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A MICRO LEVEL ANALYSIS OF VIOLENT CONFLICT

Local Water Governance: Negotiating Water Access and Resolving Resource Conflicts in Tanzanian Irrigation Schemes

MICROCON Research Working Paper 33

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July 2010

Correct citation: Kramm, J. and Wirkus, L. 2010. *Local Water Governance: Negotiating Water Access and Resolving Resource Conflicts in Tanzanian Irrigation Schemes*. MICROCON Research Working Paper 33, Brighton: MICROCON

First published in 2010

ISBN 978 1 85864 945 5

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Local Water Governance: Negotiating Water Access and Resolving Resource Conflicts in Tanzanian Irrigation Schemes[1]

Johanna Kramm[2] and Lars Wirkus[3]

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Abstract: This paper explores conflictive negotiation processes over access to water. It focuses on the ability of farmers to access water in an irrigation scheme in Tanzania. In the case of irrigation, management and governance of water resources is a result of self-organization embedded in a matrix of institutional arrangements which derive from local formal and informal institutions. The governance system is characterized by conflictive negotiation processes over access of water. Conflicts occur over the direct extraction of water from the canal between single farmers, and about regulation patterns on the village level between the representatives of the different canals. Negotiation processes and the ability to access water are determined by the participants' social position and power. The village's social communities are highly heterogeneous and characterized by strong power differences (concerning capital, access to market, labour and authority). Even though conflicts about accessing water do arise, the existing institutional arrangements for the distribution are quite comprehensive and efficient. Nevertheless the exercising of these rules and the sanctioning differ according to the water availability.

[1] We acknowledge financial support from United Nations University and MICROCON. This research received research clearance from the Tanzania Commission for Science and Technology and the Arusha District Council. We are grateful for input and support from Els Lecoutere, Therése Rosenfeld and Florian Silangwa.
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1. Introduction

Water is a vital resource. In the last years influenced by the debate about global environmental change there has been an increasing awareness that water is also a scarce resource. The media discusses already about water wars (Süddeutsche Zeitung 2007; Guardian 2007). The Canadian researcher Homer-Dixon gave support for this alarming assertion by claiming that the renewable resource most likely to stimulate interstate resource war is river water (Homer-Dixon 1994). However, research on the relation of conflict between states and the water resource has shown that increasing scarcity of water resources has not been led to the outbreak of an interstate war (Wolf 1998, 2002; Brauch 2003: 745). Swatuk and Wirkus observe that there "is a spreading perception in the research community that water is – and will become increasingly – a source of violent conflict not in the international realm, but in the sub-national or local context" taking the form of "water point clashes between immediate users, and of 'water riots' " (Swatuk and Wirkus 2009: 18). Research findings presented in the paper are based upon investigation at the local level on how water users facing water scarcity, negotiate their access to water and what role institutions play in the context of water related conflicts. At the heart of the research lies the question of how access to and the distribution of the vital resource water is governed in a quite conflict prone setting, thereby focusing on the institutional structures and processes of water governance of an irrigation scheme in Tanzania.

Agriculture in Tanzania remains the most important economic sector: it contributes 45% of Tanzania´s GDP and nearly 30% of its export earnings, while employing over 80% of the nation´s work force (URT 2008: 1). Tanzanian agriculture, which is mostly rain-fed, remains susceptible to drought as well as to the inadequate and erratic nature of rainfall. Irrigated agriculture protects against drought and ensures food security. The largest proportion of the irrigated area (85.000-100.000 of 150.000 ha) is farmed by smallholders using diversion furrows (Kaswamila and Masuruli 2004: 4). Many people depend directly on irrigated agriculture to secure their livelihoods and it is therefore essential to understand local processes of water access and distribution.

After presenting the conceptual background of governance, institution and access theory, the methodological approach of this study is outlined. This section also introduces the research site: a village and the irrigation system at the Lake Eyasi in Tanzania (see map 1). The village and the irrigation system are exposed to the dynamic processes of increasing market linkages and population growth due to migration. The empirical findings are presented: highlighting the institutional framework, the actors and the negotiation processes on the village and canal level. A final synthesis draws the findings together and gives an outlook on future research challenges.

Map 1 Tanzania
(source: http://upload.wikimedia.org/wikipedia/commons/thumb/2/2a/Tanzania_map-fr.svg/1000px-Tanzania_map-fr.svg.png)

2. Conceptual Background: Local Water Governance – The Role of Institutions in the Context of Water Related Conflicts at the Local Level

2.1 Local Governance and Institutions

In order to explore issues of water access and organizational structures of water distribution this paper looks at the negotiation processes of diverse actors with different interests at the local level. This paper speaks not of water management, since this term implies certain issues like planning measures to improve performance of for instance an irrigation scheme, developing projects or applying technologies to reach a certain aim. As Biermann puts it "'management' is a term often related to notions of hierarchical steering, planning and controlling of social relations" (Biermann 2007: 2). The process of water distribution and thus accessing water in the scrutinized irrigation scheme is rather captured as governance. Governance is here understood as the coordination of collective action (Benz et al. 2007: 9). The governance perspective focuses on formal and informal rules, rule-making systems and actor networks on different societal levels (Biermann et al. 2009: 4).

The term governance is applied in several disciplines and therefore a variety of definitions exist. One of the most cited definitions of governance is that of the Commission on Global Governance: "Governance is the sum of the many ways individuals and institutions, public and private, manage their common affairs. It is a continuing process through which conflicting or diverse interests may be accommodated and co-operative action may be taken. It includes formal institutions and regimes empowered to enforce compliance, as well as informal arrangements that people and institutions either have agreed to or perceive to be in their interest" (Commission on Global Governance 1995). In this respect conflicts are regarded as tensions, oppositions and arguments between social units (individuals, groups and organizations) (Hillmann 1994).

The governance perspective focuses on the coordination of collective action and collective arrangements. Institutions play an important role in the coordination of collective action, since they reduce uncertainty and promote coordination and cooperation among individuals. They structure action and give guidance for patterns of action. Institutional arrangements shape social interactions and the way a resource is accessed and used. One of the most common definitions stems from Douglass North. According to North (1992: 3) institutions are "the rules of the game", they are "humanly devised constraints that structure political, economic and social interaction" and enable a more secure and orderly interaction. This definition differentiates between institutions and organizations. Others definitions are broader and cover institutions as rules as well as organizations (Vollmer et al. 2009: 4). Sociological and anthropological approaches view institutions not as the rules themselves, but as regularised patterns of behaviour that emerge from underlying structures or sets of "rules in use" (Leach et al. 1997: 26). Regularised practices, performed over time, eventually

constitute an institution (Leach et al. 1997: 26). In this sense institutional arrangements may not be conceived as a fixed framework, they are rather constantly made and remade by social practice. The interrelationship between institutions and social practice is characterized by mutual influence: On the one hand, social practice is shaped and constrained by institutions; on the other hand institutions are reproduced and also amended by social practice.

Often, a general distinction is made between formal and informal institutions. Formal institutions comprise codified and written rules, directives and contracts that are outlined in constitutions, articles of law, company directives, working contracts etc. (North 1992: 55ff). They are exercised through organizations, which can be public (the legal system, bureaucratic authorities, political parties, etc.), economic (companies, trade unions, etc.) or educational (schools, universities, etc.) (North 1992) and thus require exogenous enforcement by a third party (Leach et al. 1997: 26). Informal institutions by contrast subsume (often unexpressed) cultural norms, taboos and values, conventions, customs and practices that are (re)produced by all members of the society (North 1992: 43ff). They are considered to be socially embedded. Informal institutions are endogenously enforced; they are upheld by mutual agreement among the social actors involved or by relations of power and authority between them (Leach et al. 1997: 26).

The dichotomous classification of institutions as formal or informal, traditional or modern is widely rejected in the literature and rather referred to as a continuum from informal to formal institutions (Etzold et al. 2009: 7). But the multiplicity of institutional relations in which people are engaged at any given time is best expressed as institutional matrix in which social action is positioned and embedded (Leach et al. 1997; North 1992). Thus, institutions can possess formal and informal aspects at the same time (Etzold et al. 2009: 7). The institutional architecture of resource access, for instance, can be a collage of informal and formal institutional arrangements. Additionally, the set of rules (informal or formal) applicable and accessible for an actor depends on his or her position in the network of power, knowledge and social status.

In conclusion the governance perspective focuses on social negotiation processes of collective arrangements of different actors. These negotiation processes are taking place in a social arena, but find also manifestation in the physical space (Bohle and Fünfgeld 2007; Bohle 2007).

