- Presentation of the objectives of the meeting and its different parts
- Presentation and ranking of the existing constraints on agriculture and livelihoods identified through the reports already made by students in the village
- Collective thinking by participants about the possible solutions they could see for these constraints and who are the stakeholders that could help them to implement those solutions
- Break
- Presentation of the game developed so far (rules, participants, roles, elements)

- Discussion on its usefulness, its accuracy
- Other matters forgotten
- Closure of the meeting

Lessons were learned from the previous discussion held the week before. More material was prepared (flipcharts) and the accent was made on the collective understanding to ensure an optimal participation and results. Tumelo conducted the meeting in Sepedi, while Bernard translated the interventions of participants to François. As a result, it was easier to ask some questions to the participants according to the course of the meeting. Indeed, François did not have to wait to understand what was happening, and could direct the discussion to get some information.

After the introduction, the constraints identified through the reading of reports made on the Ga-Mampa site were presented. There were six:

- Conflicts between croppers and livestock owners because of animals grazing the cultures
- Soil erosion in the wetland
- Manpower limitations for some activities
- Access to the local markets for farmers who want to sell their products
- Access to the land for the different farmers: has everybody access to the wetland and/or the irrigation scheme?
- Water scarcity in winter, preventing farmers from cropping during the dry season

Some clarifications were required to explain what was meant. Farmers agreed that each constraint exists, but their importance vary. The different problems were written on one sheet of paper for each and displayed on the walls of community center.

Then, participants were asked if some constraints of importance had been overlooked. They just mentioned one more: the extension officer cannot teach farmers how to farm efficiently in the wetland; he lacks knowledge to advise them on the right practices and the crops that could suit the conditions in the wetland. This constraint was added to the discussion as “Thuto”, which literally means “education”, and refers to the lack of knowledge for farmers on the right agricultural practices.

The next step was to rank the different constraints according to their importance. The stone ranking method was used: participants were asked to come one after the other and to put some stones on each constraints displayed on the table, while other participants remained seated and could not see what was done by the others. They could use three stones for each, 0 stone meaning that the constraint had no importance for their agriculture or livelihoods, 3 stones meaning that it is a very important matter limiting them. It was explained that the importance of the constraint was to be determined according to its

impacts on their livelihoods and also its frequency of occurrence (problems faced every day, week...). Great care was paid to ensure that this method was well understood by farmers.

Each time a farmer put stones, the number was written down, and at the end the cumulated score was determined for each constraint. Unlike the previous meeting, it was decided by faciltators (prior to the discussion) that the constraints would no be ranked as #1 to #10, but rather three categories would be made out of the scores :

→ one for the least important constraints
→ one for constraints of some importance
→ one for constraints of high importance

No particular rule was applied to distinguish the different scores into the different categories. This was done by François, who tried to gather close scores together.

Results of this process are displayed in table one thereafter.

Constraints of few importance (+)	**Constraints of some importance (++)**	**Constraints of high importance (+++)**
→ Manpower restrictions → Access to the land	→ Conflicts between croppers and livestock owners	→ Erosion of the banks of the river → Access to the markets → Water scarcity in winter → Education

Table 1: ranking of the constraints according to the stone ranking

The experience from the previous session told that it was necessary to ensure that farmers agree with the ranking made. Participants said that this reflected well the situation in their daily lives, and did not want to move a constraint to another category.

The next step was to carry out the discussion on their perceived causes of the constraints, and what possible mitigation measures they can imagine or know about. Facilitators limited their interventions as much as possible in order to not influence the farmers. Some questions were asked when clarifications were needed, but farmers had every latitude to express themselves.
The results of this discussion are shown on the next page, in table 2.

Constraint	**Causes**	**Possible mitigation measures**
Manpower	– It is not a lack of possible workers, but a lack of money to hire them – there are inequalities between farmers on this subject	– Farmers need to increase their income, through better harvests
Access to the land	– Increase of population – There is possibility to build new	– Nothing mentioned

Constraint	Causes	Possible mitigation measures
	houses, but there are no new lands in the valley	
Conflicts between livestock owners and croppers	– There are no camps to put the cattle safely – The existing fence around the wetland or the irrigation scheme is not in good condition to keep livestock out – There are no shepherds to look after the cattle if they want to bring them elsewhere	– Improve the fence (“diamond mesh fence”)
Erosion of the banks of the river	– Heavy rains and winds remove the soil – Erosion causes water to go directly to the river : the plots are too dry – Erosion is also important in the plots themselves	– Gabions on the banks, but lack of funds
Education	– Many emerging farmers do not know what to plant, when to plough... – Need for advices that are not found through the extension service	– Workshops and trainings on farming in the wetland
Access to the markets	– Markets (Polokwane, Tzaneen) are too far – No transports for the people or the products – Not enough knowledge on the methods to have access to the markets (what are the quality requirements, etc...) – Lack of informations about the markets (where is the market for this crop, what crops are needed on the market) – No tarred road	– Need for education to have the knowledge about the structure and the requirements of the markets – Groupments of farmers to look for markets – Help from government to upgrade the road
Shortages of water in winter	– Lack of rains – No dams to store the water – Floods and erosion remove the good soil that keeps water – Big trees on the banks, which usually keep the water are cut, so water can run off to the river – The intake of water in the river is not properly designed – The irrigation system is too old	– Build a dam to store water (there is one already existing) – Workshop from LEDET about the trees – Help from external stakeholders to fix the irrigation system

Table 2 : list of causes and possible mitigation measures foreseen for the different constraints

The last step was to introduce the Wet-Wag role playing game to the farmers.
Lessons were drawn from the previous meeting and it was decided to present the game as though it was to be played. The board and the other elements were displayed on a table and the participants stood or sat around the table. The different elements involved for one player during a round (a season) were presented and displayed on the board as in a real session, though all the six roles were not represented. As time was not a constraint on this event, emphasis could be made on teaching and explanations on the functioning of the game. Participants were given the opportunity to touch and have a close look at all the elements, and could ask questions.
For this part, François gave in English the general direction of the discussion, presenting the different elements of the game, and Tumelo translated in Sepedi, while giving additional informations and examples to ensure a proper understanding. Bernard also added his comments inspired by his playing of the game during a session at the CRCE.
It was also made as clear as possible that for now, the game is not ready to be played, as François' work is to develop this platform. The purpose of the game was also carefully explained, bearing in mind the response from previous week focus group discussion. It was explained that the game is meant to be played with different stakeholders, both from the community and external, so people can sit together and discuss problems arising through the game. It is expected that players gain a different point of view by playing and are able to consider other stakeholders' concerns.
Farmers seemed to be satisfied with the idea of this game. They were able to understand the game properly, and seemed pleased with this method of discussion. During the presentation, several participants agreed and nodded in approval, stating that the game was a good approach of their daily lives, the elements of the games could be found in their real situations.
It seems that they were especially pleased with the idea of gathering different stakeholders and have them experience another point of view.

