

Water availability and distribution in Africa

Effects of the IFAD irrigation scheme in Kiru Valley, Tanzania

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Abstract

The case study was made in the area of Kiru Valley, Tanzania, in order to study the conflicts over the water in the river Dodumera, and also to understand how the villages Mawemairo, Matufa and Mapea have been affected by the construction of the IFAD irrigation scheme. The aim was to connect the conflicts in the area with a general view of how water can create such conflicts. The method used in the case study was semi-structured interviews. The results from the interviews made with farmers and officials in Kiru Valley was analysed through general theories about water conflicts and theories about governing common-pool resources, such as Ostrom's eight principles and the theory *the Tragedy of the Commons*. The analysis was also made through the IFAD poverty reduction strategy programme (PRSP). The conclusion made on the basis of this analysis was that the IFAD project, in Kiru Valley, was in correlation with the PRSP and an attempt to reduce poverty in the two villages Mawemairo and Matufa. The project has been very successful and has contributed to an increase of livelihood and development in the villages. However, the scheme has also affected other villages, such as Mapea. The scheme has contributed to a decrease of water availability in the Dodumera River for Mapea. Nowadays they only rely on rain-fed irrigation. The conflicts have been affected by the scheme, not so much in the quantity of the conflicts but more in the target of the conflicts. Before the construction of the scheme the conflicts was directed at the big-scale farmers, now they are directed at the scheme. On the other hand, the scheme has helped reducing the conflicts between the farmers in Mawemairo and Matufa. There are solutions to conflicts and water scarcity, such as more efficient irrigation techniques and Ostrom's principles on governing the common-pool resources.

Keywords: *Water conflicts, common-pool resources, Kiru Valley, IFAD poverty reduction strategy programme.*

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The report was written in order to increase the understanding of the farmers' situation in parts of Tanzania, to understand the disparity the rural poor have to face every day. Which also is a global phenomenon. My thoughts go out to all of the people in the world who struggle every day to bring food to the table. - **May 2007 Huddinge**

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1. Introduction

1.1 The issue at hand

The Great Rift Valley runs down from Eritrea into central Tanzania. One of the branches of the valley runs through Babati district. The part of the valley, located beside the capital of the district, Babati Town, is called Kiru Valley. Mawemairo and Matufa are two villages located in this valley. The two villages take their irrigation water from the river Dodumera, which flows from the escarpment down through the valley. The irrigation water was, before the end of the last millennium, extracted from the river through traditional irrigation channels. The channels were built with mud and logs, leading the water from the river to the plots. At this time the farmers in the two villages only cultivated maize and beans. The water extracted from the river was not enough for cultivation of cash crops, because of the inefficiency of traditional irrigation systems due to water leakage in the channels.¹

In 1998 there were great rains because of the el Niño phenomenon, which led to massive water flows in the rivers. The flows were so great that they destroyed the traditional irrigation systems in Mawemairo, Matufa and Gichameda. The UN-authority IFAD (International Fund for Agricultural Development) decided to finance and build a new irrigation scheme. IFAD built two intakes. The first one, the Mugano scheme, leads the water from the Dodumera River to Mawemairo and Matufa. The second intake, the Mkombozi scheme, leads the water from the Rigina River to the village Gichameda. The new schemes had one big main channel and several feeder channels, which lead the water to the plots. The main channels were not built with mud and logs but with concrete, which reduced the water leakage.²

Further down the Dodumera River lies the village Mapea, which does not get irrigation water from the IFAD scheme. The scheme structure has meant that the plots in Mawemairo and Matufa get more water; this has made it possible for the farmers to cultivate cash crops like rice. Cultivation of rice claims more water than crops like maize. The increase of water going into the scheme has caused a decrease of water in the river when it reaches Mapea.³

¹ Interview: Mohamed, *Scheme facilitator*

² Interview: Mr Mirisho, *IFAD official in Babati*

³ Interview: Farmers in Mapea

1.2 The aim of the study

The aim of the study is to get a greater view of what the IFAD irrigation scheme has meant for the three villages Mawemairo, Matufa and Mapea, and to understand what kind of effects the IFAD project has had on the villages that get water from the scheme and the villages that do not receive water. The aim is to analyse how water may create conflicts in general, and to look closer at the conflicts between the three villages.

1.2.1 Study questions

What kind of effects has the IFAD irrigation scheme had on the villages around the Dodumera River in Kiru Valley, Tanzania?

- How is the IFAD irrigation scheme, the Mugano intake, constructed and managed?
- What are the effects on the villages Mawemairo, Matufa and Mapea?
- Are all the effects positive?
- Has the irrigation scheme had any effect on the conflicts in the area?
- Are there any conflicts within the scheme?
- Have the conditions of water availability improved in the area or has the problem just been moved further down the river?
- What alternatives might there be to help solving the conflicts?

Does the project in Kiru Valley correspond with the IFAD poverty reduction strategy programme?

2 Background

2.1 United Republic of Tanzania

Out of the union of the two states Zanzibar and Tanganyika, the United Republic of Tanzania was founded, on the 26th of April in 1964. The commercial capital of the country is Dar es Salaam.⁴ Tanzania is located on the southeast coast of Africa, bordering with seven other countries, Uganda and Kenya in the north, Mozambique in the south and Rwanda, Zambia, the Democratic Republic of Congo and Burundi in the west.⁵ The country has a total area of

⁴ National website of the United Republic of Tanzania (2007a).

⁵ ICID International Commission on Irrigation and Drainage (2006) Global ICID database.

945 090 km².⁶ The population was estimated at 37.7 million in 2004. 63 percent of the total population lives in rural areas.⁷ Tanzania is the biggest among the East African countries.⁸ 42 percent (40 million ha) of the total land area is cultivatable, still only 16 percent (6.3 million ha) of this area that is cultivated today. Approximately half of the country's GDP (Gross Domestic Product) is accounted for by the agricultural sector.⁹

About 80 km³/year of the water resources of the country are renewable, of which more than half is surface water. These resources are extremely under-utilized, the major parts of the unused land have poor soils or water sources are very remote.¹⁰

2.2 Climate

The climate of Tanzania is semi-arid¹¹ savannah, characterized by Miombo woodlands, grassland and bushland.¹² The land consists of steppes and plateaus with a big amount of horst-mountains. Some parts of the soil is built up by volcanic material.¹³ This topography is linked to the Great Rift Valley that runs from the north east of Africa into central Tanzania.¹⁴ The Rift Valley is divided into two separate branches, the western valley where the lake Tanganyika lays, and the eastern valley, which includes valleys and lakes such as lake Manyara and Lake Natron.¹⁵

The yearly average temperature is about 23 °C. The variations in temperature during the year are very small; the daily variations are much bigger. The eastern highlands, the coastal belt and the lake Victoria Basin have two rainy seasons; the short rains (Vuli) which fall during October to December and the long rains (Masika) which fall during March to June.¹⁶

⁶ FAO. (1995) *"Irrigation in Africa in figures – L'irrigation en Afrique en chiffres"*, Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

⁷ ICID, 2006, International Commission on Irrigation and Drainage,

⁸ National website of the United Republic of Tanzania (2007a).

⁹ FAO. (1995) *"Irrigation in Africa in figures – L'irrigation en Afrique en chiffres"*, Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

¹⁰ FAO. (1995) *"Irrigation in Africa in figures – L'irrigation en Afrique en chiffres"*, Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

¹¹ Behrens, Sven. (1995), *"Tanzania, Terräng, Berggrund och Klimat"*, in Nationalencyklopedin, Bra Böcker AB, Höganäs

¹² ICID International Commission on Irrigation and Drainage (2006) Global ICID database.