2.2 Framing Access to Water

For many people access to natural resources is the basis for sustainable livelihoods. Especially rural households depend on access to and availability of fertile land, grazing grounds, water, woods and fish grounds. When it comes to issues of resource access and sustainable utilization, property rights have been given attention. Property rights involve a social relationship between the right holder, other people, and an institution to back up the claim (Meinzen-Dick 2000:7). The backing institutions can

derive from statutory law or customary law. Property-holders can assert their rights, with the associated enforcement mechanism, to control access. These different rights, deriving from state law, customary law or convention, are not equivalent. Rights over land, trees, water are not usually homogenous “ownership” rights that permit one to do anything with the resource, but they may rather be considered as bundles of rights that may be held by different parties (Meinzen-Dick and Nkonya 2008: 15).

The farmers use the water to irrigate their fields, to cultivate their crops for domestic use or sale. Thus, the access to water contributes to the benefit of the farmer. In most cases, rights to use water and access irrigation system infrastructure are linked to land rights within an irrigation system. Nevertheless property rights to water and land does not mean that each farmer benefits from the resources in the same manner. Therefore scrutinizing only the layer of rights and laws cannot fully grasp all modes of accessing water. There are other factors which (can) play an immense role in getting the benefit and enforce the right to water and therefore need to be considered.

The notion of access developed by Ribot and Peluso (2003) offers a broader view than the one by property theorists. They argue that property as a bundle of rights is only one set of factors in a larger array of institutions, social and political-economic relations, and discursive strategies that shape access to benefit flows. Therefore they define access not only as the *right* to benefit from things, but the *ability* to benefit from things including material objects, persons, institutions, and symbols (Ribot and Peluso 2003: 153). Access relations are dynamic, depending on an individual´s or group´s position and power. The terms of access may change by different political-economic circumstances and thus may change the specific individual or groups who benefit most of a set of resources (Ribot and Peluso 2003: 158).

Where the property theorists speak of a bundle of rights, Ribot and Peluso (2003) use the term bundles of power which constitute a web of access. In the web of access which is characterised of power relations and a constant struggle of different actors, winners and looser can be found. In order to disaggregate the means by which actors are enabled to gain, control and maintain access to a resource, they identify different strands of mechanisms. These are the strand of the rights-based access, which matches with the realm of property and the strand of the structural and relational mechanisms of access. These structural and relational mechanisms are technology, capital, markets, knowledge, authority, social identity and social relations that can shape or influence access and assign the actor a position in the web of power (Ribot and Peluso 2003: 160-161). Besides social processes the environmental circumstances matter as well. As Langridge et al. (2006: 3) emphasize that opportunities for access are facilitated not only by social relations, but also by the geographic location and climate of a region and the ecological integrity of the resource base. This is one of the crucial points since geographical location and biophysical conditions matter when analyzing access to water in an irrigation scheme.

Beside these access mechanisms the disaggregation of the endowment of an actor needs to be considered. In the Sustainable Livelihoods Framework the endowment of an actor is formed by different assets or capitals (Scoones 1998). The capitals are: The human capital, natural capital, financial capital, social capital and physical capital (DFID 1999).

The different combination of assets available to the actor and how these are used in a most beneficial way is captured by the capability perspective of Sen: "[…] capability concentrates on the opportunity to be able to have combinations of functionings […] and the person is free to make use of this opportunity or not. A capability reflects the alternative combinations of functionings from which the person can choose one combination" (Sen 2005: 154-155).

In the negotiation process of accessing water the actors can use and transform different assets (Bourdieu 1983) to enhance their capability to benefit from a resource and to secure their livelihoods. This paper takes from the approach of access theory the idea that access should be conceived broader namely as the ability to benefit from a resource, and takes from the capability approach the idea that certain assets are crucial for the ability to transform people's access rights in capabilities. The transformation process should not be conceived as mechanistic, but as social negotiation process with winners and losers.

2.3 Legal Regulation of Water Management in Tanzania

Tanzania has a long history of evolving water management and governance mechanisms (Maganga 2007; Huggins 2000). "[I]n pre-colonial time, management of water was an integral part of overall customary laws and behavioural norms of each tribal society. […] Some of these customs are still in operation, while others have been discarded or modified" (Huggins 2000: 5). Huggins summarized that "[…] most indigenous systems of water management in Kenya and Tanzania were based on the concept that water for certain, limited uses was free, open-access resource, while access for other uses was regulated and controlled by specific groups (whether chiefs, elders, clan leaders, or household heads)". Against this background the modern interventions in water management, e.g. the widespread water reforms which are taking place, driven by the idea of Integrated Water Resources Management (IWRM), were superimposed.

Nowadays Tanzania is experiencing a reform of the water sector. As many other developing countries it is implementing Integrated Water Resource Management (IWRM). The approach of the IWRM in Tanzania is also reflected in the new legal policy bodies like the National Water Policy 2002 and the Water Sector Development Programme 2006-2025 which aims at attaining the objectives of the National Water Policy 2002. These policies stress an integrated approach for water management which is participatory, multi-sectoral and multidisciplinary.

Thus IWRM is implemented through River Basin Management. Tanzania is divided into nine River Basins. The River Basin Management is established in order to manage water utilization by different users, especially to allocate water rights; legalize, grant, modify and control water abstractions; protect the existing water rights and take defaulters of the Water Utilisation (Control and Regulation) Act, 1974 to court (Maganga et al. 2004).

The River Basin Management (figure 1) includes several offices and committees at several levels: There is a committee and officers at the basin level, the catchment level and the sub-catchment level, while a Water User Association (WUAs) (in some cases Irrigation Organization) is the institution which encompasses the water users at the local level. The Water Users Associations are obliged to register to obtain a 'water right' and manage water for multiple uses at village and ward level (van Koppen 2004: 1). The first installed Water Basins were Pangani Basin (since 1991) and Rufiji Basin (since 1993). The catchment of Lake Eyasi, in which the research took place, is located in the Internal Drainage Basin, which had been established in 2003 (see map 2, no. VI). In the last years there has been intensive researching regarding the impacts of the implementation on the Pangani (map 2 no. I) and Rufiji (map 2 no. III) Basins (Maganga 2003; Maganga et al. 2004).

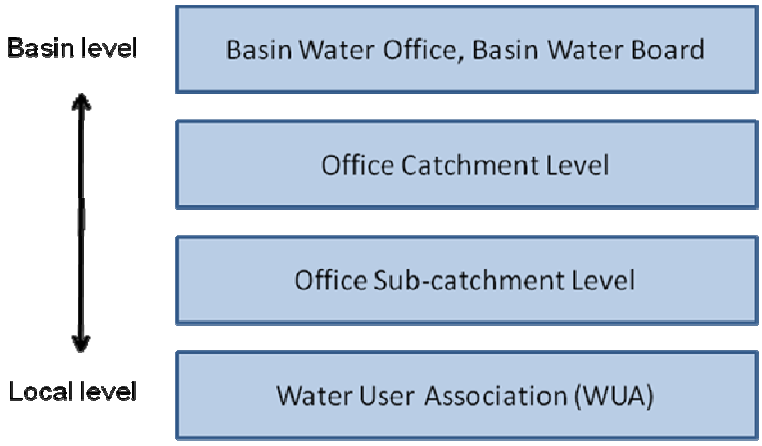
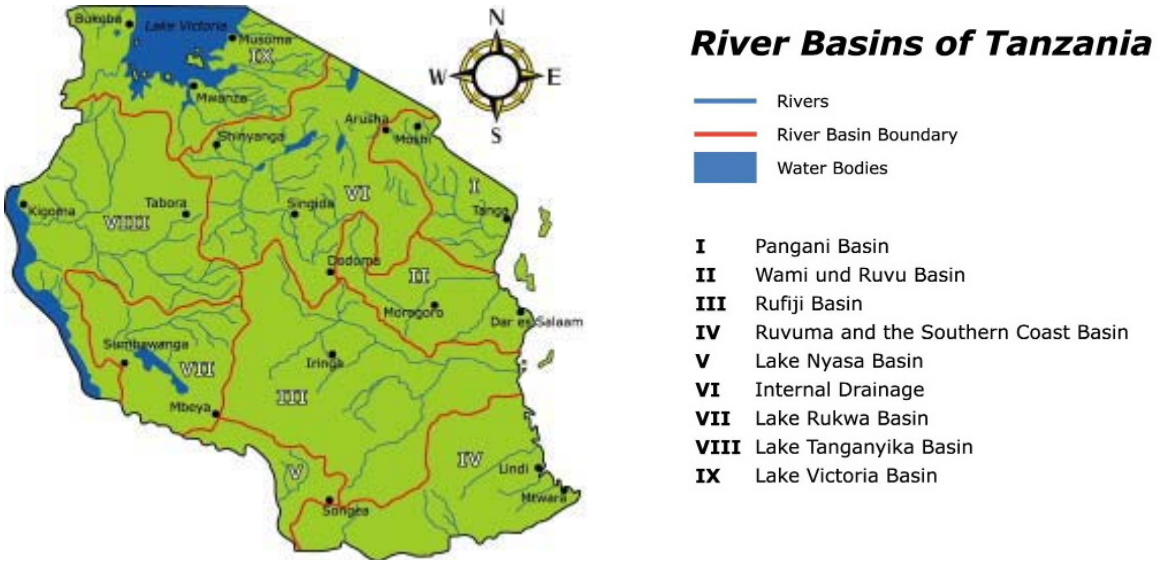


Figure 1 Levels of Water Management in Tanzania (draft Kramm and Wirkus based on: URT: National Water Sector Development Strategy 2006-2010: 14)

Scrutinizing the implementation process and grade of implementation, it has been remarkable to witness in which ways the process and the whole program have deficits. Maganga et al. pointed out that the capacities of the Rufiji Basin Water Office are overstretched and the small number of staff is not able to master the tasks (Maganga et al. 2004: 1338).