The meeting closed around 17:00, after ensuring that farmers did not have any other matter they would like to discuss.

Lessons learnt

- It is necessary to be as educative as possible, using many examples and allowing people to participate every time in the discussion
- The use of various supports and methods (sheets, flipcharts, game board, stone ranking) keeps the interest of the participant along the meeting
- A “live” translation was very useful, as all the facilitators could be aware of the reactions of the participants at the same time and could give answers after a collective agreement between them

Comments

- Better preparation and lessons learned from the previous meeting were of great help and this meeting went very well (guidelines and time were respected)
- The larger number of women present gave them more space to participate in the discussion, though it was not easy at first

Recommendations

- Groups should be split according to gender if it is not possible to ensure that more women than men are present. However, it will probably be difficult in terms of number of facilitators (2 persons able to conduct the meeting and speak Sepedi should be present, while François gives directions)

Report on the Focus Group Discussion held at the Community Center in Ga-Mampa (21/04/2010)

Participants:
Rapulana Victoria, Monnya Sarah, Rapulana Sina, Monnya Blomina, Monnya Brenda, Senyolo Maria, Senyolo Fortunate, Rapulana Paulina, Thobejane Francina, Seleme Rosina
All the participants were women from Mashushu, and farmers.

Facilitators:
Mashabela Bernard (CRCE/UL), Masilela Tumelo (CRCE/UL), Milhau François (Cemagref/CRCE)

Observer:
Mohlatlole Shokgela (Ga-Mampa), Mphahlele Koketso (CRCE/UL), Murgue Clément (Cemagref/CRCE)

Objectives of the discussion:
The focus group discussion was conducted in order to get information on the constraints borne by farmers in the valley and to get their views on the role playing game developed jointly by Cemagref and IWMI-SA.
The invitations were sent by Bernard Mashabela, the field assistant for the CRCE.

Description:
The meeting started at 14:30 at the Center of the Community Development Forum in Ga-Mampa.
The guidelines were the following:

- Welcoming, presentation of participants and facilitators
- Presentation of the objectives of the meeting and its different parts
- Presentation and ranking of the existing constraints on agriculture and livelihoods identified through the reports already made by students in the village
- Collective thinking by participants about the possible solutions they could see for these constraints and who are the stakeholders that could help them to implement those solutions
- Break
- Presentation of the game developed so far (rules, participants, roles, elements)
- Discussion on its usefulness, its accuracy
- Other matters forgotten
- Closure of the meeting

As recommended after the previous discussion (on the 30th of March), this meeting was carried in the same spirit, using as much visual material as possible and ensuring that everybody understood the discussion. Once again, Tumelo was conducting the meeting with great ease due to our past experiences while Bernard translated the different interventions from the participants to François. Koketso and Clement were neither considered as participants nor facilitators, but they gave some inputs during the session, encouraging discussion with the farmers.

It is to be noticed that this time gender was not an issue. For the first time, we were able to secure invitations for women only, and they participated with enthusiasm and expressed themselves.

After the introduction, the constraints identified through the reading of reports made on the Ga-Mampa site were presented. There were seven, as it was decided to include the constraint of knowledge of farming in the irrigation scheme raised during the previous meeting:

1. Conflicts between croppers and livestock owners because of animals grazing the cultures
2. Soil erosion in the wetland
3. Manpower limitations for some activities
4. Access to the local markets for farmers who want to sell their products
5. Access to the land for the different farmers: has everybody access to the wetland and/or the irrigation scheme?
6. Water scarcity in winter, preventing farmers from cropping during the dry season
7. Education (referring to technical know-how on farming in wetland)

These constraints were written on separate sheets of paper and displayed on the wall. Some explanations were provided to make clear what is meant for each of those headings. Farmers nodded their approval that the constraints exist. As usual, they were asked if something had been overlooked when listing those issues. Unlike the two previous discussions, the participants said they were satisfied with the ones mentioned and did not feel the need to add another.

The next step was to rank the different constraints according to their importance. For a description of this method, please refer to the report of the discussion held on March 30th. The ranking in three different categories of importance was also drawn from the experience of the aforementioned session. Results of this process are displayed in table one thereafter.

Constraints of few importance (+)	**Constraints of some importance (++)**	**Constraints of high importance (+++)**
→ Manpower restrictions → Access to the land	→ Education → Erosion of the banks of the river	→ Access to the markets → Water scarcity in winter → Conflicts between croppers and livestock owners

Table 1: ranking of the constraints according to the stone ranking

The experience from the previous sessions told that it was necessary to ensure that farmers agree with the ranking made. There was some discussions about the concept of manpower, but it was decided that is what not of major importance and thus was left in its category. On the other hand, participants said erosion is very important in Mashushu and wanted it to be moved to the top category. As the score obtained during the ranking (18) was not far from the one obtained by "water scarcity" (20), this was agreed.

It can be noticed that this ranking bears close resemblance with the one made during the previous discussion.

The next step was to carry out the discussion on their perceived causes of the constraints, and what possible mitigation measures they can imagine or know about. Facilitators limited their interventions as much as possible in order to not influence the farmers, even though Koketso often started a discussion to make farmers clarify their opinions. The results of this discussion are shown in table 2.