¹³ Behrens, Sven. (1995), *"Tanzania, Terräng, Berggrund och Klimat"*, in Nationalencyklopedin, Bra Böcker AB, Höganäs

¹⁴ National website of the United Republic of Tanzania (2007a).

¹⁵ Behrens, Sven. (1995), *"Tanzania, Terräng, Berggrund och Klimat"*, in Nationalencyklopedin, Bra Böcker AB, Höganäs

¹⁶ AQUASTAT survey. (2005) *"United Republic of Tanzania, Irrigation in Africa in Figures"*

The average rainfall on the highland plateaus is around 500 to 700 mm per year.¹⁷ The periods between the rain seasons are very dry, and there are occasional droughts, which can last for several years. The water level in the rivers and lakes follow the rainfall patterns. The river discharge and the lake levels start rising in November to December and generally reach their max in March to April with a recession period from May to October/November.¹⁸

2.3 Babati District

Babati district is located along the Great North Road in north-central Tanzania. It is one of the five districts in the Manyara region (Babati, Hanang, Kiteto, Mbulu and Simanjiro)¹⁹. The district is divided into four divisions, Babati, Bashnet, Gorowa and Mbugwe with 21 wards and 81 villages. Babati district has a population of 302 253 inhabitants who live on an area of 6 069 km².²⁰ Babati district is located on the highland plateau and lies on an altitude between 1 000 to 2 300 meters above sea level.²¹

2.4 Kiru Valley

Kiru Valley is part of the Great Rift Valley and runs parallel to the Great North Road south of Lake Manyara. Most of the villages in the valley were settled in the 1970s during the villagisation, which was a result of the execution of the Arusha declaration. During this period there was a big drought in the region, which made many people, most pastoralists, move into the valley from regions close by. After the Tanzanian declaration of independence the white big-scale farmers in the valley started to move out, and by the 1970s almost all the white farmers were gone.²² The big farms were taken over by NAFCO (National Food Corporation) and then sold to farmers with Indian origin.²³ The big-scale farmers have an average of 3 000 ha of land which is under a 99-year lease.²⁴

¹⁷ Behrens, Sven. (1995), "*Tanzania, Terräng, Berggrund och Klimat*", in Nationalencyklopedin, Bra Böcker AB, Höganäs

¹⁸ AQUASTAT survey. (2005) "*United Republic of Tanzania, Irrigation in Africa in Figures*"

¹⁹ National website of The United Republic of Tanzania (2007c).

²⁰ National website of The United Republic of Tanzania (2007d).

²¹ Said. Samy. (2006) "*Irrigation in Africa: A conflict between large-scale and small-scale farmers in Tanzania, Kiru Valley*", Södertörns Högskola

²² Ubwani, Zephania. (2002) "*Babati land conflicts*".

²³ Juma, Thomas. (2004) "*Politicians behind Babati land disputes*".

²⁴ Ubwani, Zephania. (2002) "*Babati land conflicts*".

The valley is located 40 km from Babati Town and consists of fertile arable soil. About 30 000 peasants cultivate in the valley. The majority of the crops cultivated in the area are rice, sugar cane, maize, velvet beans and sorghum.²⁵

2.5 Irrigation

One of the most water consuming activities is agriculture. The global use of water has increased six-fold over the last century. This is two times more than the population growth. About 70 percent of this water is consumed by agriculture.²⁶ Between 30 and 40 percent of the food cultivated in the world come from irrigated land, which is only 17 percent of the total area of the cultivated land. Despite this great water consumption only four percent of arable land in sub-Saharan Africa is irrigated.²⁷

Researchers agree that irrigated land has an increased productivity; irrigated land is almost three times more productive than areas relying on rain to feed the plots.²⁸ The biggest strain on the world's water resources is the insufficiency of irrigation schemes. Modern irrigation loses almost 60 percent of the transported water²⁹ and traditional irrigation waste nearly 80 percent through evaporation.³⁰ Irrigation has the ability to increase production by enough to provide for one extra meal a day.³¹

One third of the irrigated land is cultivated with rice. In Africa it is, most of the time, cultivated in valley bottoms and wetlands in the humid zones of the Gulf of Guinea and Eastern Africa.³²

²⁵ Juma, Thomas. (2004) "*Politicians behind Babati land disputes*".

²⁶ United Nations. (2002) "*UN Calls on World Leaders to Commit to a Sustainable Future at Upcoming Johannesburg Summit*" UN Press Release.

²⁷ FAO. (1995) "*Irrigation in Africa in figures – L'irrigation en Afrique en chiffres*", Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

²⁸ Stockle, Claudio.O. (2001), "Environmental impacts of irrigation: A review", United states, Washington, Washington state University, water research centre.

²⁹ United Nations. (2002) "*UN Calls on World Leaders to Commit to a Sustainable Future at Upcoming Johannesburg Summit*" UN Press Release.

³⁰ Huggins, Christopher, (2000), "rural water tenure in east Africa, a comparative study of legal regimes and community response to changing tenure patterns in Tanzania and Kenya", Nairobi, Kenya, African centre for technology studies.

³¹ FAO. (1995) "*Irrigation in Africa in figures – L'irrigation en Afrique en chiffres*", Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

³² FAO. (1995) "*Irrigation in Africa in figures – L'irrigation en Afrique en chiffres*", Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

2.5.1 Irrigation and agriculture in Tanzania

The agricultural sector accounts for almost three quarters of Tanzania's export. It also offers opportunities for employment for about 80 percent of Tanzania's population.³³ Agriculture leads the country's economic growth, its value is 43.4 percent of Tanzania's GDP.

Small-scale farming dominates the Tanzanian agriculture; it covers more than 90 percent of the country's farming.³⁴ The small-scale farmers have an average of 0.9 to 3.0 ha of farming land. 5.1 million ha is cultivated annually in Tanzania of which 85 percent is cultivated with food crops.³⁵ The main cultivated crops are sorghum, paddy rice, maize, bananas, wheat, millet, cassava, sweet potato and pulses. The dominating crop is maize, cultivated on an area of 1.5 million ha during recent years, followed by paddy rice, which has been cultivated on an area of more than 0.5 million ha during the same period.³⁶ The main amount of poor people in Tanzania live in rural areas where they have limited access to clean water for crop production and for domestic use, and also lack of adequate sanitation.³⁷

Falling land productivity and labour, due to a dependence on unpredictable and irregular weather conditions, are the biggest limitations for the agricultural sector. The farmer's cultivation and livestock are greatly affected by the frequent events of droughts. According to the national website of Tanzania, irrigation is the key to stabilizing agricultural production in Tanzania, in order to improve food security, increase farmers' productivity and income, and also to produce higher value crops such as vegetables and flowers. The website also states that Tanzania has the potential of achieving an irrigation development, which will guarantee essential food security and improve the life standard in the country.³⁸

The agricultural sector devour about 4 624 million m³ of water of which the major part (4 417 million m³) is consumed by irrigation. Still only 184 330 ha of the approximately 2.1 million ha irrigatable land is irrigated.³⁹ More or less all the water used for irrigation in the mainland of Tanzania come from surface water such as rivers, springs and streams. Paddy rice and maize are the main irrigated crops, they account for 48 and 31 percent of the total irrigated area (2002).⁴⁰ 7 934 ha of the mainland of Tanzania is irrigated through rainwater

³³ National website of the United Republic of Tanzania (2007e).

³⁴ AQUASTAT survey. (2005) "*United Republic of Tanzania, Irrigation in Africa in Figures*"

³⁵ National website of the United Republic of Tanzania (2007e).