In many cases water abstractions takes place where the Water Basin Officers have little access. Van Koppen, Sokile, Hatibu et al. (2004: 2) strongly criticise the new water rights and fee system. In areas where water fees have already been introduced negative impacts like competition and conflicts between water users are exacerbated. Also there is little understanding of why some people have to pay for a resource which they consider to be of free use (Maganga et al. 2004: 1338). These are cases



Map 2 River Basins of Tanzania (Source: URT: National Water Sector Development Strategy 2006-2010: 14)

where customary law conflicts with statutory law. Many voices emphasize the point that water reforms in Tanzania have focused on the use of statutory legal systems to regulate the utilization of water resources, despite the fact that Tanzania operates under a plural legal system. Since the state penetration to the local level is rather thin, local regulation regimes exist and develop over time. Customary law is based on customs and is not necessarily traditional. It is usually locally inspired, unwritten and considered to be informal. This implies that statutory law of the national level faces customary law on the local level. But in reality there is not a clear dichotomy between statutory and customary law. It is rather seen as a continuum, also where local legal arrangements are influenced by statutory law and where both “pure types” are rather intermingled, having a flexible form depending on the situation and actors applied.

3. Research Approach and Methodology

3.1 Research Questions and Object of Research

The water distribution in Mang´ola is a dynamic social process, which is shaped by rules and regulations, and still needs to be negotiated on a daily basis. Hence accessing water is understood as a negotiation process, which is bound in an institutional matrix of water governance. To answer the first research question

> *"In which 'formal' and 'informal' institutions and organizations of water management are conflictive negotiations over access to water embedded, and how do the framing institutions shape the negotiating processes?"*

the paper looks at the institutional architecture of water governance of the irrigation system. It assesses the rights and duties that need to be fulfilled for gaining access to water and how are they backed up by institutions, hence shaping the access of the actors.

The second research question explores the approach to water from the actor´s level. It takes into account that the negotiation processes are not solely shaped by institutions, but have to be placed in a web of power relations where access mechanisms (like access to capital and labour, authority, social relations) and the actor´s asset endowment influence the agency and strategies of the actors.

> *"What are the different strategies developed by individuals or group actors to control, enforce or secure their access to water resources and social arenas?*

Institutional constraints are reproduced by agency, but can still be amended. Therefore the paper looks not only on institutions but also on agency - how are these institutions in a daily wise produced by agency and at the same time how do they constrain agency.

As Ribot and Peluso stated (2003: 173): "Access analysis can be focused on the policy environments that enable and disable different actors to gain, maintain, or control resource access or the micro dynamic of who benefits from resources and how." The objective of this research paper is to delineate these micro dynamics by looking on the one hand at the constraining factors as well as on the other hand on the agency of the actors and their benefit. Of interest are questions of equity of resource use and of the distribution of the benefits. Beside the processes, the outcomes of the negotiation processes are as well of interest: Who are the losers, who are the winners in this game?

3.2 Methods

The paper is based on two and a half months of field research in Tanzania. The research followed a qualitative, ethnographic approach and most of the data generated are of qualitative nature, since an in-depth analysis of social processes and perceptions is needed. The design of the research was kept under review while the study proceeded and was revised in a hermeneutic spiral (Mayring 2002: 30). Different research methods were applied: Household questionnaire, Participatory Methods, Extended Case Method, Expert Interviews and Participant Observation. The research was conducted in four sub-villages (see map 3) of Mang´ola Barrazani (Miswakini, Mayfowla, Narray, Anza) with a focus on several canals in these sub-villages.

Household Questionnaire

A household questionnaire was conducted in three sub-villages of Mang´ola Barrazani (Mayfowla, Miswakini and Narray), which included open as well as some closed questions. The household questionnaire was conceptualized to generate a fundamental understanding about household composition, property regimes, labour force and origin of household members. The interviewees were chosen in a random sample. The household questionnaire provides a good impression of the livelihoods of the farmers and established a first contact with the people and their water problems.

Participatory Methods

PRA (Participatory Rural Appraisal) tools compose the second block. The participants of the discussions were either drawn from interviewees of the micro census suggested by the assistant or randomly picked according to the required characteristics (gender, rent, own, worker). The group sizes ranged from 2-5 participants. Several topics were covered by and assessed during the focus group discussions:

- Focus group discussion on institutional arrangements, how to access water, which rules exist, which duties have to be fulfilled for getting water were conducted. This task was done in every sub-village with a stratified purposive sampling by the selection criterion of socio-economic background (determined by property ownership and employment: farmers who own land, farmers who rent and workers).
- Seasonal diagrams were made by mixed (gender, land ownership) groups of farmers in four sub-villages (Mayfowla, Miswakini, Narray, Anza). The diagram was conducted to identify periods of water scarcity and water problems. It showed that every sub-village has different cropping patterns with different water requirements.
- In social group ranking sessions, different groups of farmers and their access to water and services were discussed. This was done with groups of farmer who rent land and farmers who own land.

- The development of water regulation was discussed in the form of a time line, three times with three different elders. The elders had been holders of important water distribution functions and had been identified through consultations with farmers. This method aimed at depicting the evolution of regulation nowadays.

Extended Case Method

In-depth interviews with people involved in violent conflicts about the evolution and solution of the argument were conducted. This was done in three cases.

Expert Interviews

Expert interviews were conducted with various officials involved in water management of the village, as well as officials on the district and national level. Issues of water regulations, rule-making and conflict solutions were discussed. For a list of the interview partners see appendix.

Participant Observation

By participating in daily social interactions and practices of the farmers, e.g. in water meetings at canals and meetings of all Bwana Majis[4] in the village office, but also in farming work like irrigating, harvesting and planting information was collected.

Almost all interviews were conducted in Swahili (except in cases were interviewees could and wanted to conduct the interview in English). Both the author and the interpreter were taking notes during the interviews.

3.3 Limits of Research

Overall, the methods were well applicable. The data collection was conducted accordingly to the anonymity, confidentiality and security principles of the MICROCON project. Even though the interviewees were informed about anonymity in some cases there were limits regarding personal information on deviation of water distribution rules. Some issues discussed with the participants were quite personal and it is obvious that not everybody is willing to speak openly about habits and issues which might be socially and morally delicate. These limits were considered when reflecting on the data.

Also the language barrier was a limitation. In order to reduce misunderstandings, after every interview the author and interpreter reviewed the interview notes to ensure a clear understanding. This was important since some information had to be embedded in the local, cultural context to gain full understanding. Nevertheless the interpretation process filters and shapes the information due to the language barrier. Unfortunately the second interpreter for facilitating the group discussion was not available, but the research was adapted to this circumstance. The interviewees were very cooperative,

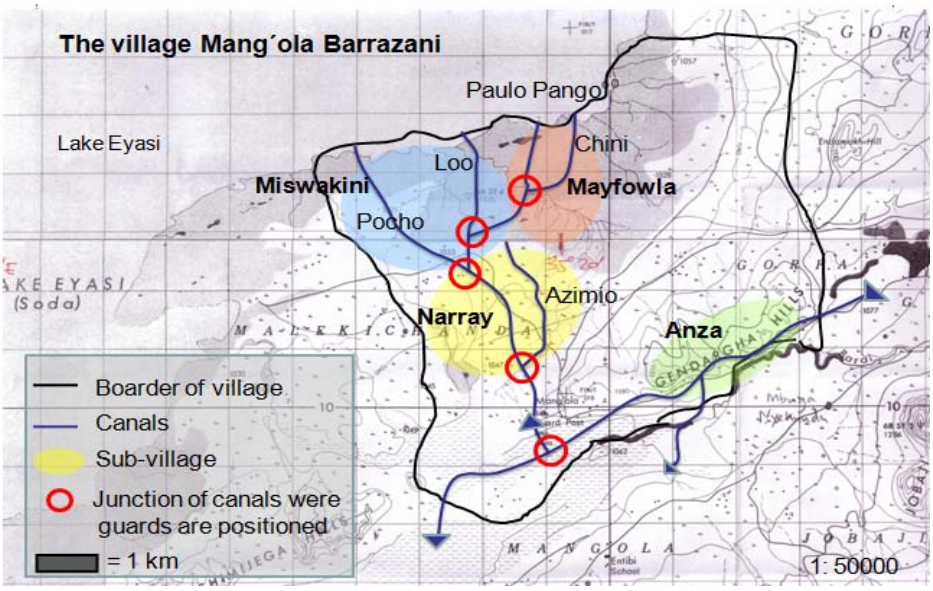
[4] Bwana Swahili for Mister, Sir, Man; Maji Swahili for water, Bwana Maji is best translated as Water Officer

but most of them hoped the author could help them in some way, particularly with financial support for infrastructure.