Constraint	**Causes, comments**	**Possible mitigation measures**
Manpower	– There are workers in the village, but farmers do not have enough money to pay them – Old people especially face this problem	– Appeal for financial help from the outside (department of agriculture) – People could also have an other job in the surrounding villages and hire workers to farm their fields
Access to the land	– Not enough space in the village	– Arable land exists but is under the rule of the Lekgalametse nature reserve. Discussion has to be done with the responsible to try to gain access to this land.
Education	– Nobody does a training or workshops	– Help from the Limpopo Department of Agriculture on what to use to farm in the wetland (quantities and types of manure, etc)
Erosion of the banks of the river	– Heavy rains remove the soil	– Gabions on the banks, – Cementing of the river bed
Access to the markets	– Farmers do not know about the markets – The extension officer is the one supposed to help them to look for markets	– Farmers have to group themselves to go and look for markets or potential buyers (for example, go to the supermarkets)
Shortages of water in winter	– Lack of rains – No dams to store the water – Canals in Mashushu are not cemented	– Build dams (reservoirs) next to the village to store water – Help from external stakeholders to cement the irrigation system in

Constraint	Causes, comments	Possible mitigation measures
	– The irrigation system in Fertilis is too old	Mashushu – Use of sprinkler irrigation method
Conflicts between croppers and livestock owners	– Already existing fences are not efficient	– Livestock farmers have to look after their animals – Cooperation between farmers to buy better fences – All farmers have to discuss by-laws to prevent intrusions of cattle

Table 2 : list of causes and possible mitigation measures foreseen for the different constraints

The issue of education raised the one of the quality of traditional knowledge. One of the participants mentioned that they use donkeys to plough whereas they would like to use tractors. Facilitators asked if a tractor is better than a donkey to do the job, and the farmers answered that is what they would like to know. They think they would be able to harvest more, as a tractor can work the soil better than a donkey.

Though it was listed as a very important constraint, the problem of the erosion of the river banks was somehow unclear on how it was really affecting farmers. The usual mitigation by using gabions was mentioned.

Farmers expressed their dependency on the extension officer when it comes to look for markets. Koketso asked them what they would do without the extension officer, and they answered they would group themselves to go and look, but as long as the extension officer is here, they rely on him. They have to think about the terms of this possible association.

The last step was to introduce the Wet-Wag role playing game to the farmers.

The description was done in the same way as during the previous meeting in March, with the exception that Tumelo felt confident enough to carry it all by himself in Sepedi. He introduced the new action and role cards designed, and the objectives of the game.

Overall, the farmers seemed pleased with the game. There were not many reactions among the audience, but they understood well the different parts of the board and the actions, stating that it was reflecting their situations. The problems the game can raise are important ones to them.

Before closing the meeting, participants were asked what would be their vision of the wetland in 10 years, what they would like to make out of the wetland. There was some perplexity among them, but one farmer said that she would like to see no more wetland, as it is causing such troubles. She would like to see only fields to provide food.

The meeting closed around 17:00, after ensuring that farmers did not have any other matter they would like to discuss.

Lessons learnt

- The question on the vision of the wetland is interesting to raise and the answers can be compared with the vision from officials of LEDET or LDA...

Comments

- Participation was very good during this session, everybody had the opportunity to give her opinion
- Experience from the past sessions made this discussion easy to carry out

Recommendations

- The next meeting should be conducted in the same way, with 3 facilitators and a group split according to gender

APPENDIX 4: Interviews with external stakeholders reports

Interview with Escort Netshikovhela (LDA) on May 5th, 2010

The purpose of this interview was to clarify the role and the involvement of the LDA in the Ga-Mampa case, and to get Mr Netshikovhela's views on the role-playing game developed by the Cemagref and IWMI-SA (thereafter referred as the RPG). Guidelines were as follows:

- Description of the interviewee's institution (mission, vision, means of action) and its role within the institution
- Specific involvement in the Ga-Mampa case (priorities, vision)
- Presentation of the Wet-Wag RPG (objectives, components)
- Feedback on the RPG (interest, usefulness, additions)

To begin with, Mr Netshikovhela was asked to describe the role and the vision of the LDA. This institution aims at ensuring a sustainable food production within the Limpopo province, both looking at animal production and at crop production. The former includes aspect of areas considered for each crop, soil analysis to make recommendations on fitting crops and regulations and technical advice on chemical treatments; while the latter is achieved through the planning of grazing and breeding. Extension services are under responsibility of the LDA. Since the new government seized power in 1994, the department of agriculture has also been granted the responsibility to deal with the land reform, ensuring that farming land is bought from large-scale farmers and fairly and effectively redistributed to small-scale subsistence farmers.

More specifically, Mr Netshikovhela is responsible of the Landcare programme within the LDA. This is a project aiming at ensuring the conservation of soil quality, indigenous vegetation and water quality in rural areas all over the province. Hence, the department conducts workshops and training with farmers and extension officers to teach environmental-friendly practices. Among its various subjects, Landcare also deals with wetlands in order to secure their good ecological status. Awareness creation is a major objective for the project. The programme receives grants from the National Department of Agriculture (approximately 5 to 8 millions rands each year) to be shared among a dozen of projects which have been previously selected by the LDA.

Coming to the Ga-Mampa case, Mr Netshikovhela underlined that this site was not part of the Landcare programme, but they are still stakeholders due to their knowledge on wetlands, agriculture and conservation projects. According to him, the main problems faced

by villagers are a lack of awareness on issues related to land conservation, a tight budget slowing down major works and education in general for the different generations. In his opinion, older generations do not have anymore the will to commit themselves in a project, while youth is interested in activities providing a quick source of income. The issue of education is one of the most important the LDA would like to tackle. It was underlined that they do not have a specific interest in water or biodiversity, those are the part of the Department of Water Affairs (DWAF) and Environmental Affairs (LEDET). However, LDa provides the project with its technical knowledge and is responsible for feasibility studies done to implement the items of the project (e.g. the study on fencing the wetland).

The second part of the interview focused on the Wet-Wag RPG developed in the Ga-Mampa context. An extensive presentation of the game, its components, its objectives and its future use was made. Overall, the idea was well-received. Mr Netshikovhela found the game interesting and easy to use, even for illiterate people, as it uses a lot of pictures. He declared himself ready to play the game with other external stakeholders such as DWAF and LEDET, as well as playing it in the village with local farmers. However, before the game can be played in Ga-Mampa with different stakeholders, he advised that the extension officer, Mr Mosima, should be trained so that he can teach the game in the village. There were no further comments made on the RPG. He did not express a will to see his own role transposed in the game; it is fine to have only farmers represented in Wet-Wag.