³⁶ ICID International Commission on Irrigation and Drainage (2006) Global ICID database.

³⁷ National website of the United Republic of Tanzania (2007b).

³⁸ National website of the United Republic of Tanzania (2007e).

³⁹ AQUASTAT survey. (2005) "*United Republic of Tanzania, Irrigation in Africa in Figures*"

⁴⁰ FAO. (1995) "*Irrigation in Africa in figures – L'irrigation en Afrique en chiffres*", Italy, Rome: Food and Agricultural Organization of the United Nations, water reports, ISSN 1020-1203.

harvesting schemes. The schemes are mostly located in the regions of Dodoma, Maru, Mwanza, Shinyanga, Singida and Tabora. In the schemes the water is diverted from built-up areas, paths and transient streams to fields in the valley bottoms.⁴¹

3. Methodology

The method used in the case study was a qualitative study with semi-structural interviews. Methods as examining the water flows and so on were not chosen because of the vast amount of time it would take to perform them. Other forms of interviews, as structural and non-structural, were also excluded. The structural interviews were eliminated because they are more quantitative and not suitable for this study. Non-structural interviews were also excluded because they have no structure and may have made it difficult to attain the desired information. The interviews were evolved from a few basic questions.⁴² All of the informants spoke Swahili; an interpreter was therefore used to translate from English to Swahili and vice versa. The use of an interpreter might have made a slight difference concerning the answers of the informants. When translating from one language to another there might be a risk of a misunderstanding of both the questions and the answers, due to lack of knowledge of the language. In this case the translation was also made in two steps, since the questions were formed in Swedish and then translated into English to the interpreter. Another risk is that the situation might become uncomfortable when both parties have to talk to each other through an interpreter, resulting in not getting enough, or the right, information from the informants. The use of semi-structural interviews has the advantage of not being confined within the borders of the structured questions, thus giving the possibility for a deeper conversation. When structuring an interview there is always the risk of forgetting questions that might be important for getting the right information. There is also a question in how to perform an interview in a manner that will result in as much information as possible, how to make the informant feel comfortable enough to give information about sensitive subjects. The study is based on eight interviews. The informants used in the interviews were one farmer from each village in Mawemairo and Matufa, and two farmers from Mapea. Two of the interviewed farmers were female. Although a comparison between the female and male informants answers gave no significant results. The reason for interviewing farmers from the villages was to get a view of how the water conditions were before and after the construction of the IFAD

⁴¹ AQUASTAT survey. (2005) “*United Republic of Tanzania, Irrigation in Africa in Figures*”

⁴² Appendix

scheme. Mr Mirisho, who worked at the IFAD office in Babati, and the Mugano scheme facilitator Mr Mohamed, were interviewed to get an understanding of how the irrigation scheme works, and to get information about what kind of complaints they had received. Mr Mirisho was first selected because he had a good knowledge about the irrigation scheme and the people in charged of it. He recommended an interview with Mr Mohamed, the scheme facilitator who had information about the framers within the scheme. From Mr Mohamed I received names of farmers in Mawemairo and Matufa, who were suitable for interviews. The names of the farmers in Mapea were given to me by my supervisors, Kari Lehtilä and Vesa-Matti Loiske, who had heard their complaints about the IFAD irrigation scheme. Because of the small amount of interviews made the study may not be able give a generalized view of the situation in Kiru Valley, but it might give a view of how some of the farmers in the valley value the situation and how they have been effected by the construction of the IFAD irrigation scheme, concerning water availability and distribution. This fact must be taken into consideration when reading the essay.

4. Theoretical overview

4.1 Common-pool resources

The common-pool resources are resources shared among the public, with no well-defined ownership.⁴³ Examples of these kinds of resources may be forests and water.

According to the theory of Rational Choice people always act in a rational manner, videlicet acting in a manner that will maximize the utility of the individual, which may or may not be egocentric.⁴⁴ When concerning a common-pool resource the theory of the Tragedy of the Commons states: the most rational action, for the individual, concerning common-pool resources is to maximize the use of the resource before someone else does it. “The inherent logic of the commons remorselessly generates tragedy.”⁴⁵

⁴³ Connelly and smith. (2003), “*Politics and the environment, from theory to practice*”, London, Routledge. Page 126

⁴⁴ Connelly and smith. (2003), “*Politics and the environment, from theory to practice*”, London, Routledge. Page 126

⁴⁵ Hardin. (1998), Connelly and smith. (2003), “*Politics and the environment, from theory to practice*”, London, Routledge. Page 129

Wallensteens definition of a conflict corresponds with this theory: “a social situation in which a minimum of two actors strive to acquire at the same moment in time an available set of scarce resources.”⁴⁶

4.2 Water conflicts

What is water worth? This section of the essay focuses on what water means for humankind and how it can create conflicts. It has to be taken into consideration that some of the sources used for the empirical data may not be scientific. Some of the primary sources for this data may have been difficult to find, but used in the study because they contain interesting information, which I have found valuable for my study.

About 75 percent of the planet is covered with water; still only one tablespoon of every 100 litres of water on the planet is available for human use.⁴⁷ The human body contains of 60 percent of water and agriculture claims about 70 percent of the total water withdrawals from the earth’s natural resource. Water is therefore essential for human survival and development and seen as one of our most valuable natural resources.⁴⁸ According to *FAO 2006* the consumption of water was not seen as a big problem 15 years ago. Today, however, there is a cumulative water scarcity, caused by a growing cultivation of water consuming crops, monocropping, a rapid population growth and environmental degradation.⁴⁹ It is said that there is more than one billion people today who do not have access to clean drinking water⁵⁰ and 40 percent of the world’s population is facing water shortage.⁵¹

Water for irrigation often comes from dams, rivers or lakes. These water resources are most of the time sheared between farmers, regions and even countries. Agriculture, in tropical countries, consumes 80 to 90 percent of all water used. A big part of this water is lost through evaporation from storage tanks and open pipes, runoff due to degraded soil or inefficient irrigation.⁵² Because of the water scarcity there may arise conflicts between stakeholders. Unjust water availability and distribution is also a reason for arising conflicts. Water sources

⁴⁶ Wallenstein, Peter. (2002), *The conflict and water group*. (2005), *Local conflict and water: addressing conflicts in water projects*.

⁴⁷ Farm radio network. (2000), “voices newsletter”

⁴⁸ Farm radio network. (2000), “voices newsletter”

⁴⁹ FAO. (2006) “*What’s water worth?*”, in *Agriculture 21*, published Marsh 2006

⁵⁰ Farm radio network. (2000), “voices newsletter”

⁵¹ United Nations. (2002) “*UN Calls on World Leaders to Commit to a Sustainable Future at Upcoming Johannesburg Summit*” UN Press Release.