3.4 Selection of Research Site

The region around Lake Eyasi was chosen, since dynamic processes in land use change were reported (Bollig, M. 2008 personal information). The population has been rapidly increased, market oriented farming had been introduced, owed by environmental degradation. Little research has been done about the area so far.

After a preliminary visit to the villages Mang´ola Barrazani, Mbuyu Nkunda and Qangdend (Karatu District, Arusha Region) Mang´ola Barrazani[5] was chosen for research since it was the biggest village with the most water troubles. Whilst attending a meeting of persons involved in water management (Village Executive Officer, Ward Agriculture Officer, Sub-villages Leaders, Bwana Majis from different canals) several severe water problems were discussed and located.



Map 3 Research site: Irrigation System (source: authors´ draft based on Map of Mang´ola (URT 1975) 1:50000)

Based on this consultation four sub-villages (see map 3)[6] were chosen to investigate the water distribution: Two sub-villages located downstream (Miswakini map 3 blue, Mayfowla map 3 red), one in an interim position (Azimio map 3 yellow) and the last one representing the upstream location (Anza map 3 green)[7]. These four selected sites are exposed to different degrees of water availability. The two locations downstream (Miswakini, Mayfowla) are experiencing the most severe problems of

[5] In the following Mang´ola Barrazani will be named just as Mang´ola.
[6] In map 3 the four sub-villages are coloured and the scrutinized canals are labelled with names.
[7] Mang´ola village has nine main channels. Five of them have been studied intensively (see map 3). All of them are main canals with a bunch of side arms and smaller furrows. Therefore these canals could rather be referred to as canal complexes.

sufficient water availability, while the other two (Narray interim position and Anza upstream) rarely have complaints about water availability.

In conclusion, the research site was chosen since highly dynamic processes are taking place in the area (like agricultural expansion, population growth) and since different conditions of water availability exist. Mang´ola constitutes an arena for different actors with different socio-economic backgrounds to contest access to natural resources like land and water in order to gain a benefit. Two arenas of negotiation appear to be interesting: the arena of negotiation between farmers at the canal level and the arena of negotiation between downstream and upstream farmers at the village level.

4. Livelihoods in a Changing Social and Ecological Environment

The climate conditions vary a lot in Karatu District. While in Karatu, the capital of Karatu District, recorded mean annual rainfall ranges between 700-900 mm, the Lake Eyasi Basin is primarily a semi-arid region with sparse vegetation, characterized by low, erratic rainfall (Mang'ola has a mean annual rainfall of 374 mm) and high daily temperatures (Ø 25-30°C) (Magoggo, Brom, van der Wal 1994: 73). Almost all agricultural production in this area depends on irrigation. Mang´ola and its neighbouring villages have gravity-fed irrigation schemes. Mang´ola River provides the water with its source (Qangdend Spring) located in a neighbour village. At the border of Mang'ola village the Barrai River flows into Mang'ola River. The Barrai River originates in Endabash and Oldeani at the foot of the Ngorongoro Mountains and is an intermittent river with no water during the dry season but heavy floods during the rainy season. Mang´ola and its neighbouring villages are known for their cash crop production of onions and the areas has been named as the "onion belt" (Boudreau 1999: 6).

While other small scale irrigation systems in Tanzania have been established over a hundred years ago (e.g. at Kilimanjaro), the land around Lake Eyasi was originally used by pastoralists Datoga and by the Hadzabe hunters and gatherers. First agricultural endeavours were undertaken during colonial times by German and English settlers. The starting point for agriculture expansion was given in the 1970s. Due to a severe drought the government decided to foster (this included forced migration) the settlement of people to Mang´ola area in order to expand agriculture and also the Nyerere´s Villagization program played a role in the resettlement. In 1974 Mang´ola was registered as a village. People from the Mbulu Highlands and from Karatu District, mainly Iraqw people migrated to Mang´ola. Land for agriculture was available for free until 1992. Since then the influx of people has not stopped and farmers who own land lease it to newcomers. Mang´ola Barrazani is an economically prospering village. With the expansion of agriculture merchants and craftsmen are settling down and open up their small business in the village centre.

There is a variety of reasons for the continuing influx of people to Mang´ola (table 1). The fact that water is available all year and thus crops can be planted three times a year (three seasons) is the main

pull factor for people to move to Mang´ola. The agricultural production generates a labour demand and pulls young men and women from other regions to the village to gain income as worker or casual labour.

Several reasons, which can be divided into pull and push factors, foster migration to Mang´ola Ward:

Pull factors:

- Availability of water throughout the year
- Three seasons (three crops can be cropped in a year) and the cash crop onion
- Diversity of income generation: Jobs in form of daily labour (kibarua). Due to growing land scarcity in the surrounding areas like Mbulu central area, the income options in Mang´ola are very attractive for migrant workers.
- Prospect to crop on an own piece of land (for rent, land for free was available until 1992)
- Health services. Since the 1990s Mang'ola has a hospital run by a Spanish catholic mission.

Push factors:

- Dependence on rain fed agriculture in home region
- Land scarcity, or no land available due to big plantations in Oldeani and Mang'ola Chini
- No sufficient employment in the home areas

Table 1 Push and Pull Factors of Migration to Mang´ola Barrazani (source: authors´ survey)

Population in Mang´ola has grown from 480 people in 1984 to 7480 people in 2004 and 8450 people in 2008 (source: Village Office Mang´ola Barrazani). Nowadays people have the impression that the land use has reached the limit of capacity. Especially during onion season, all plots which can be irrigated are cultivated. The water demand continued to increase in the last ten years even despite the fact that all plots in the village have already been occupied. This is due to the economic attraction of the cash crop onion. As elsewhere elaborated (Kramm 2010) the growing influx of people is accompanied by a growing anonymity and reduction of social control.

Excursus: Irrigation in Tanzania

Some authors group the irrigation farming in Tanzania into three categories (Kaswamila and Masuruli, 2004; URT 2008).

The first category forms the "traditional smallholder irrigation" system. In this case individual farmers or groups of farmers run these schemes by diverting water from available water resources like rivers and springs to their fields. This category covers relatively small and scattered areas, often not more than 5 ha. The farmers employ traditional methods, like furrows and flooding their fields and the water intake structures are often temporary, having to be replaced from time to time. Much of the diverted water is lost due to seepage before reaching the field. The overall assessment of "traditional smallholder irrigation" is that the irrigation efficiency is generally very low.

The second category is classified as the "modern small scale holder/village irrigation scheme". The

main characteristic is that in most cases these are planned and constructed by central/local government, which bears the costs of head works, the main canal, and where necessary the storage reservoir. In most cases the distribution of water, land preparation and decisions on what should be grown, as well as scheduling, are the responsibilities of the farmers. The authors state that the performance results are poor despite a lot of money being spent to construct and sustain these schemes, and nearly all of them became unsuccessful and degraded after a few years (Kaswamila and Masuruli 2004: 4).

The third category is "large scale irrigated private/public plantations and estates". These are large scale farms growing high value crops for export and/or local consumption. They are centrally managed by either private or parastatal companies and generally have quite efficient irrigation systems. They require large capital, skilled investment and manpower. Due to a lack of capital, low technological know-how and high maintenance costs of large irrigation schemes, rural farmers cannot afford this type of irrigation.

The irrigation scheme of Mang´ola does not fit into one of the above mentioned categories perfectly. The farmers themselves call their irrigation scheme traditional, because they are using simple "traditional" irrigation techniques. Irrigation agriculture is mainly practiced through flooding the plots using traditional furrows. To divert the water at canal junctions or intakes, small dams are built by using sand, mud and branches. The canals have been built gradually over the last decades. Despite some recently made construction works on a very small number of canals the whole canal system consists of simple unlined canals and furrows. The responsibility of the organization of the water distribution is assumed by the farmers. According to the infrastructure and organization structure the irrigation scheme of Mang'ola can be located in the overlap of the first and second category. But when it comes to the point of performance none of these classification characteristics reflect the situation of Mang'ola. Despite the fact of using "traditional" irrigation technology, irrigation endeavours have been expanding in the last decades. This is due to the agricultural performance of the scheme: Mang'ola Ward (consisting of Mang'ola Barrazani and two smaller villages) and the neighbouring Barrai Ward (Karatu District) are one of the major onion production areas in Tanzania (SLE 2008: 108). Comparative Studies have revealed that even the onion yields in Mang'ola double the ones achieved in similar production systems in Kenya (Nyoro, Wanzala, Awour 2001: 11). The onions are not only sold in Tanzania, but are also exported to Kenya, where there is a high demand due to their superior quality over the Kenyan onions (Nyoro, Wanzala, Awour 2001: 12).