Then, Mr Netshikovhela was asked to mention the most important regulations existing on wetlands, as none is included yet in the game. He mentioned two of them:

- Resource conservation act (Act 43, 1983), also known as CARA, aiming to protect fertile land and setting restrictions on wetland cultivations, stating that no cultivation should occur in the 30 meters next to a river
- Subdivision of agricultural land (Act 70, 1970) designed to regulate what farmers can do with their agricultural land.

The problem of enforcement was discussed, as it is obvious that the CARA is trespassed in Ga-Mampa. This law is enforced by inspectors who report to the minister of agriculture. Until now, inspectors always tried to find a compromise to avoid endangering villagers' livelihoods, but the threat that someone could come and expropriate farmers cannot be dismissed for the future. Such regulations could bring more consistency to the game if they were included.

The last part of the interview dealt with the major threats faced in the village for the future. Mr Netshikovhela expressed his fear of floods for the ten years to come, as they usually occur in a cycle. Since the last event in 2000, the wetland has been considerably degraded, leading to a greater vulnerability in case of an other similar event. He reckons this would be worth including in the game. He also said that the issue of land ownership in the area is of great significance for the project, and should be somehow represented in the RPG.

Lessons learnt, comments:

- The game is perceived as useful by many stakeholders, villagers as well as external (administrations)
- Existing regulations could be included in the game, for example in the form of an event card where CARA would be enforced
- An event card simulating a flood could also be designed, but some information (maybe coming from the one of 2000) has to be gathered to simulate possible consequences
- Land ownership is an issue, but seems difficult to include in the game, as I guess it would once again create a new aspect leading to confusion

Interview with Mischack Masindi (LEDET) on May 6th, 2010

The purpose of this interview was similar to the one conducted on the previous day with Mr Escort Netshikovhela from the Limpopo Department of Agriculture (see the document "Interview with Escort Netshikovhela 05-05-10.doc"). However, due to time limitation, this meeting was less formal, and the following guidelines were not strictly observed:

- Description of the interviewee's institution (mission, vision, means of action) and its role within the institution
- Specific involvement in the Ga-Mampa case (priorities, vision)
- Presentation of the Wet-Wag RPG (objectives, components)
- Feedback on the RPG (interest, usefulness, additions)

To begin with, Mr Masindi explained the role and the vision of the LEDET. The team he is part of is essentially composed of specialized scientists, dealing on aquatic issues. The term "aquatic issues" refers to water flows, as wetlands are not always priorities in their daily mission. However, they often deal with terrestrial wetlands. Their experience on such themes leads them to give inputs to environmental impact assessment (EIA) process. Though they do not conduct themselves those projects, they provide an expert appraisal regarding water management. Other teams within the LEDET can give inputs on different subjects related to environmental conservation (biodiversity, etc...).

LEDET has three levels of action when they are involved in a project:

- Financial support *(the amount of money was not specified)*
- Technical advice (how to conduct actions while keeping the environment in mind)
- Providing regulations, laws, by-laws and enforcing them

Regarding the Ga-Mampa case, Mr Masindi underlined the issue of awareness on environment protection among villagers. According to him, this situation comes from the conflict of knowledge existing and now growing between the generations. Roughly speaking, older generations stick to the local traditions, while younger ones are more open to "western" ways. This gap would lead to conflicts of interest and non-acceptance. He pleaded for a compromise approach gathering different generations. On the other hand, he reckoned the community also faces material problems, the major ones being electricity and water supply for all households.

Obviously, LEDET's main objective in this project is to protect the wetland and its environmental services (biodiversity support, flow regulation, etc...).

Then, Mr Masindi was introduced to the game and its different aspects and rules. The extended presentation took some time, but he said that Wet-Wag is not too difficult to understand. He also stated he would agree to play it along with other stakeholders, especially with Ga-Mampa farmers. He found the "Wetland condition record" tool very interesting from the LEDET point of view, as it adds an environmental aspect to the economic one already developed. He did not listed other problems that the game should tackle.

When asked about some important environmental regulations that should of interest for the game, Mr Masindi listed two laws:

- National Water Act (Act 36, 1998) establishing, among other dispositions, that a buffer zone has to be made between a cropping system and a sensitive area (wetlands being regarded as sensitive areas)
- NEMBA, National Environmental Management Biodiversity Act (promulgated in 2004), stating that one cannot cultivate a sensitive area

The discussion shifted to the enforcement of such regulations and laws, as a strong enforcement in Ga-Mampa would have dreadful consequences for the livelihoods of farmers. Mr Masindi did not seem so concerned about it, in his opinion he reckons that most inspectors knows the situation in rural areas in South Africa and would try to find a compromise before telling responsible authorities.

Lessons learnt, comments:

- The game is perceived as useful, and people are willing to play it with other stakeholders. This should be tried as soon as possible
- Most regulations seem to deal with the same topic of buffer zone and preservation of sensitive areas. They could be designed as only one regulation in Wet-Wag
- Designing a specific role for a regulator could be of interest. This role could play simultaneously the administrative part (acts such as NEMBA, CARA) and also a traditional authority (Headman)

APPENDIX 5: Reports on game sessions

WET-WAG CRCE FEEDBACK

Feedback on the session of the Wet-Wag game held at the Centre for Rural Community Empowerment (CRCE), University of Limpopo, on the 17th of March 2010.

Participants: Ramokomito (BYDIC[12]), Mosima P. (Department of Agriculture), Louw (BYDIC), Mashapa L.K. (CRCE/UL), Mashabela N.M. (CRCE/UL), Letsoalo T.R. (BYDIC), Mampa M.N. , Mmakat T.T. (BYDIC), Marokane M. (BYDIC), Mhlane M.M. (BYDIC), Magabe H.K. (CRCE/UL), Mashabela B. (Ga-Mampa/CRCE)
Facilitators: Mphahlele K. (CRCE/UL), Milhau F.G. (Cemagref)

Organisation of the session:

1. Slide show presentation (30/45 min) : definition of wetlands and examples of services they provide, presentation of the Ga-Mampa study site and the main issues for both local and external stakeholders, presentation of the objectives of the game and its components
2. Break
3. Introduction to the game itself : the board, the different roles, action cards and water circulation
4. Two rounds of the game
5. Answer to the questionnaires
6. Lunch Break
7. Discussion with remaining people (mostly Ga-Mothiba and CRCE) about their feelings

Most of the participants could understand English fairly well, so it was easy to facilitate the session.