⁵² Farm radio network. (2000), “voices newsletter”

for irrigation are often common-pool resources. The farmers who share these resources will therefore act in a rational manner and extract as much water from the resources as possible, before some one else will.⁵³ The unjust availability and distribution may be caused by different positions in the water system. One of the most common conflicts is between the upstream and the downstream stakeholders. The upstream stakeholders are closer to the water source and can extract as much water as possible, leaving the downstream stakeholders with not enough water to cultivate their crops.⁵⁴

Carius et al. state in their article *Water, Conflict and Cooperation* that: “In most cases, it is not the lack of water that leads to conflict, but the inadequate way the resource is governed and managed.” Insufficient administrative capacity, lack of adequate water institutions, lack of transparency and lack of necessary infrastructure are a few of the reasons, according to Carius et al, why water management fail.⁵⁵

The report on *Water, Conflicts and Cooperation* also states that when a sector, depending on water, like agriculture no longer can sustain the livelihoods of the farmers it may cause an uneven migration. People are forced to look for jobs in the city or other ways of making a living, which might cause conflicts between the locals and the migrants, because of the increased pressure on already limited resources.⁵⁶

According to *The conflict and water group* the causes of water conflicts can be summarized in four basic categories: 1) conflicts over a limited resource; 2) conflicts over the control of the distribution; 3) conflicts over the quality of the resource; 4) conflicts in large infrastructure projects.⁵⁷

Carius et al. Water does not often cause violent conflicts between countries, but still, an international dispute has lead to tensions and deteriorated the countries development. The Nile Basin, Euphrates, and the Ganges rivers are examples of areas where this kind of tension has come up. Even if conflicts often stay local they can affect the national and regional stability.⁵⁸ The report on *Local conflict and water* states that conflicts on the local level are often related

⁵³ Connelly and smith. (2003), “*Politics and the environment, from theory to practice*”, London, Routledge. Page 126, 129

⁵⁴ Ostrom and Gardner. (1993) “*Coping with Asymmetries in the Commons: Self-Governing Irrigation Systems Can Work*”, in the Journal of Economic Perspective no.4, vol. 4, pages 93-112

⁵⁵ Carius et al. (2004) “*Water, conflicts, and cooperation*”, Environmental Change and Security Project Report

⁵⁶ Carius et al. (2004) “*Water, conflicts, and cooperation*”, Environmental Change and Security Project Report

⁵⁷ The Conflict and Water Group. (2005) “*Local conflict and water: addressing conflicts in water projects*”, Stockholm, Swedish Water House

⁵⁸ Carius et al. (2004) “*Water, conflicts, and cooperation*”, Environmental Change and Security Project Report

to access to water for agricultural use, such as livestock keeping and irrigation. These conflicts occur when water is of vital importance for the local population.⁵⁹

It is said that in many cases of civil war in Africa, south Asia and Latin America the cause of the major conflict is poverty due to livelihood loss.⁶⁰ *The conflict and water group* also states that the most common conflicts are between pastoralists and agriculturalists in rural areas. In these areas agriculture is the main source of income, which makes livelihoods directly affected by the access to water.⁶¹

There is a common opinion that the scarcity of a resource, in itself, is not the reason for conflicts but instead it is poverty and the lack of institutions to manage conflicts, which are more important. However, some authors state that it might be the opposite; the lack of institutions and policies helps to increase environmental degradation and scarcity, which later leads to social conflicts. Countries who are suffering from environmental degradation in particular land degradation, are more disposed to civil conflict.⁶²

In regions with a more arid climate the increase in water pollution and scarcity and the limits in the social and economic development are closely linked to poverty, disease and hunger, which are one of the world's most conflictual issues.⁶³ The "Basin at Risk" project states "the likelihood of conflict arises as the rate of change within the basin exceeds the institutional capacity to absorb that change" meaning that a sudden change in the river basin or a reduced institutional capacity makes the area more prone to conflicts.⁶⁴

Some researchers believe that water may be a key in ending conflicts, building confidence and cooperation. Even if this is true conflict prevention, conflict resolution and post-conflict reconstruction efforts often ignore water as a helping resource, especially in regions such as southern and eastern Africa, along with the Great Lakes region, the Middle East, and South and Southeast Asia.⁶⁵ The authors of the report on local conflicts and water projects believe that the solving of water related issues and the increasing sanitation and access to water is a

⁵⁹ The Conflict and Water Group. (2005) "*Local conflict and water: addressing conflicts in water projects*", Stockholm, Swedish Water House

⁶⁰ Carius et al. (2004) "*Water, conflicts, and cooperation*", Environmental Change and Security Project Report

⁶¹ The Conflict and Water Group. (2005) "*Local conflict and water: addressing conflicts in water projects*", Stockholm, Swedish Water House

⁶² The Conflict and Water Group. (2004) "*Water and local conflict: a brief review of the academic literature and other sources*", Stockholm, Swedish Water House.

⁶³ Peter J, Ashton. (2002) "*Avoiding conflict over Africa's water resources*", in *Ambio* vol.31, No.3.

⁶⁴ Carius et al. (2004) "*Water, conflicts, and cooperation*", Environmental Change and Security Project Report

⁶⁵ Carius et al. (2004) "*Water, conflicts, and cooperation*", Environmental Change and Security Project Report

highly valued and important effort, which might change the lives of millions of people, and it is also a key process in sustaining the use of limited resources.⁶⁶

According to the *voices newsletter*, of *Farm radio network*, the solution in water scarcity may not lay in increasing water supply but more in increasing the efficiency of water use. In using more efficient, low-cost and locally adapted technologies the loss of water may be reduced. The small-scale farming is said to have an important role to play in these solutions. There are many, already existing, low-cost and water saving techniques; such as catching water on roof-tops, using plant covers that reduce water run-off, and recycling grey water. Drip irrigation is also a good technique for reducing water use; it may reduce the water use with up to 70 percent on high-value fruit and vegetable crops. All these techniques are very simple and cheap. There is no need to focus the water shortage solutions on high-tech interventions, the focus must instead be on solutions that are affordable for local communities, which will cover their water needs and increase their own ability to build, operate and maintain water delivery systems.⁶⁷

4.3 The Elinor Ostrom theory

In 1990 Elinor Ostrom published a book on common-pool resources: *Governing the Commons, The Evolution of Institutions for Collective Action*. In this book she illustrates eight principles on the managing of common-pool resources: (1) the first principle, *clearly defined boundaries* states that the boundaries of a common-pool resource must be clearly defined, and the stakeholders of the resource must be specified. This may be seen as one of the first steps in organizing for collective action. The definition of boundaries may help in shutting out those who does not contribute to the maintenance of the resource. Identifying the people who use the resource is also very important. If this is not possible it is difficult to know how much the resource is exploited. If these definitions are not succeeded the resource might become scarce and even totally disappear. (2) *Congruence between appropriation and provision rules and local conditions*: a generalization of the policies of technology, time, place, financial input, such as money and labour. The principle is at the same time an evaluation of how much of the resource that can be extracted. This is very difficult to do in a particular area; these policies must therefore be designed from the specific conditions in the local area. This gives the

⁶⁶ The Conflict and Water Group. (2005) “*Local conflict and water: addressing conflicts in water projects*”, Stockholm, Swedish Water House

⁶⁷ Farm radio network. (2000), “voices newsletter”

biggest chance for a sustainable maintenance of the resource. (3) The third principle *collective-choice arrangements*, states that the operational rules must be designed by those who are affected by them. The participating parties interact with each other and are therefore able to better adjust the rules to the local conditions. (4) *Monitoring*: the people responsible for the supervision of the resource must act according to the laws and rules.⁶⁸ (5) *Graduated sanctions*: the one who goes against the rules must be sanctioned. The resource stakeholders must themselves decide the size of the sanction, depending on the importance of the broken rule. If the stakeholders of the resource have direct contact with each other they are more urged to follow the rules. (6) *Conflict-resolution mechanisms*: the stakeholders must have the chance to discuss conflictual issues in order to solve conflicts in a quick and cheap way. (7) *Minimal recognition of right to organize*: in order to have a long-term self-governing over the resource the stakeholders need to be able to make their own rules, concerning the maintenance of the resource, without the meddling of external authorities. The external authorities must approve the rules but not change them. (8) And finally the principle of *nested enterprises* state that there might be a difficulty in a sustainable cooperation and maintenance of common-pool resources when several villages exploit the resource and if each village has their own set of rules and institutions. Some of the governed resources are therefore organized in several levels. These levels include appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities.⁶⁹

4.4 The IFAD poverty reduction strategy programme

The IFAD poverty reduction strategy programme was implemented after the World Summit on Social Development, held in Copenhagen in 1995. The goal is to reduce the proportion of people living in extreme poverty by half by the year 2015.⁷⁰ This is one of the Millennium Development Goals: “halving the number of people without access to safe drinking water and

⁶⁸ Elinor, Ostrom, 1990, “*Governing the commons, The Evolution of Institutions for Collective Action*”, Cambridge University Press, United Kingdom.