5. Local Water Governance and Conflictive Negotiation Processes

5.1 The Institutional Architecture of Water Distribution

In the Ward (administrative unit) where Mang´ola Barrazani is located the latest national policy reforms (chapter 2.3), namely the water right-fee system, has not been established yet. An official at the Ministry of Water explained that the implementation process is delayed and that there should already be a registered Irrigation Organization in Mang´ola. An Irrigation Organization is a form of Water User Association which is particularly responsible for irrigation affairs. The delay is due to the fact that the Internal Drainage Basin (the River Basin in which the Ward is located) is rather new (established in 2003), and the Ward is quite distant from the Basin Water Office (located in Singida). Additionally in this basin the need for an Integrated Water Resource Management (IWRM) is not urgent, not like e.g. in Rufiji Basin where different sectors collide, as the official stated (Interview Assistant Director). Priority of the IWRM implementation process is given to the Rufiji and Pangani Basin.

Since the reform process has not reached Mang´ola the organization of the water distribution lies in the hands of the farmers. They are organized along the canals. The farmers of each canal have elected one farmer who is in charge of coordinating the water distribution (Bwana Maji[8]) and one person who is in charge of arranging the cleaning of the canal (Bwana Mfreji[9]). The number of farmers a Bwana Maji is responsible for varies from 15 up to 110. The field sizes at the canals range from 0.25 acre up to 20 acres. But the average size of the fields is between 1 and 2 acres.
In the last years the organizational structure has expanded at some canals and includes also a chairman of the canal, a secretary and a cashier. Elections take place every second year. Only men can be elected to become a Bwana Maji and a Bwana Mfreji[10]. The work is unsalaried. On the one hand, the Bwana Majis perceive it as an honour that they have been elected by the people, on the other hand they are aware that the work is hard and time consuming. Whereas some regulation and organizational structures (like the chairman, secretary etc.) are rather new, nobody was able to tell exactly when the post of Bwana Maji was established. Elders remembered that even back in the 1960s there had been a Bwana Maji.

The Bwana Maji plays the most important role in the direct water distribution since he is organizing and supervising the distribution at the canal level. During irrigation the Bwana Maji or an assistant is supposed to be close to the canal, in order to oversee the water distribution. If any argument about water arises between farmers the Bwana Maji can immediately mediate and impose a sanction.

[8] Bwana Swahili for Mister, Sir, Man; Maji Swahili for water, Bwana Maji is best translated as Water Officer.
[9] Mfreji Swahili for canal
[10] In the view of (male) farmers the requirements a Bwana Maji needs to fulfil, including physical strength, a strong personality to coerce farmers to adhere to the rules, mediate conflicts and work at night on the field and canal, can only be met by men.

Furthermore in the meeting at the village office the Bwana Maji represents the interest of their farmers.

The water distributers (Bwana Maji) are embedded in a wider water governance structure. At the village level the Village Executive Officer (VEO) and the Ward Agriculture Officer are important for water issues regarding the whole irrigation system. The VEO calls all Bwana Majis and sub-village leaders into the village office every couple of months to receive reports of the Bwana Majis and discuss problems. This meeting is also the opportunity for the village and ward officials to pass on information from the district level. In addition the Village Executive Officer mediates between farmers as well, and also arguments or complains about the Bwana Maji are brought to him.

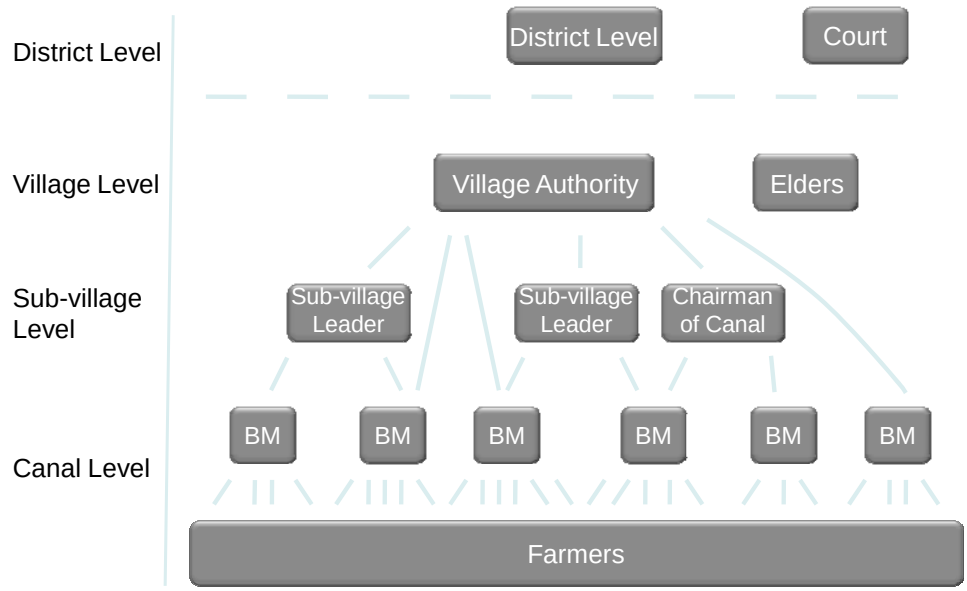
In the context of ongoing decentralisation, processes, by-laws have been created in the villages recently, concerning a bunch of affairs ranging from tax matters to water management. These by-laws are signed by court and have a formal character.

The by-laws concerning water for irrigation:

1. All water must be distributed by the Bwana Maji, it is not allowed to take water without permission of the Bwana Maji
2. Water is not allowed to enter the roads (fine 15.000 TZS)
3. It is not allowed to wash a chemical canister in the canal, or to put chemicals in the water (fine between 5.000-10.000 TZS)
4. It is not allowed to wash clothes or your body in the water of the canal (fine 5.000 TZS)

Table 2 By-laws concerning Water for Irrigation (source: authors´ survey)

Besides the rules of the village level there are also rules regarding the daily water distribution made by all Bwana Majis. Rule breaking is fined. Arguments and rule violation of farmers is first mediated by the Bwana Maji, who also collects the fine. If the Bwana Maji is not able to solve the conflict or the assaulted is not willing to pay, the person is send to the sub-village leader or at some canals to the Chairman of Canal (see figure 2). If the case can still not be solved, the Village Executive Officer is responsible for the legal practice of the dispute. At every level the fine increases. These rules guide the interaction, but nevertheless are still negotiable. So it can be the case that fines are cancelled if the culprit excuses his deed during a canal meeting and the other farmers of the canal accept that.



BM = Bwana Maji (Water Officer)

Figure 2 Institutional Setup (Kramm 2010)

In cases of violent arguments the case is handed over to either the elders (wazee) or the Ward Court. The culprit has to consult elders in order to initiate the conciliation process. The temporary Ward Court is held in the neighbouring village Ghorfani every month with a judge coming from Karatu.

The institutional architecture of the water governance comprises formal and informal aspects. The water regulation of the Mang´ola is a collage of different institutions with different degrees of formality and informality. The post of the Bwana Maji is locally developed and strongly connected with the place. However, this initially rather customary position has been recently formalised by the by-law and the effects of this are yet to be seen. Nevertheless, it has an informal character compared to a Water User Association which is endowed with a legal water right of statutory law and therefore ranges in the legal sphere of formal water management (see fig. 3). The village authority (Village Executive Officer, Village Council, Ward Agriculture Officer) is of formal character since established by the state and constitutes the lowest level of state administration. But still it is strongly embedded into the social sphere of the village: their practices and customs. The Village Executive Officer and Ward Agriculture Officer execute tasks which might belong to the realm of the duties of a leader of an Irrigation Organization or Water User Association. The rules of the water distribution derive from local circumstances and must be seen as social agreements of all farmers. Even though they are rather informal from a state legal perspective, for the social realm of the local farmers they have a formal character in this location since everybody knows them and sometimes they are even written down and thus codified.