Development of the game:
The basic setting of the game was used, along with some adjustments. Due to the large number of participants during the session, two people were playing one role, taking decision after discussing between each other. Thus, the room was quite crowded and messy.
We played one wet season followed by a dry season.
Neither manpower nor starting costs for cultures were used, as those features are expected to add confusion to the game.
The game manager distributed the incomes, collected the basic expenditures, facilitated negotiation when necessary and introduced the consequences of farmers' decisions,

12 BYDIC : Bokamoso Youth Development and Information Centre (youth leaders from Ga-Mothiba, nearby village)

For the first round, all the irrigation scheme was covered with maize, and the six units of water were shared equally, even if this does not give the best yield, people were satisfied to get high incomes in terms of food quantity.
For the second round, farmers on the irrigation scheme put tomato, onion or coriander everywhere, before realizing there was too little water available. They also did not know at first that they would lose money if their crops were not properly fed. As a result, they were at loss at first, so the game manager had to tell them that they should remove crops before sharing water. They left just three crops per secondary canal, so each would get one unit of water. They also started to negotiate a seasonal cultivation between themselves (they would agree on what each farmer is cropping and make rotations depending on the year).
In the meantime, people from the wetland harvested as much reeds and sedges as possible in the natural part while cropping in the cultivated part. As a result, some plots were declared out of order for the next round (that was not played). It is remarkable that none of the farmers from the irrigation scheme decided to harvest reeds or sedges, but maybe they did not realize they could do it also.

Two rounds only were played because of time constraint: it took some time for people to understand the different rules and to feel comfortable with the elements of Wet-Wag.

Debriefing:
Two approaches were used: a short questionnaire first, and after lunch break a discussion about the features of the game and the possible improvements.
The questionnaire was based on previous debriefings for the game during other sessions. The results are displayed in the two tables below:

	fully agree Ke a dumela	**rather agree** Ke dumela gannyane	**rather disagree** Ke gana gannyane	**fully disagree** Ke a gana
It was funny E be e le segisa	7	3	2	
Rules were clear Melao e be e le bonolo	6	5		1
It was interesting E be e le bose	10	2		
It was too long E be e le e telele	1	2	2	5
I learnt about wetland issues Ke e thutile ka ditlhohlo tsa mahlaka	10			
It was too abstract	1	3	5	3

	fully agree Ke a dumela	**rather agree** Ke dumela gannyane	**rather disagree** Ke gana gannyane	**fully disagree** Ke a gana
E be e le bothata go e bapetsa le seemo sa nnete				
It may be useful for teaching E ka ba le mohola ge e ka rutwa batho	9	2		
It may be useful for decision making E ka thusa go tsea dipheto	9	2	1	
Can be played with policy-makers E ka bapalwa le ba balaodi	7	3	1	
Can be played with people from Ga-Mampa E ka bapalwa le bakgathatema ba Ga-Mampa	8	2		1

What was good? Ke eng seo se bego se le se sebotse? 	**What was not good?** Ke eng seo se bego se le se sempe? 
– Game was extrapolative – Helps to make decisions and negotiate before planting (consider the season) – Can help to manage water efficiently in dry season (2) – The part about decision making on irrigation scheme during dry season – Help to make good decisions about planting (3) – Learnt things about wetlands issues (3) – Learn how to gain income from crops or animal stock	– Too long – Sacrifices for farmers because of water sharing during dry season – Could not ask questions to the manager – People don't want to share water during dry season – The more you plant and have workers for animals, the more you lose money

Generally speaking, the game was well received, a large majority of people found it interesting and funny to play. The presentation made before the session itself allowed participants to learn about wetland issues, maybe especially in the case of the youth group from Ga-Mothiba who comes from a dry area. The session was perceived as too long.

People from Ga-Mampa did not take part in the discussion held in the afternoon, as they had to take public transports. The main outcomes from this discussion are listed below.
Participants had to take some time to feel at ease with the game. At first, they did not take into account the seasons, they wanted to crop and make money.

The organisation of the game in two seasons was discussed : some people are fine with it, some would like to see four seasons including spring (wet as well as summer) and autumn (dry like winter).
Participants would like to have a larger choice for of crops.
They mentioned that scenarios for water sharing are not really realistic compared with what they know in their villages. This needs to be further discussed in the village.

One of the participants did not get the message of the game at first. Thus, one of the CRCE students mentioned that the game should be less complicated in its design and its rules. He said that a good way to introduce it to local farmers would be to play one round per day at the beginning, explaining clearly when it is necessary. Once this work is done, farmers would understand the game and could be able to play it for a longer time.

Youth leaders from Ga-Mothiba declared themselves interested in this game and think it could be very useful to teach children. Even if they do not have a wetland and the same concerns, they would like to learn more about role playing games as an educational tool. Facilitators at village level should be taught and could use it.

Personal comments:
As I was alone to facilitate the session for twelve participants (Koketso had a lot of work, so he could only help me during the session by taking pictures and adding comments and during the debriefing by doing a great deal of translation), it was difficult for me to answer all the questions and the concerns of the participants.

In its current setting, the game is really designed for farmers, and above all irrigation farmers, they are the ones who have more actions to do (negotiations to share the water). I do not think that external stakeholders such as policy makers would be really interested in playing the game along with farmers (each stakeholder playing his own role), they would not have much to do and would be waiting for a long time before making any intervention.

For my part, I think it is all right to play the game in two seasons, but this need to be discussed with the farmers of Ga-Mampa also. If we keep crops as they are now, I am not sure it would bring anything to add two more seasons, as they would not plant something different during spring or autumn. Crops like maize last during spring and summer, so there would be no change. However, this is to be taken into consideration.

Action cards and role cards must be kept as simple as possible. Suggestions for this will follow and could be tested during the next session.

WET-WAG CRCE FEEDBACK

Feedback on the session of the Wet-Wag game held at the Centre for Rural Community Empowerment (CRCE), University of Limpopo, on the 9th of April 2010.

Participants: Louw McDonald (BYDIC[13]), Masilela T.C. (CRCE/UL), Shiba P.G. (CRCE/UL), Letsoalo T.R. (BYDIC), Mmakata T.T. (BYDIC), Ramotoni T. (BYDIC), Mphahlele K.C. (CRCE/UL), Letsoalo E.M. (CRCE/UL)
Facilitators: Morardet S. (Cemagref), Milhau F.G. (Cemagref)

Organisation of the session:

1. Introduction to the game : the board, the different roles, action cards and water circulation
2. Two rounds of the game
3. Answer to the questionnaires
4. Lunch break, closure

Most of the participants could understand English fairly well, so it was easy to facilitate the session.