⁶⁹ Elinor, Ostrom, 1990, “*Governing the commons, The Evolution of Institutions for Collective Action*”, Cambridge University Press, United Kingdom.

⁷⁰ IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

sanitation, halving the number of people with incomes below one dollar a day, and empowering women”.⁷¹

The Fund is convinced that the human and natural resources for the rural poor to overcome extreme poverty exist, but people need aid in accessing these resources in order to control their own future and find new paths to development. To enable the rural poor to overcome poverty a kind of revolution must commence, this revolution must be performed by the poor themselves, the private sector, the civil society, the government and by donors.⁷²

The poverty reduction strategy programme in eastern and southern Africa complements the IFAD’s *Strategy framework for 2002-06*. The framework focuses IFAD’s future work on the enabling of the rural poor to overcome poverty. The Fund will concentrate their work in the very critical areas; its goal is to build the capacity of the rural poor and their organizations, and to increase the access to markets and financial assets. This work will not only require a good use of IFAD’s own resources but also a coalition between the stakeholders within evolving organizations, the focused mechanisms of recognizing the important role of the reduction of poverty in rural areas for the global reduction of poverty, and concentration on the impacts and innovations leading to new answers. It will also require investments to turn local success into global solutions.⁷³ In order to achieve the Millennium Development Goals the development on the national and rural level needs to accelerate a great deal.⁷⁴

15 of the 21 countries in eastern and southern Africa are classified as low-income countries, and 12 countries are classified as the least developed countries in the world. This region may have the highest concentration of poverty on the planet; only seven of the low-income countries had a GNP (Gross National Product) increase between 1990 and 1998. 260 million of the 350 million people living in the region live in rural areas, and the rural areas account for about 83 percent of the total extremely poor. Around 85 percent of the extremely poor are dependent on agriculture as their main source of income. There is a great potential for agricultural growth in some areas in this region. Areas around the great lakes often have two

⁷¹Palamagamba, John.Kabudi. (2005) “*Challenges of legislation for water in rural Tanzania: drafting new laws*”, international workshop on African water laws: plural management in Africa, Johannesburg, January 26-28.

⁷² IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

⁷³ IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

⁷⁴ IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

rainy seasons and some have temperatures that may allow cropping most of the year, even so many of the farmers struggle to make a living.⁷⁵

IFAD believes that in order to reduce poverty the poor need to be enabled to improve the control and management of natural resources, which in turn will help to increase labour productivity and income in the medium-to-long term.⁷⁶

Small-scale agriculture is one of the basic foundations for livelihoods, and the growth of the agricultural sector is seen as one of the most important opportunities for reducing poverty. Another solution for reducing poverty involves fundamental social and policy change.⁷⁷

Many of the rural poor are confined within the policy and institutional system left by the colonial states. The rural poor are in a situation where they are objects of other people's policies and institutions rather than having made their own.⁷⁸

One of the most important factors in reducing poverty is that the rural poor need to have a voice in the creation of policies and the investments that will affect their livelihoods.⁷⁹

IFAD's programme in eastern and southern Africa is focused on the economy of the smallholders. The Fund's work with the governments, the rural poor, NGOs and donors have resulted in several activities that are based on the initiatives of the small-scale farmer to develop new relations with the private sector and the public service, and also based on new approaches in accessing and managing resources.⁸⁰

Three principles for the design and implementation of all the IFAD aid activities has been developed through IFAD's co-operation with rural development stakeholders: (1) "A growth-oriented strategy for rural poverty reduction must focus on where the poor are and what they do for a living. The support will therefore focus on areas of medium and high potential, where the greatest numbers of people live and farm. However this will not be to exclusion of more marginal areas with a higher proportion of poor people living in them. Within rural communities in those areas, IFAD must identify who the poor are, it must understand their livelihoods; and, working with them, it must analyse the constraints they face and

⁷⁵ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁷⁶ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁷⁷ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁷⁸ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁷⁹ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁸⁰ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

opportunities they have open to them”; (2) “IFAD will invest in the empowerment of rural poor to strengthen their own productivity and increase their assets. This empowerment embraces both access to material goods and organization in order to collectively assert influence – not only on government, but also increasingly on the private sector”; and finally (3) “the best guarantee that public policy and institutions will effectively facilitate the efforts of rural poor people to work themselves out of poverty is to ensure the democratic accountability of governments. IFAD will support the development of policies for rural poverty reduction and the establishment of institutions, structures and processes of service agencies. Decentralization also offers the poor the potential to exercise more direct influence over the factors that shape their lives”.⁸¹

IFAD will embrace the role of a donor giving aid by financing direct projects and programmes and will make an investment in partnership building, policy dialogue and the sharing of knowledge. This work will be focused on four key driving forces, which are most important for the outlook for the economic growth of the poor: (a) promoting efficient and equitable market linkages; (b) developing rural financial systems; (c) improving access to and management of land and water; and (d) creating a better knowledge, information and technology system.⁸²

One of IFAD’s most important contributions to reduction of rural poverty, in eastern and southern Africa, is the support for water development and management for small-scale farmers. Water is one of the most valuable resources on the planet. The regions potential for water management is great, 18 million ha is suitable for water management, but still only three million ha is partially managed and only two million ha are irrigated. The ones who have not managed to get the benefits of these irrigated and managed areas are the small-scale farmers. IFAD is also working with the governments to transfer the management, operation and maintenance of irrigation schemes to the stakeholder. This will require the training and capacity-building of the stakeholders, and also the improvement of infrastructure, production technologies and mercantile connection to markets.⁸³

The core of the poverty reduction strategy programme is to enable the poor to help themselves. The poor must manage resources and participate in the creation of policies and

⁸¹ IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

⁸² IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

⁸³ IFAD. (2002) “*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*”, Global IFAD database

implementation of institutions in order to overcome poverty and sustain a positive development.⁸⁴

5. Results / Analysis

How is the IFAD irrigation scheme, *the Mugano intake*, constructed and managed?

The Mugano intake came to use in 2002. The water is extracted from the Dodumera River and distributed between the villages Mawemairo and Matufa. Farmers from the villages further down the river, Mapea and Magugu, complain because they feel that they were never considered when IFAD was planning the project. The intake is located 7 km from Matufa and it takes about three hours for the water to get to the village, the intake is much closer to Mawemairo and it only takes the water ten minutes to get to the village.⁸⁵

There are two main channels leading the water into the villages. Every main channel has feeder channels that lead the water to the plots. The feeder channels are not built with concrete, which causes water leakage into the ground. They are planning to reconstruct the channels with concrete to minimize this leakage. The main channel in Mawemairo gets water four days every week and the main channel in Matufa gets water three days every week. There is one person at every intake, one at the intake from the river, one at the main channel and one at the feeder channels, who is responsible for the supervision of the amount of water going in to the system. The supervisor for the feeder channels checks if the plots have a good water holding capacity and decides from that which plot need the biggest amount of water. Farmers who try to take water from the scheme when it is not their turn end up paying a fine. The amount of water going into the scheme from the river is regulated by the time that the water gets to flow through the system, which is 600 litres/second for the two villages. There is also a fixed level of the bottom of the intake at the river that regulates the amount of water that can be extracted from the river. There might become an unjust distribution, but if Matufa does not get water one time the village will be prioritised the next time. Some plots are located too far from the scheme to be able to get water from IFAD.⁸⁶