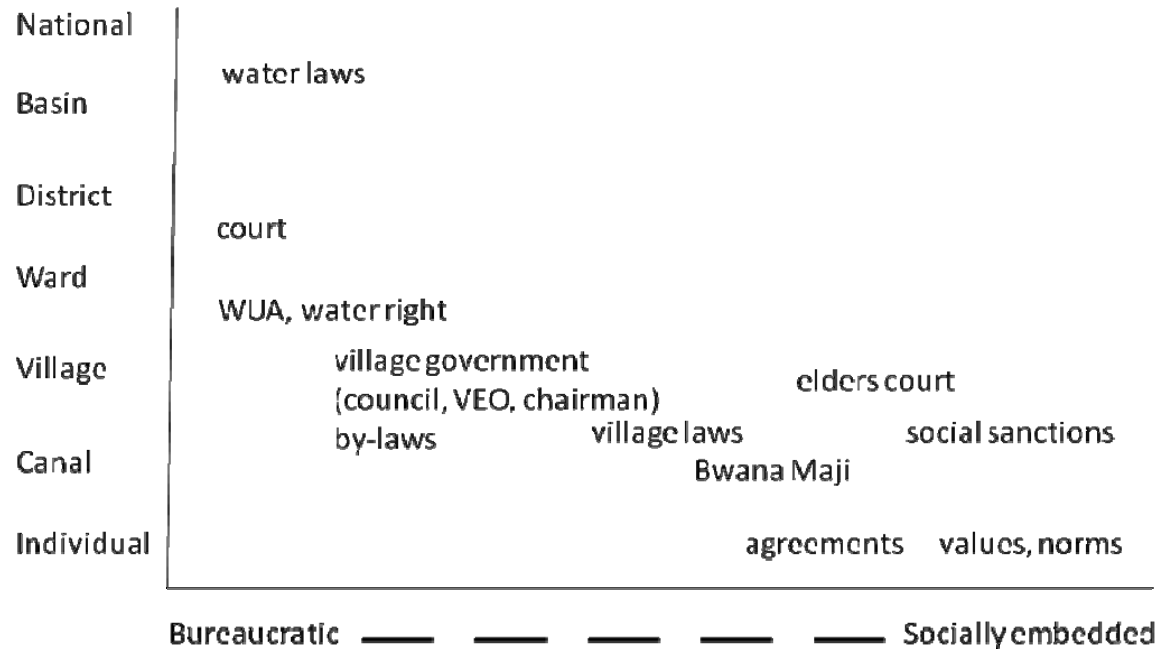


Figure 3 Institutional Continuum (authors´ draft)

5.2 Geography of Institutional Arrangements

The main themes of the following section are the rights and duties that need to be fulfilled for gaining water access and how they are backed up by institutions, hence shaping the access of the actors. To receive the right to take water, a bunch of duties which regulate the distribution of water could be identified. These duties include for instance meetings, cleaning of the canal and guarding the water along the canal during irrigation[11]. There are different physical and the social conditions at the canals and the rules, duties and organizational structure of the canals differ a lot from canal to canal.

The Situation Upstream: Anza

canals in Anza	Lala (140 acres, about 50 famers), Severini + Seri (20-30 farmers)
soils	fertile clay soils
crops	maize and onions (dry season), rice (rainy season)

The farmers of Anza are the first ones to take water from the stream. Three canals depart from the Mang´ola River: Severini, Lala and Seri. Taking water is in all canals allowed for six hours from 6 am

[11] The distribution of water takes place in a meeting of the Bwana Maji with the farmers at the canal on the day of irrigation. All farmers who want water have to attend the meeting. The farmers discuss and decide who gets when water. Normally there is some kind of rotation within the canal, the irrigation starts interchangeably one time upstream and one time downstream. In some cases the Bwana Maji distributes the irrigation times by writing time and name of the farmer on a piece of paper, which is handed over to the farmer. Thus anyone who does not attend the meeting and has not received a time from the Bwana Maji is not allowed to take water. Attempts to get water without permission are sanctioned with a fine from the Bwana Maji. Every farmer is responsible for cleaning the part of the canal nearby his or her fields. The Bwana Mfreji is responsible for organizing the cleaning. If the canals are not well prepared and the sand is not removed, water can be denied to this farmer. The next duty comprises what is called in Swahili “kulinda”, which means literally to guard, to protect. The farmers walk along the canals to watch over the flow of water.

till 12pm. This regulation came with the adoption of a rotation program in 2001. In Severini and Seri farmers can irrigate every day[12]. Only in Lala, where the number of farmers is bigger, upper Lala canal irrigates on the one day and lower Lala on the next day. Meetings take place only if many farmers demand it, or if the Bwana Maji has to make announcements. Guarding the water also does not play a role. But the cleaning of the canal becomes especially important during floods: Washed up flotsam like tree trunks and sand needs to be removed. Junctions need to be prepared with sacks and otherwise maintained. A farmer's statement of a farmer summarizes the situation regarding the access of water:

> *"Here we have no problems with water, the source is close by. We can irrigate every day, not like in other areas. We don´t have to block water we just take it. And we have good soil, so we don´t need much fertilizer."* (farmer Anza, owner)

The Interim Position – Azimio Canal

canal in Narray	Azimio (155 acres, 56 farmers)
soils	Fertile clay soil, sand soil
crops	maize, onions, beans (dry season) and rice (rainy season)

Azimio runs through the sub-village Narray. From the main canal, eight smaller arms lead off. The farmers are allowed to take water from 12 pm till 6pm (18 hours). Azimio has a well elaborated organizational body. It has a chairman, a secretary, a cashier, a Bwana Maji responsible for all canals, and every canal has an own Bwana Maji. The secretary has a book where all rules regulating water at the Azimio canal have been written down. Every canal has a Bwana Mfreji, who is responsible for the cleanliness of the canals. People of Azimio did not report many problems of water scarcity or of conflicts. Regarding the execution of the rules, a farmer stated:

> *"We don´t have a meeting every week because here is a lot of water. If you need water you go to the Bwana Maji and he gives you water. Here is no competition for water. It´s like in Anza, where people can just take water."* (female farmer Narray, lessee)

The guarding service is not really practiced. Even when there is a high water demand one guard at the junction of Azimio and Loo to check the water flow is considered to be enough. Nevertheless some problems with the farmers of the other canal (Loo canal) have been reported. The farmers of the Loo canal would block the water and divert into their canal and thus interfering the irrigation program of the Azimio canal.

Nevertheless the situation regarding the guarding of water seems similar to the one in Anza and overall, the water situation is relaxed. All interview partners stated that water distribution works quite well and there are not many people who "steal" water. They derive this from the facts that all farms are close to the canal and that there is no time of great water scarcity. Only people from downward

[12] The numbers of farmers and acre size could not be exactly identified.

located canals were interfering with their water flow in times of high water demand, some farmers stated.

The Situation Downstream: the Canals Pocho, Loo (both Miswakini), Paulo Pango (Mayfowla)

canals in Miswakini, Mayfowla	Pocho (97.25 acres, 45 farmers), Loo (194.5 acres, 110 farmers), Paulo Pango (60-70 farmers), Chini (80-100 acres, 30-40 farmers)
soil	sandy soil, partly salty
crops	maize, onions, beans (dry and rainy season)

Miswakini and Mayfowla are the two sub-villages located downstream. The situation downstream is quite different from the outlined situations above. The people of these sub-villages reported water problems.

> *"There are problems of water because here are many farmers. In Anza there is a high quantity of water therefore there are no problems, but Mayfowla and Miswakini are the last ones to get water and there is sand."* (female farmer Mayfowla, owner)

Due to the high demand of water all these canals, namely Pocho, Loo, Paulo Pango and Chini are participating in a rotation program since 2001. The water is shifted day wise from canal to canal. Every canal has a certain number of days for irrigation which depends on the number of acres of irrigated land. The first canal to get water is Pocho with two days (97,25 acre 45 farmers), after these two days water is shifted to Loo canal for three days (194,5 acre 110 farmers), afterwards to Paulo Pango (60-70 farmers) with two days and finally to a smaller canal called Chini (80-100 acres 30-40 farmers) for one day. Once the water has been shifted to the next canal, the other one turns dry.

But at a certain time of the day all canals are opened and water is flowing in all canals. This takes place from 7 pm - 9 pm, the water is called "rusuko" and is meant for watering vegetable gardens. But it is also used by people who were not able to finish the irrigation of their crops in the given time frame.

Pocho	2 days
Loo	3 days
Paulo Pango	2 days
Chini	1 day

Table 3 Rotation Program

The farmers have identified times when they experience water scarcity and when problems about water arise. One period falls in the dry season, when many farmers plant onions and a lot of irrigation is taking place: July and August. But more problems were experienced during the rainy season in February, March and April. The rice cultivation upstream in Anza and partly in Azimio was named as reason.