Development of the game:
The recently added features of the game were tested for the first time during this session. Those features were the new design of the action and role cards, with some informations removed; new action cards for wet season cropping (groundnut, sweet potato) and dry season (dry beans); the use of the wetland health record, a sheet made to include the impact of cultivation on the wetland; the use of a monitoring sheet filled by the participants to record their gains. We played one wet season followed by a dry season.

Neither manpower nor starting costs for cultures were used, as those features are expected to add confusion to the game, and are not considered to be of major importance.

The game managers distributed the incomes, collected the basic expenditures, facilitated negotiation when necessary and introduced the consequences of farmers' decisions.

During the first round (wet season), the whole irrigation scheme and cultivated wetland were cropped with different cultures, with a preference for maize (the only crop that produces food) and sweet potato (a crop with potentially high revenue). The natural wetland was used for some cattle, though some were also put in the mountainous grazing areas.

13 BYDIC : Bokamoso Youth Development and Information Centre (youth leaders from Ga-Mothiba, nearby village)

There was already negotiation on the water sharing in the irrigation scheme as sweet potato requires a large quantity of water. The basis was equal water sharing between the different plots, but one player also had to remove one of his groundnuts to have more water for the next wet season (which was not played).

As a consequence of the large number of sweet potato grown in the area, the game managers decided to lower the prices of this crop of one level in the production and revenue table.

The other consequence of the large number of crops planted in the wetland was a degradation of its health. The expected consequences listed in the table were applied, and 3 plots from the cultivated wetland were blocked (one from the plots not attributed, one from a wetland farmer, and the only one for the irrigator n°1), a fee of 10 money unit was charged for each farmer for poor water quality, and reeds and sedges could only be harvested on 10 plots in the natural part.

The next round played was a dry season (during a dry year). The players did not seem to have been taking into account the consequences of overcropping in the wetland. Indeed, the round started with an argument about who could use the two remaining plots not attributed to any of the players. The irrigator n°1 (Tumelo) wanted to take them as a compensation, as his only plot in the wetland was blocked, but other players disagreed. In the end, he just had the right to crop in one of those two plots.

At first, most of the irrigation scheme was cropped before players realized that water would be very scarce. Thus, the negotiation over water sharing took a very long time, each player from the irrigation scheme (with the noticeable exception of irrigator n°2) bitterly discussed about the right way to share the three units of water between the different players and crops. Some players (Irri n°1) were in favour of getting water in line with the number of plots of each player, while other (Irri n°3) were pleaded for an equal sharing of the resource. The second method was adopted at last, after some changes in the choice of crops chose at first. It has to be noted that during this long argument, the wetland farmers were left aside as they did not have anything to negotiate. They only made a couple of remarks on the matter.

The natural part of the wetland was used for grazing (10 plots) and for some reeds and sedges harvesting.

The game managers decided prior to the session that if more than 6 plots were cultivated with the same crop, prices would decrease because of market saturation. This rule was applied again, as there was too many tomatoes and cabbages. The wetland health was considered to be stable compared with the previous season, there was no further degradation nor any improvement (to my personal feeling, this is more the consequence of the grazing needs of 2 plots per cattle - which prevented from further harvesting - than a realization from the players).

The session had to end after two rounds only, because the argument over water sharing during the dry season took a long time, and some discussion still needed to be done before closing the session for lunch.

After playing the game, Sylvie asked the participants if they could think of setting rules for water sharing so they could avoid the tension between players. The first point raised was to leave some plots fallow during the dry season and to limit the cultivated parts to some plots. It was agreed that wetland farmers should have the priority to crop during dry season, though the wetland farmer n°1, who has a large number of plots, should leave some of his fields fallow too. Participants agreed that this ought to be a collective agreement enforced by the farmers themselves, which could be overlooked by the Induna (the Headman) to ensure its functioning.

The second point raised by Sylvie was a collective investment by farmers to rehabilitate the irrigation system. Some players reckoned only the irrigation farmers should contribute to a collective fund, but Koke was in favour of a general contribution. The farmers would then constitute a committee, who would have the responsibility to share the money equally between the different projects to improve the farming conditions of all the farmers. Chiba suggested an equal contribution from all the farmers, Sylvie suggested for her part a contribution depending on the livelihoods of the different participants.

The last issue tackled during the discussion was the decrease in prices suffered by the farmers, as they were planting too many of one crop. It was suggested that before the season starts, farmers should sit down together and discuss what they are going to crop, and make a rotation on each season (e.g. on dry season 1, farmer A could plant tomatoes and farmer B cabbages, and the opposite on dry season 2). But this may be difficult to accept for small-scale farmers, who are not used to be specialized in one crop, as it increases the risks on their livelihoods. There must be some cooperation at farmer level, but the idea has to come from the farmers themselves. Koke underlined that before farmers agree on what each one has to crop, they have to learn about the markets, a group of farmers should be specialized in marketing. The extension officer could be helpful for this process.

Debriefing:

Only the questionnaire could be used for this session, as most participants left after lunch.

The questionnaire was based on previous debriefings for the game during other sessions. The results are displayed in the two tables below:

	fully agree Ke a dumela	**rather agree** Ke dumela gannyane	**rather disagree** Ke gana gannyane	**fully disagree** Ke a gana
It was funny E be e le segisa	5	2		
Rules were clear Melao e be e le bonolo	2	4		1
It was interesting E be e le bose	4	2		1
It was too long E be e le e telele	3	1	2	1
I learnt about wetland issues Ke e thutile ka ditlhohlo tsa mahlaka	7			
It was too abstract E be e le bothata go e bapetsa le seemo sa nnete		5	2	
It may be useful for teaching E ka ba le mohola ge e ka rutwa batho	5		1	1
It may be useful for decision making E ka thusa go tsea dipheto	5		1	1
Can be played with policy-makers E ka bapalwa le ba balaodi	4	3		
Can be played with people from Ga-Mampa E ka bapalwa le bakgathatema ba Ga-Mampa	2	4	1	

What was good? Ke eng seo se bego se le se sebotse?	**What was not good?** Ke eng seo se bego se le se sempe?
– The teaching of skills to learn how to share the water and what to plant during the different seasons (2) – The rules were clear – Good material – The game represents typical issues faced by farmers in Ga-Mampa – Less people and material are required to play the game – It is informative about wetland management and usage – Gives an idea of how farmers behave – Gives an idea of the problems that can arise when farmers are working in their plots – Players had a chance to challenge each other	– Did not balance from cultivated wetland and irrigation scheme (?) – Distribution of water is difficult and takes time to solve – Agreement on water-sharing difficult to be reached – The rules were not clearly stated, but it ended nicely

Generally speaking, the game was well received, most people found it interesting and funny to play. The discussion on water sharing, though it was too long, was considered to be an interesting part of the game. The consequences of overusing the wetland were educative, but not really considered during the game itself as a parameter to be taken into account. Participants were more familiar with the game as some of them were already part of the first session, which helped to explain the rules.