The villages have to pay 1 328 600 TZS (US \$ 1107) every year to the central government for the scheme, which the farmers think is too much since they have to maintain the scheme

⁸⁴ IFAD. (2002) "*IFAD strategy for rural poverty reduction in Eastern and Southern Africa*", Global IFAD database

⁸⁵ Interview: Mohamed, *Scheme facilitator*

⁸⁶ Interview: Mohamed, *Scheme facilitator*

themselves. This amount is collected through a yearly fee, of 5 000 TZS (US \$ 4,2), that the members of the scheme have to pay. The farmers who are members also have to pay 10 000 TZS (US \$ 8,3) every season for O and M (Operation and Maintenance). They also have to pay 500 TZS (US \$ 0.42) for every cow every year.⁸⁷

The scheme has 472 members, 171 of whom are from Matufa and the rest from Mawemairo. There are also 105 farmers who are not members but still get water from the scheme.⁸⁸

The water committee of the scheme is divided into two parts: the executive committee which manages the finance and planning, the O and M, security and distribution, and the mediation committee that manages arising conflicts.⁸⁹

The current situation and conflicts for the villages, Mawemairo, Matufa and Mapea:

According to the scheme facilitator the farmers in Mawemairo and Matufa did not cultivate rice, only maize and beans, before the IFAD irrigation scheme. The price on the land in both villages has gone up since the scheme was built. The price was around 400 000 TZS/acre before and now its more than 1 000 000 TZS/acre. People, in the villages, who do not provide for themselves through farming and people living nearby Mawemairo and Matufa, come to the villages to ask the farmers for work. Working for small-scale farmers in Mawemairo and Matufa pays better and offers better working conditions than if they work for the big-scale farmers.⁹⁰

The common opinion, of all the interviewed farmers in both Mawemairo and Matufa, on the IFAD irrigation scheme is that it has improved the livelihoods in both villages, they believe that their plots get much more water now than before. Before the irrigation scheme the farmers had to go to the Indian big-scale farmers to ask for employment, because they could not provide for themselves on their own cultivation. With the new scheme they can cultivate rice, which gives them more profit. This has helped reduce the gap between the big-scale and the small-scale farmers.⁹¹

The farmer in Mawemairo has 0.81 ha that get water from the IFAD scheme; her plot gets water twice a week both during wet and dry season. The farmer in Matufa has 1.01 ha that get

⁸⁷ Interview: Mohamed, *Scheme facilitator*

⁸⁸ Interview: Mohamed, *Scheme facilitator*

⁸⁹ Interview: Mohamed, *Scheme facilitator*

⁹⁰ Interview: Mohamed, *Scheme facilitator*

⁹¹ Interview: Farmers in Mawemairo and Matufa

water from the scheme but his plot only gets water once every other week during the wet season and little or no water during dry season. He also has 0.3 ha that is in the scheme, which can not get water from it because it is located on the top of a slope where the water can not reach.⁹² The farmers in the villages said that the water is distributed equally between the villages, but still the farmer in Matufa, who has the biggest plot, gets much less water than the farmer in Mawemairo. The farmers in Mawemairo also said that if Matufa falls short of water one time they will be prioritized the next time, but the farmer in Matufa almost does not get any water at all during the dry season.⁹³ Even if there is a big difference concerning the distribution of water between the two villages the farmer in Matufa is happy. He does not complain because he still gets more water now than he did before. He can manage a living on his cultivation and therefore he does not see water scarcity as a big issue.⁹⁴

The farmer in Matufa believes that the cultivation in the village has become more commercial because of the IFAD scheme. The village executive officer of Matufa says that every good thing has its backside; with the great amount of water coming in to the village through the scheme come more diseases, like malaria, which causes a problem for Matufa since the village is located far from a hospital.⁹⁵

The scheme facilitator believes that there were more conflicts between Mawemairo and Matufa before the IFAD scheme; now the farmers have to cooperate and agree on the distribution of the water. The farmers in Matufa said that the big-scale farmers who are located downstream of the irrigation scheme did not complain before the scheme was built; now when they do not get enough water they blame it on the IFAD scheme. The scheme facilitator said that when there is a water scarcity the farmers blame each other, the big-scale farmers blame the farmers in the IFAD scheme and vice versa, but he also points out that the ones who suffer under these conditions are the small-scale farmers, not the big-scale. He also said that if someone is unhappy they can complain to the mediating committee, where it will be addressed like in a court.⁹⁶

The farmers in Mapea only have one cultivation season, they cannot cultivate during the dry season, only in the wet season.⁹⁷ Before the construction of the IFAD scheme the farmers in Mapea still only had one cultivation season because the big-scale farmers took all the water from the river during the dry season. During the rainy season they got water from both rain

⁹² Interview: Farmer in Matufa

⁹³ Interview: Farmers in Mawemairo

⁹⁴ Interview: Farmer in Matufa

⁹⁵ Interview: Farmer in Matufa and Shabani Kondo, *Village executive officer* in Matufa

⁹⁶ Interview: Mohamed, *Scheme facilitator* and Farmer in Matufa

⁹⁷ Interview: Farmer in Mapea

and the river, today they only rely on rain fed irrigation. They also got water from gullies with seasonal rivers. Today there are still seasonal rivers in the gullies but there is not enough water to reach the plots. The farmers blame the current water situation on the IFAD scheme. The two interviewed farmers in Mapea believe that the IFAD irrigation scheme has contributed to a decrease of the amount of water coming into the village from the river. Because of the water scarcity people are cultivating at the riverbanks which is both illegal and environmentally degrading. This will in turn make things worse by increasing the scarcity. The irrigation system used in Mapea is made of mud walls built around 0.405 ha (one acre) to trap the rainwater in the plots.⁹⁸

The irrigation scheme has made the farmers in Mawemairo and Matufa able to extract a great amount of water from the river, which has made it possible for them to cultivate rice, a very water-consuming crop. The soils in Mawemairo and Matufa are not good for cultivating rice because they do not have a good water holding capacity; this makes the cultivation of rice claim even more water.⁹⁹ This enormous extraction of water from the river may have diminished the amount of water left in the river when it reaches the farms downstream.

The farmer in Mapea thinks that the scheme is technically a good construction but that there is a lot of water gone to waste because of leakage, and he believes that no water should be wasted. He also points out that the farmers around the Dodumera River should share the little amount of water that exist, no one should be without.¹⁰⁰

The informants state that the soils in Mapea are very good, and that the village is the best place for cultivating rice, but this is not possible because of water scarcity, they can only cultivate maize, beans and vegetables.¹⁰¹

Mapea's location at the river basin is very unfavourable; first there are big-scale farmers then the IFAD scheme and then there are five more big-scale farmers. After that the water comes to Mapea.¹⁰² The IFAD scheme facilitator points out that the situation is much better during the wet season, when there is more water. During this season everybody gets more water, even Mapea. This year there have been almost no conflicts at all because of the big rains that have occurred, everyone is happy because they have enough water to cultivate their plots. However, during September, October and November 2006 there were more conflicts