At each day of irrigation a meeting takes place in the morning. Everyone who wants to irrigate needs to attend. The rules for guarding water are refined in these canals. Here everyone who wants to irrigate needs a second person to guard water. At the meeting the Bwana Maji assigns a junction to each "guard" where they have to position themselves to take care that the water flowing into their canal is not distracted by farmers of other canals. Every group of guards at a junction has a "commander", who

is leading the group and is responsible to report to the Bwana Maji. In the worst case of Loo, these guards are on duty for three days – day and night. Guards are positioned three or four junctions upstream. For instance the guards of Loo are positioned several kilometres upstream, even up to Anza to ensure water flow (see map 3). There is not only a fine for missing the guarding service, but also one for being late for the guarding service.

> *"We have to guard the water, if nobody is guarding the water or the guard is sleeping, people of other canals come to steal the water. It is a problem if somebody takes water while you are irrigating, because then you don´t get enough water for your crops and the crops will die."* (worker, Miswakini)

The people feel that guarding the water is very important to ensure an unhindered water flow. But still they perceive it as hard and risky work. During rainy season the risk of a malaria infection during the guarding service is high. But the service imposes also other risks on the farmers and workers. Farmers reported that they had fallen asleep during the service and as they woke up not only the water but their shoes and radio had been stolen.

Many farmers or workers cultivate their field by themselves. They do not have a second person as the rule says. Many interviewed farmers where this criterion applied do not see this as a problem. They tell the Bwana Maji their concern and then they first irrigate and then join the guarding service. Women and old men are exempted from the guarding service. A farmer, whose wife just passed away, left with three small children, is exempted from guarding as well. These examples expose the close relationship and trust between the farmers and their Bwana Maji. The Bwana Maji is for many people the first one to go when problems, conflicts or other issues arise. The rules are handled flexibly and become adapted to social circumstances.

Due to the high water demand, since there are so many farmers, the coordination structure needs to be highly elaborated in order to provide all with water for irrigation. The access to water for the downstream farmers is more labour intensive and time consuming than for the upstream farmers, since their duties to access water are of a much bigger volume than those of the upstream farmers. The duties, especially the time-consuming guarding service is perceived by the farmers as a huge burden. Nevertheless the duties and rules are seen as the only way to face the water scarcity and to guarantee a fair water distribution.

In conclusion it can be stated that the water distribution is mainly regulate through regulative rules. The Bwana Maji plays a key role in the distribution process. In addition he plays a bridging role between the farmers at the canal level and the village authorities at the village level. The village authorities are important when it comes to the water regulation of the whole irrigation system.

5.3 Daily Negotiations in the Social Arena - the Canal Level

The negotiation processes of the actors are not solely shaped by institutions, but have to be placed in a web of power where the actor´s endowment with assets and the structural and relational access mechanisms (like access to capital and labour, authority, social relations) influence the agency and strategies of the actors. The first sub-chapter tries to depict the differently endowed groups of farmers to positioning them in the web of access. The second one explores the different strategies applied by the farmers.

5.3.1 Endowment of the Farmers

The farmers identified five social groups of farmers/workers according to their socio-economic background:

The farmers indicated the people who do “kibarua” (**casual labour**) are of least wealth. Many of these people do not have land. They do jobs like planting, weeding and harvesting. They are not involved in water affairs.

The biggest group consists of farmers who cannot be count as wealthy, they either own land or they rent some. The **land owning farmers** have the advantage that they can rent out their land in case of capital shortage and financial problems. During onion season land owning farmers who cannot crop their whole field due to high capital requirements of pesticides and fertilizer, lease their land to other farmers. Farmers who do not own land are often recently to Mang´ola migrated newcomers. Those **land renting farmers** suffer from an increased competition for fertile land, leading to raising rent prices.

The following criteria have been addressed to **rich farmers**: They own land and they can rent additional land. These farmers have a car/ lorry (to bring their onion harvest to Karatu or Arusha) and/or own a shop and have enough capital to buy fertilizer and chemicals. They have workers and sometimes also a manager. The ownership of land is not an imperative indicator for wealth. A farmer might own only 0.5 acres of land and still has enough capital to rent more acres.

Another identified group are the **investors**. People, who are not from Mang´ola and do not live there. They either have bought land or rent it for onion production. They have capital and a manager who employs workers. The manager is in charge of the onion production. One manager, whose employer lives in Moshi, explained that he is responsible for 15 acres -all rented- which are located in four different sub-villages.

Farmers, who can afford it, employ **workers**: young men, who are usually not from the village, but from Karatu, or other Districts or Regions. Most of them are temporarily employed for the onion season and return to their homes after the harvest. They get a share of the harvest as payment, either in form of sacks of onion or sometimes in cash. Their amount of salary depends on the harvest: The

better the harvest the higher the payment. Normally the workers live in house close by to the fields far from the village centre. It is appropriated to employ one worker for one acre. But many farmers have far too few workers in relation to their number of acre at the expenses of the workers´ work load (in one case 9 workers had to cultivate 14 acres).

During onions season much land is rented out, since the production input for onions is quite capital intensive. [13] Beside the seeds and the land, fertilizer and chemicals are needed to achieve a successful harvest. In particular the price of fertilizer has quadrupled in the last years [14] and became very expensive. Therefore many farmers cannot afford to cultivate onions, or cultivate only a part of their field and rent the other part out. The land is rented by people with capital, either from Mang´ola or outside-investors. In the rice and maize season the share of the rented out land decreases, since the farmers have the necessary means available and cultivate these crops to secure their food supply.
Onion production can be very lucrative when the market price is high, but on the same time it bears some risks. The input for the production is quite costly. The fluctuating market price is one of the main risks which threaten the gains. After the harvest the market price is quite low. Those farmers who can afford to wait for their revenues have the option to store their harvest, till a better price develops.

There are multiple forms of cooperative crop production and land use patterns. One farmer has land, another one has seeds. They crop together and share the harvest. Also the fertilizer is shared. In these cases the social capital of the farmers is important and ensures the agricultural production.
There are also different renting patterns. It has been reported that people with capital come from Karatu or Arusha to Mang´ola rent land from people, who have cannot afford the capital to cultivate it. They take the land for 5 years and build the owner of the land a house and give them 1/3 maize of their harvest per year.

Farmer who have to rent a farm, complained about the increasing competition about land and the rising rent prices. Contracts for leasing are newly negotiated after every season. The one with the better offer gets the land.

> *"It is very difficult if you don´t have your own farm, because the best pieces of land are often already taken. And if you find a good piece of land, then it happens that somebody else comes and offers more money. So you have to take what´s there, even if the field is not so good."*
> (farmer Miswakini, lessee)

The high demand for land has led to a sharp increase of the lease in the last decade. The leasing price for an acre[15] has increased ten times (see figure 4).

[13] A Bwana Maji in Anza estimated that during onion season about 75% of the people rent land and 25% of the people cultivate their own farm.
[14] 2002=15.000 TZS, 2006=40.000 TZS, 2008=60.000 TZS per 50 kg sack (source: authors´ survey)
[15] 1 acre = 0.4 ha

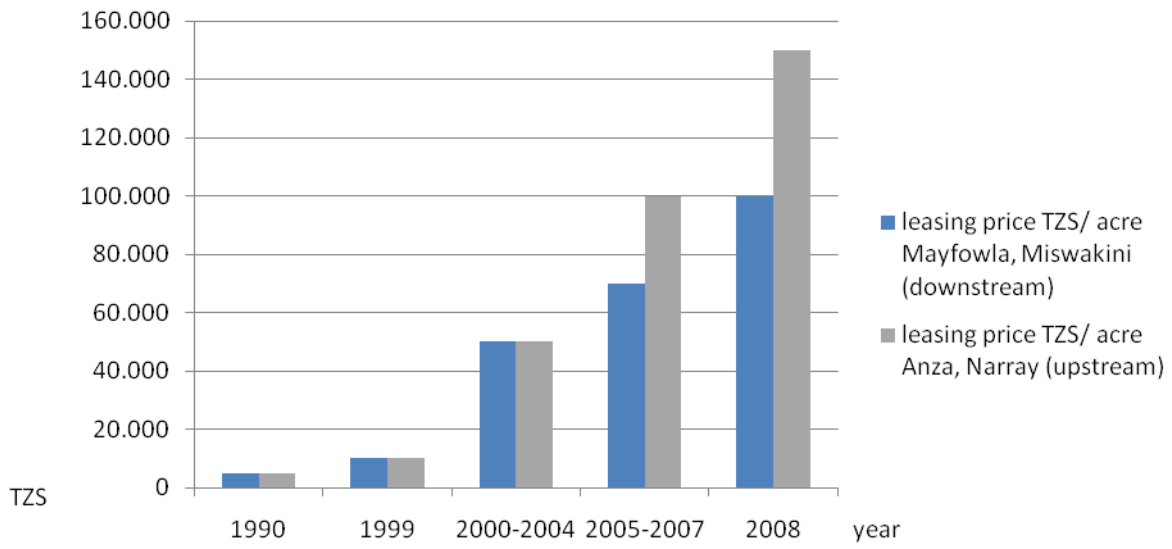


Figure 4 Course of the Leasing Price (source: authors´ survey)

The increasing competition makes it difficult for farmers to rent a piece of land longer than for one season (four months). After the four months the farmer has to leave the land. Problems arise when the crops are not ready for harvest at the end of the contract time. In the worst case the farmer has to harvest the verdant crop and leave the field.