Personal comments:

It was once again evident that the discussion on how to share the water and what crops should be planted in the irrigation scheme (especially during the dry season) is too long. The wetland farmers lost interest in the game as they were “excluded” from this discussion. Several recommendations can be designed to avoid such problems:

- Prior to the discussion, set a time limit for the discussion (such as 10 minutes) before laying down a rule (which could be an equal water sharing). This would also be somehow realistic, as farmers from Ga-Mampa cannot argue for days before supplying water to their crops
- create a new role who could be part of a regulator, who has to facilitate the discussion and whose responsibility would be to set rules
- give this role to one of the game mangers

However, though being too long, the discussion was also interesting as it forced the players to think about this aspect.

It seems that the wetland farmers have to be further involved in the negotiation process, especially if we include discussion on the use of the wetland. Indeed, now that farmers’ actions have consequences (fees, plots blocked...), there should be some agreement among the players to know what they want to do with the wetland (cultivation vs. environmental concerns). This issue can also be raised after the game itself, to summarize what happened to the wetland during the game and what should be done to prevent/enforce it.

Generally speaking, though the level of participation from the people of Ga-Mothiba was low during the end of session discussion, this part seems really interesting as it offers the opportunity to have a collective feedback on what happened during the session and allows participants to think of collective decisions that could be helpful.

WET-WAG GA-MAMPA COMMUNITY CENTER FEEDBACK

Feedback on the session of the Wet-Wag game held at the Ga-Mampa community centre on May 11th 2010.

Participants: Bernard Mashabela, Gloria Mohlatlole, Fortunate Seyolo, Brenda Monnya, Victoria Rapulana, Ernest Letsoalo (CRCE/UL), Philip Mosima (Extension officer), Frans Sefala
Facilitators: François Milhau (Cemagref), Tumelo Masilela (CRCE/UL)
Observer: Clément Murgue (Cemagref)

Organisation of the session:

5. Introduction to the game : the board, the different roles, action cards and water circulation
6. Two rounds of the game
7. Discussion, informal debriefing

As some participants were not comfortable at all with English, a large amount of translation was provided by Tumelo, Bernard and Ernest. This also leaded to some adjustments in the debriefing. Participants were mostly farmers from Ga-Mampa, from Fertilis and Mashushu, except otherwise indicated in the list above. Gender was balanced at a 50-50 proportion.

Development of the game:

This was the first time the game was tested in the village, with only villagers (and Mr Letsoalo) playing it. However, most participants had already participated in some of the focus group discussions that were held previously, so they already heard about the game and its purpose. The setting of Wet-Wag used was similar to the previous test made at the CRCE on April 9th, that is to say:

- Newly designed role and action cards were used
- Crops recently added (groundnut, sweet potato, dry beans) were included
- Monitoring of the wetland condition and the impact of actions taking place on the wetland
- Monitoring sheets for participants to record their gains was not used, as it was expected to create some confusion and delay the course of the session
- Manpower and starting costs were deleted for good
- Due to time constraints, it was decided to set a time limit for negotiation on water sharing

The game facilitators distributed the incomes, collected the basic expenditures, facilitated negotiation when necessary and introduced the consequences of farmers'

decisions. Great care was put on ensuring the proper understanding of each and every participant. Philip Mosima and Bernard Mashabela helped a lot other farmers, as they had already played the game once (though the game was slightly different – see report on the session of March 17th).

The first round played was a wet season. At once, players started cropping on the natural part of the wetland, also adding their cattle. Maize was the most planted crop as usual, only seven sweet potatoes were planted and ten groundnuts. Maize was the only crop used on the natural wetland. Players chose their actions very quickly and then processed to the water sharing.

It was learnt in past sessions of Wet-Wag that this part can last too long, so it was decided to set a time limit of ten minutes to agree on water sharing, before the manager decides on a way to share without players' agreement. This proved useful as it allowed the session to follow its course without interruption and to keep every player interest, but it also underlined the importance of gender and education, as Mosima (though being a wetland farmer in the game) and Mashabela were the main participants in this discussion and left less room for the other players. Still, there was some argument, especially on the difference in the number of plots in the irrigation scheme. Some players reckon that irrigator 3 (deep blue) has too many plots and should leave some water to small irrigators such as n°2 (yellow). The basis for water sharing was an equal distribution, with only some adjustments made on specific situations to give one more unit of water for a player.

Facilitators gave each participant his income in money and food. Two players had to buy a couple of food units from the managers to be able to feed their people for the next round. Then, we moved on to the impact of cultivation on the wetland. Some 20 plots were cultivated, and cattle was put to graze on some of the 30 plots of the wetland (both natural and cultivated parts), so it was explained that this is too much for the wetland, it does not have enough carrying capacity. The wetland was said to be degraded, and the consequences described in the "Wetland condition record" tool were applied.

The second round was a dry season. Unlike other sessions played before, players did not crop too much in the irrigation scheme, as they perfectly knew there would not be enough water. However, every participant took at least one plot in the natural wetland, and it was fully covered with crops. Cattle were put in the mountainous grazing areas. Only ten crops were put in the irrigation scheme. The water sharing went on smoothly, and participants quickly agreed on an equal basis, with some local adjustments.