⁹⁸ Interview: Farmer in Mapea

⁹⁹ Interview: Farmer in Mapea

¹⁰⁰ Interview: Farmer in Mapea

¹⁰¹ Interview: Farmer in Mapea

¹⁰² Interview: Farmer in Mapea

than usual because of the drought, which had gone on for almost three years.¹⁰³ At this time there was almost no water at all. Water conflicts often occur between upstream and downstream stakeholders where the downstream stakeholders complain that the upstream stakeholders take too much water. In Kiru Valley the conflicts are closely related to water scarcity. The IFAD scheme facilitator said that he only receives complaints from the villages downstream the scheme, villages like Mapea. The conflicts in the area arise when there is a scarcity of water, during the dry season or droughts. Under these conditions the farmers in the valley all blame each other, even though the problem might just be that there is not enough water for everyone. The scheme facilitator said that conflicts within the scheme might arise when someone tries to cultivate rice during the dry season and claims a lot of water. The farmer in Mapea points out that the ones who suffer most when there is a water scarcity are the farmers in Mapea and Magugu. During the dry season or a drought the farmers within the IFAD scheme are still able to extract some water from the river and the big-scale farmers have wells they can take water from. Mapea only gets water from rains, if the rains do not come there will be no cultivation.¹⁰⁴

It is quite clear that the reason for the conflicts in Kiru Valley is water scarcity. All the informants agree that the conflicts are much worse during the dry season and droughts, when the water is extremely scarce. This year when the supply of water has been great there have been no complaints, and the conflicts have seemed to be toned out. The solutions on the conflicts should perhaps therefore focus primarily on reducing water scarcity. One of the main solution might not be to focus on advanced technologies but to use more efficient techniques that are affordable for the poor farmers, such as catching water on rooftops, using plant covers, recycling grey water and drip irrigation. These are all efficient methods, which everyone can afford, and they may reduce water scarcity by quite a lot.

Ostrom's principles on how to manage common-pool resources may also be a good example on how to reduce the conflicts in the region. She state that this kind of resource must have clearly defined boundaries, if not, the stakeholders of the resource will act in a rational manner giving the results of the theory of *the Tragedy of the Commons*. Who has the right to exploit the resource must therefore also be defined. This fits perfectly with the situation around the Dodumera River. Even though the members within the IFAD scheme and the boundaries of the available resource are clearly defined, the other stakeholders of the river are not. The other stakeholders may be able to exploit the river as much as they can. Many people

¹⁰³ Interview: Mohamed, *Scheme facilitator*

¹⁰⁴ Interview: Mohamed, *Scheme facilitator*

also immigrate to the area around the river illegally and therefore exploit the river at a maximum, to get as much profit from the resource as possible. In order for a common-pool resource to be governed in a sustainable way the laws and policies concerning how the resource is to be exploited must also be clearly defined. The design of these laws and policies must, in order to look out for the common good, be outlined by those who are affected by them. If the stakeholders of a resource are involved in the designing of the laws and policies they may be more inclined to follow them. In order to make the laws and policies more effective the one who breaks them must be sanctioned.

One of the most important steps in reducing conflict is to have a good conflict solution mechanism. The stakeholders must have an ongoing discussion on all the conflicts that might arise concerning the common resource. An example of a conflict solution mechanism is, in the case of Kiru Valley, a water committee. The big-scale farmers have a water committee, there is also a water committee for the whole IFAD scheme, and even Mapea has a water committee. The solution is not that every village has its own committee but that all the stakeholders within the Dodumera River have a joint water committee, where everyone has a voice, and one person's voice will count as much as the next. The governance over the IFAD irrigation scheme corresponds with Ostrom's eight principles; the members of the scheme are all clearly defined, if someone breaks the laws and policies they will be sanctioned, the scheme is governed by the farmers through a water committee, one part of the committee acts as a conflict-resolution mechanism. This governance has been very successful and might stand as an example of how the governance of the whole river basin might be improved and become sustainable. The farmers within the IFAD scheme are only one portion of all the stakeholders of the river. There are many stakeholders who are not included in the laws and policies of the scheme. For the governance of the whole river to be sustainable and fair, all the stakeholders of the river must be included in the policies and laws of the water administration, of the river.

According to the article *Local conflict and water*¹⁰⁵ there are four basic causes for a conflict: over scarce resources, over the distribution of a resource, over the quality of a resource and in large infrastructural projects. Conflicts over a scarce resource are the main causes for the conflicts in Kiru Valley; all the conflicts in the area arise because many farmers do not get enough water. The farmers in Mapea blame their water scarcity on an uneven distribution but if they got enough water from the river would they still complain if the other villages got

¹⁰⁵ The Conflict and Water Group. (2005) "*Local conflict and water: addressing conflicts in water projects*", Stockholm, Swedish Water House

more water? The conflicts in the valley are not related to quality, the question of water quality has never come up in any of the interviews done. There are no really big conflicts within the IFAD scheme; this is most likely related to the farmers' joint management over the scheme.

The IFAD poverty reduction strategy programme

One of IFAD's main focuses, concerning poverty reduction, is to improve access and management of land and water for the rural poor. One of the Fund's most important contributions, in eastern and southern Africa, is supporting the development and management of water for small-scale farmers. The Fund and governments are working together to transfer the management, operation and maintenance from the schemes to the stakeholders. This work requires not only the training and capacity-building of the stakeholders but also improvement of infrastructure, production technologies and linkage to markets. The IFAD project in Kiru Valley is an attempt to reduce poverty for the villages Mawemairo and Matufa through enabling the farmers to increase their control and management of the irrigation. One of the most essential steps in reducing poverty in the IFAD PRSP (Poverty Reduction Strategy Programme) is to enable the poor to control and manage resources and design policy in order to overcome poverty themselves. The construction of the irrigation scheme in Kiru Valley is just that, the scheme is built and financed by the Fund but the farmers manage it. The villages within the scheme have a water committee that manages finance and planning, operation and maintenance, security and distribution. There is also one part of the committee that manages the conflicts that might arise between the farmers within the scheme. The members of this committee are farmers who get water from the scheme. There is also one person who facilitates the whole scheme, a person elected among one of the members of the scheme. The project is about to face out and soon the farmers will manage the whole scheme all by themselves. If it continues to work as well as it has it will be a good example of how to enable the poor to manage resources on their own.

The aid coming from IFAD is focused on agricultural development. Agriculture is the basic foundation for the livelihoods of small-scale farmers. It is therefore a common belief that agricultural growth is the basic key to poverty reduction. This correlates with the projects IFAD has done in Kiru Valley, since the scheme has increased the livelihoods and production for both Mawemairo and Matufa.

The IFAD PRSP states that 85 percent of the extremely poor are dependent upon agriculture as their main source of income. This is also true in the region of Kiru Valley; if the farmers in

the villages cannot make a living on their agriculture they have to seek for an alternative income and maybe even move into the cities. The use of water for agriculture is no longer a big issue for the farmers in the villages Mawemairo and Matufa, because of the vast amount of water coming into the villages from the new irrigation scheme. They no longer need to seek for work outside the village. The situation is on the other hand very different for the farmers in Mapea. They only rely on rainwater, if the rains do not come they will not have any water for their agricultural use, which results in a failed cultivation. This may cause livelihood loss and the farmers are forced to seek for different ways to make a living.

The Fund states that there is enough human and natural resources for the rural poor to make them able to overcome poverty. But is it the same for every region? Maybe some regions just do not have enough natural resources to support their population. How is it in Kiru Valley, can the poverty be reduced for all the villages around the Dodumera River? The IFAD PRSP is focused on the most critical areas, with high or medium potential. Mawemairo and Matufa was one of these areas after the –1998 el Niño floods. The IFAD scheme has helped the villages develop by increasing production and livelihoods, and also making the cultivation more commercial. But how is it in Mapea? They have almost no water for irrigation except for rains. The farmers said that the soils in the village are very good, especially for cultivating rice because of the good water-holding capacity. It seems as if the critical area with high potential has been moved down to Mapea.