Participants were asked to pay the fine intended in the case of a degraded wetland, and they were given their incomes. It was interesting to see that some players seemed to replicate a strategy they do in their real life (e.g. one woman only harvested reeds and sedges). Some players had troubles getting enough money to pay for their basic expenditures, while other who cropped a lot of tomatoes earned a lot. It has to be said that

facilitators forgot to lower tomato price because of overproduction. As a consequence, some farmers who cropped plenty of tomato had the highest pay.

Once again, it was explained that, because of wetland overuse, the wetland condition degraded. However, the consequences could not be applied, because the session had to come to its end.

Debriefing:

The usual questionnaire was not used for this session, as it requires reading and writing abilities. Facilitators were not sure that participants would be comfortable with it, so the debriefing took the form of a discussion on the outcome of the game.

First of all, participants were asked to comment on what happened during the game. The first question was to understand why there were so many crops in the wetland. Philip Mosima stated that plants in the wetland are used to maintain a high level of Soil Organic Matter (SOM), as they bury the remains of crops after harvesting. Other participants said that they have to crop in the wetland because there are not enough plots in other places (irrigation scheme, personal gardens). And obviously, one said that wetland is suitable for crops as it provides sufficient water.

Facilitators asked what farmers would do if there would be more water available in the irrigation scheme. The solution would be to borrow (=rent) plots in the irrigated part from farmers who have plenty of plots (example in the game: irrigator n°3). Thus, some farmers would be able to leave the wetland for good. However, one participant underlined that they would not leave completely the wetland, as it would be a problem for those benefiting from reed harvesting and crafts. It was also asked about the quality of soils in the wetland, as it is reportedly supposed to increase yields. The extension officer, Mr Mosima, stated that during the first three years they used the wetland, farmers experienced higher yields (up to three time more), but now they can see it is decreasing. A farmer said they should start applying fertilizers to maintain the high level of yields, leading to an argument between Mosima and Mashabela, because Mosima reckoned the use of chemical fertilizers would be harmful for the environment and the water. Bernard Mashabela disagreed with this.

To answer the next question, farmers had to think about the use of the wetland they had in the game, if they thought it was sustainable. They agreed it was not sustainable, because there was no agreement between farmers in the wetland and farmers in the irrigation scheme. It was not very clear what was meant by this sentence, but they probably expressed the idea that irrigators should stay in their irrigated plots, to relieve the pressure over the wetland. Some farmers reckoned there would be no more wetland if this use was maintained. Facilitators wondered what their opinion is on a potential death of the wetland. The immediate consequence they think of is shortage of water for agriculture.

The last part of this discussion asked what participants would do to prevent the wetland from dying. They said they could ask farmers to reduce the intensity of their activity, but it would need a committee to enforce this.

There was little time for a discussion on the feedback of the game itself, if they enjoyed it, what do they think about it... The discussion was quite informal, but they seemed to have enjoyed playing the game and the opportunity to discuss afterwards. The discussion was difficult to start, but it helped to bring some ideas on wetland management that could be useful for the future.

Personal comments:

- Philip Mosima said again that tomatoes are cropped during the wet season
- It can be difficult sometimes to make people clearly understand why some crops have two action cards (one for the wetland, one for the irrigation scheme). I think it would be easier to have one card, and make the difference between the two yields when it comes to the end of the round. The game manager would just give more money or food, according to the production and revenue table
- It could be interesting to give a rule for the attribution of the unoccupied plots. The "first come, first serve" rule can be discriminatory for farmers who did not understand while others take 5 plots at once. This could be part of the role of an external regulator: participants should ask first the right to use an unoccupied plot, which could be granted or not. If the regulator has no guidelines, he could either give every plot, or try to think of a "reasonable" limit.

The session went on very well. Great emphasis was put on understanding, to ensure everybody knew what was happening. This took some time, but it allowed a good participation.

There were many differences between this session and ones we played previously, as farmers have different reactions. They tend to reproduce what is happening in the village, and have no difficulties at all linking the situation depicted in the game and the situation in Ga-Mampa.

Some things were unfortunately forgotten during the game, such as market price fall when too much of one crop is produced. It obliterated a part of the interest of the game. On the other hand, this really focused the discussion on wetland issues, which was a good thing as there was an evident lack of time.

Résumé:
Les zones humides sont des écosystèmes d'une grande importance car ils hébergent une faune et une flore bien spécifiques. Toutefois, les lois et les politiques publiques négligent souvent leur importance, mettant leur avenir en péril.
Le projet WETwin vise à valoriser le rôle des zones humides dans un contexte de gestion intégrée des ressources en eau. Un des sites d'étude du projet est le village de Ga-Mampa, situé en Afrique du Sud.

L'International Water Management Institute, partenaire du projet WETwin, et le Cemagref ont lancé le développement de leur propre jeu de rôle, Wet-Wag. Son but est de servir de support aux négociations et de faire prendre conscience des enjeux environnementaux aux différents acteurs du projet.

Une mission de quatre mois a été menée en Afrique du Sud afin de développer Wet-Wag. Les objectifs étaient de mieux connaitre les attentes des acteurs pour que le jeu puisse y répondre ; de tester le jeu pour en voir les points forts et les faiblesses ; et enfin d'inclure des éléments importants qui manquent, comme des cultures.

Les rapports déjà écrits sur Ga-Mampa ont donné un premier état des lieux du village. La zone humide est de plus en plus cultivée chaque année. Le gouvernement provincial aidé par des organismes de recherche a donc commencé à travailler avec la communauté pour établir un plan de gestion durable de la zone humide.

Des articles sur les jeux de rôles ont été étudiés pour connaitre les points importants. Les jeux utilisent différents niveaux d'abstraction pour simplifier la réalité et la rendre plus abordable. Ils font souvent partie d'un processus d'apprentissage collectif où tous les avis sont considérés.

Des méthodes participatives comme les discussions en groupe ciblées ont été utilisées dans le village pour connaitre les attentes des agriculteurs. Dans le même objectif, les acteurs extérieurs (gouvernement) ont été interviewés individuellement.

De nouveaux éléments ont donc été conçus pour Wet-Wag. Une feuille de suivi de l'état de la zone humide a été faite. Trois nouvelles cultures ont été ajoutées. Le jeu propose également aux joueurs de prendre des décisions collectives. Enfin, le jeu a été simplifié d'éléments dispensables. Toutefois, Wet-Wag n'est pas terminé, et des pistes sont données pour continuer le développement. Le rapport se termine avec des recommandations pour l'usage futur du jeu.

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