6. Conclusion

The IFAD irrigation scheme has contributed to a positive development in the villages Mawemairo and Matufa. It has helped to increase production, which in turn has increased the livelihoods in the two villages. The only negative affect that the scheme has contributed to, is the increase in diseases that come with an increase in water, such as the mosquito born disease malaria.

The scheme has had quite different effects on the village Mapea. The scheme has contributed to a decrease in the amount of water left in the river when it reaches Mapea. The farmers in the village were able to take some water from the river for irrigation, during the wet season, before the construction of the IFAD scheme. Nowadays they only rely on rain-fed irrigation.

The scheme has contributed to an unstable situation concerning the water supply for the farmers' plots.

The big-scale farmers did not complain on water scarcity before the construction of the IFAD scheme. Some conflicts in the valley have changed, instead of complains being directed at the big-scale farmers it is the opposite. The big-scale farmers located downstream of the scheme blame the scheme for taking too much water when there is a scarcity. The farmers in Mapea blamed the big-scale farmers for taking all the water in the river during the dry season, before the scheme was built. Now they blame the scheme for taking too much water during the wet season, leaving them with no water at all.

During the wet season there is very few conflicts within the IFAD scheme. Conflict may arise when there is a water scarcity, e.g. during a drought, and when someone tries to cultivate rice during the dry season. All these conflicts are addressed in the mediating committee. And those who disobey the laws and policies are sanctioned. The conflicts between farmers in Mawemairo and Matufa have been reduced since the scheme was built.

The water availability has been greatly improved for Mawemairo and Matufa. Before they could only cultivate maize and beans, now they have enough water to cultivate rice. However the availability of water from the Dodumera River has been reduced for Mapea. The problem of water scarcity has not been solved by the IFAD scheme; it has only helped two villages within the whole river basin. There is still an instability in the water supply of the river during the dry season and the occasional droughts, when the villages in the lower part of the river basin, like Mapea, do not get any water at all for irrigation. Mawemairo and Matufa do not have the same problem any more because of the IFAD irrigation scheme. It seems as if the critical area has been moved from Mawemairo and Matufa further down the river to Mapea.

The conclusion is that the conflicts in the valley are a result of the scarcity of water in the river basin. If the water were not scarce there would not be much conflict around the river.

There might be a few alternatives in solving the conflicts and water scarcity in the area. One alternative is to use more low-cost and efficient methods for irrigating the plots, such as drip irrigation, using plant covering in the riverbanks to minimize runoff, catching water on rooftops etc. Alternatives for reducing conflicts might lay in the management of the resource.

Using Ostrom's principles on governing common-pool resources, well-defined boundaries and stakeholders, laws and policies designed by the stakeholders etc, might be an alternative for the whole river basin and not just within the IFAD scheme.

The IFAD project of the irrigation scheme in Kiru Valley correlates quite well with the Fund's poverty reduction strategy programme. The Fund's aim is to help the poor in the region to help themselves, videlicet to enable the poor to self-govern resources in order to overcome poverty themselves. This is precisely what IFAD has done for Mawemairo and Matufa; the scheme is financed and built by the Fund but governed by the farmers within the scheme through a water committee.

7. Discussion

The IFAD irrigation scheme was built in order to help Mawemairo and Matufa after the el Niño floods had destroyed their own irrigation systems. The scheme has definitely contributed to a positive development of the two villages, but the fund never looked at what consequences the scheme might have on the villages downstream. Even if Mapea always have had a finite access to the water in the river, the farmers were able to lead some water from the river for irrigation during the rainy season, before the construction of the IFAD scheme. Nowadays there is not enough water left in the river for the village to be able to lead it to their plots. Still the matter on how much water they got from the river before can be discussed. How big of a difference did the water from the river contribute to? However, the question of why IFAD did not look at what might happen to Mapea before they constructed the scheme must be asked. Now Mapea has the criteria of the regions that IFAD give aid to, according to the IFAD poverty reduction strategy programme. Should not Mapea therefore be the Funds next focus? However, is it true that there is enough resources to sustain the whole valley? Can the problem be solved through an even distribution for everyone in the river basin? Or is there just not enough water to sustain all the stakeholders? The fluctuations of water availability in the area may be too great to be solved, there will probably always be a scarcity of water during the dry season no matter how the water is distributed. The conflicts in the area would probably not get resolved, even if everyone in the river basin would get the same amount of water. If there is not enough water to sustain everyone there would still be a scarcity of water, and the stakeholders would keep on blaming each other. Some of the facts from the interviews have made me draw the conclusion that it is not actually the unjust distribution of the water in

the river that is the real source of the conflicts, but livelihood loss due to scarcity. For example the farmer in Matufa only gets water once every other week while the farmer in Mawemairo gets water twice a week, still the farmer in Matufa does not complain, because he gets more water than before and suffers no livelihood loss. Would the farmers in Mapea still complain if they got enough water to cultivate their crops and as a result did not suffer any livelihood loss, even if they still got less water than other villages? The problem in the valley is not distribution but availability. When there is a scarcity it might be easier to blame it on an unjust distribution than to face the fact that the earth's resources are just not enough to sustain the vast human population growth. Human activity is at the root of the arising conflicts over resources. Conflicts are related to a scarcity of resources and scarcity is created by human overexploitation of these resources.

One of the big issues in the area of Kiru Valley is the conflict between the small-scale and the big-scale farmers. In order for the Dodumera River basin to be governed in a sustainable and just way all the stakeholders within the basin have to work together, in my opinion this is not possible as long as the influence and dependence is unequal. The big-scale farmers are not dependent on the other farmers in the area and they are not as dependent on the water from the river. They have enough economical resources to dig wells to get water for irrigation if there is a water scarcity in the river. The big-scale farmers also have enough economical resources to increase their influence on the administration of the river basin. Is not this a commonly occurring situation, that the smallholders who already are scraping at the bottom, with scarce access to resources leading to livelihood loss, are always the ones who falls short. The small-scale farmers and the big-scale farmers in Kiru Valley need to cooperate and for the cooperation to be successful they all need to be dependent on each other, will this ever happen without the aid of outside organisations? The IFAD irrigation scheme has helped in decreasing the gap between the big-scale farmers and the farmers in Mawemairo and Matufa. Could the Fund also help the other villages in the river basin? Or is the problem just too big? Even though Mapea has suffered from the construction of the scheme, IFAD has done something extremely good for Mawemairo and Matufa. Not just by building the irrigation scheme but also in enabling the farmers in the villages to self-govern the scheme. In my opinion the empowering of the poor and giving them the resources to overcome poverty themselves might just be the solution to poverty reduction.

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9. Appendix

Questions

Mr Mirisho:

- How does the IFAD irrigation scheme work?
- How is the water distributed?
- How is the water consumption monitored?
- What kind of conflicts exists in the area?
- How was the water distributed before?
- Were there any conflicts at that time?

Mr Mohamed:

- Could you describe the structure of the water committee?
- Could you give an example of how the negotiations of the water distribution?
- How dose the conflicts differ from rainy to dry season?
- Were there big conflicts last year during the drought?
- Is there a big immigration to the area?
- What do you consider to be the biggest problem with the irrigation?
- Do you get any complaints about the irrigation scheme?

Farmers:

- How many acres do you cultivate?
- What kind of crops do you cultivate?
 - Dry season?
 - Wet season?
- How do you get water for irrigation?
- How often?
 - Dry season?
 - Wet season?
- If from IFAD, how did you get water for irrigation before?
- What is your opinion on IFAD?
- Would you say that your life has improved or aggravated since the IFAD irrigation scheme started?