As it can be seen in the previous account the richer farmers can afford to wait for a better price and have better access to technologies like the means of transport to sell their crops at the market for a better price. This has impacts on their financial capital. Their financial capital again can be used in a profitable way by investing in the purchase of agricultural input like fertilizer, chemical and the employing of workers. The poorer farmers on the other hand have to rely on different forms of social capital. Those who rent bear double hardship since they find themselves in a suppression process through the raising rent prices. This has impacts on their access to water, since they are pushed to the downstream canals, where the access to water is connected to a huge body of duties and rules. Not only the rent prices are raising, but also the prices of production inputs like fertilizer, what in the end disadvantages the poor ones, since they are not able to enter the lucrative onion cropping. Thus for those farmers the capability to benefit from the resource water is limited.

5.3.2 Contested Water Access

In Mang´ola there is a diversity of different endowed actors who enter the arena to access water. The following account concentrates on the farmers downstream who are experiencing water scarcity.

As in the previous chapter depicted farmers who have to rent land are facing an increased competition about land that forces them to change their fields. They have to acquaint with the new rules and the

farmers of the new canal. The new canal constitutes a new arena with a new rhythm of social interaction and where accessing water needs to be newly negotiated with the other farmers.

> *"It is better to rent a farm always at the same canal, because there you know the Bwana Maji and the people. But unfortunately it is not always possible. Sometimes you are a newcomer. As a newcomer it is very hard. Everyone takes water from you and threats you with the hoe."* (farmer Mayfowla, lessee)

The farmers perceive that the water regulation secures their access to water.

> *"When I came here there were no problems of water. With the farms and the people increasing also the problems arose. Therefore we need the rules. Without rules and laws, nobody is able to achieve something. These rules help us to make our work."* (farmer Miswakini, owner)

People acknowledge that for their collective action rules are necessary to avoid conflicts and guarantee them to gain benefit from the resource. On the other hand the breaking of the water distribution rules is quite common. The most important rule "not to steal water" was at the same time the most violated rule, according to the farmers. Different explanation patterns for the violation were stated:

> *"Some people don´t want to listen to the Bwana Maji. They take water whenever it suits them."* (female farmer, Mayfowla)
>
> *"Some pay money to the Bwana Maji and get the water."* (farmer Mayfowla, lessee)
>
> *"Rich farmers send their workers to steal water."* (farmer Miswakini, owner)

These statements reflect different aspects: the rejection of the existing regulative system, corruption to bypass the rules and the transfer of the rule deviation from the farmer to the worker. Some farmers admitted that they had broken the rule and did steal water.

> *"When I see that my crops are dry, I take water, even when it is not my turn. I prepare the fine and give it to the Bwana Maji."* (female farmer Miswakini, owner)

Similar statements were made from several farmers. The farmers feel that they have to deviate from the rule otherwise their harvest would diminish, which would have negative impacts on their livelihood security. The fear of an insufficient water availability let them act in this way. But they have also the freedom to break the rule since neither the financial sanctions, nor do the normative sanctions like for example loss of reputation impedes them.

Three managers were interviewed separately. All of them stated that they and their workers were taking water, outside the regulation in case of dry fields.

> *"When we [the manager and his workers] did not finish watering, I call my employer and we discuss what to do. When my employer tells me to get water and that he will pay the fine, I go to the workers and tell them that we will steal water today. At night around 1-2am we go to the junction to the guards. We start a conversation with them. One of us excuses himself and says he goes home. But he is unblocking the water to irrigate, while the others distracting the guards. Then one after the other leaves."* (manager, Miswakini)

Besides this strategy the Manager also has alternative strategies at hand:

> *"When I found out who is the guard, I go there and tell the guard that I need water. I ask him to give me water and I give him money."* (manager, Miswakini)
>
> *"When we need water, we are discussing what to do: Who is guarding, are they weak, do they like money, do they sleep."* (manager, Miswakini)

The rich ones can afford to pay the fine, therefore they are rather detached from the fine system. They assure sufficient water availability by "buying" the water. The water which is collective good gets the monetary value of the sanction. But not every farmer has the financial capital or workers to handle the constraining rules that flexibly. One farmer states:

> *"Some rich men bribe the Bwana Maji, and then the Bwana Maji is afraid, because he took the money. But even when the Bwana Maji doesn´t accept the bribe the rich man sends his workers to steal water. I cannot afford to pay the fine. I have to wait till the right day of irrigation. But the rich man can irrigate when he steals water and on the right day!"* (farmer Mayfowla, owner)

Stealing water - Experience of a worker

The crops were dry. I decided to take water, because the rich man [his employer] will ask me, why the field is dry. At night I went to the junction, I was lucky the guards were sleeping. I unblocked very carefully and silent the water with my hands. I just wanted to return to my field to irrigate, when the guards were waking up. I ran away, but the guards were following me. They got me and I fell down. While I was lying on the ground they beat me. They took my hoe and my shoes. I only could escape because I grabbed a big stone and threatened them. If I hadn´t picked the stone I don´t know what had happened next – maybe they had beaten me with the hoe. Now I have a problem of my chest, when I cough it hurts. After this I went to the Bwana Maji and told him that I was beaten. The Bwana Maji went to the people who did it to ask why they had beaten me. They told him that I wanted to steal water. It is not allowed to beat somebody nor is it allowed to steal water. Both parties did a mistake. We did not take any further actions, because we were all wrongdoers. I´m afraid and they are afraid – we are avoiding us. I had to go to the hospital to get medicine. If I had succeeded to get water my employer had paid the fine to the Bwana Maji, now I had to pay it by myself. (worker, Mayfowla)

Conflictive and sometimes violent encounters happen at the junctions when one party is guarding "their" water flow, and another party approaches to snatch water.

> *"We steal water only at night. We fight, we beat. You have to be strong otherwise you don´t get water."* (worker, Miswakini)

And another worker elaborates the contra position of guarding:

"When we´re guarding water, nobody will come to try, because they know we´ll beat them up. When they see the guards are strong, people will not come, they only come to newcomers." (worker, Mayfowla)

Most of the workers who are stealing water are backed up by their employers. But it is also in their interest that the crops prosper well, *"[...] because when the crops die my amount of sacks decreases!"* (worker, Mayfowla)

The workers are often in-migrated and have a limited stay in the village and it seems that social sanctions concerning stealing water might not apply. For some, a driving force is the ambition to maximize their income.

The composition of farmers at one channel can be quite heterogeneous regarding their power status. Access to labourers and capital secures the access to water. The wealthy farmer does not have to take the risk of stealing water and can pass this on to his workers. Even if the "stealing water" is detected, the wealthy farmer is able to pay the fine to ensure the irrigation of his fields, while for the other farmers the money for the fine is not so easily raised.

5.4 Violent Encounters and their Solution

As seen in the previous chapter, violent encounters evolve about contention over direct water use. They are often located at junctions where water is divided between farmers of different canals. The farmers, spoken to were aware that in case of a conflictive situation where somebody is taking water illicitly from another farmer, the farmer is supposed to call the Bwana Maji for mediating the argument to avoid violent encounters. Nevertheless, in some cases arguments got heated up and violence occurred. This chapter explores the solution structures for violent conflicts by exploring the case of a violent argument between two farmers.

Farmer X blocked water, even though he had no permission from the Bwana Maji. When other farmers saw this the Bwana Maji Y was called. The farmer Y (Bwana Maji) unblocked the water and was attacked and beaten by the farmer X. The auxiliary police took the culprit to the police office. Farmer Y had a cut on his forehead and needed to go to the hospital. The culprit is responsible for calling the elders court. When, after two days, no action had been taken, farmer Y decided to go to the court. In the neighbouring village Ghorfani a temporary court was held, with a judge from Karatu. The case was opened and witnesses of both sides were heard. On the third day of the trial the case was postponed for some weeks, since the judge returned to Karatu. Shortly after this the culprit called the elders (wazee[16]) and the case was handed over to them. The two parties were sitting together with the

[16] Elders who negotiate and solve conflicts: All involved parties sit together every party has a certain number of elders. They reconcile both parties and set agreements of claim payments etc. After that the leader of the elders prays a prayer that the culprit will never repeat the deed.

elders and farmer X apologized for his deed. The elders decided that the farmer X had to pay farmer Y the hospital costs. Both parties were reconciled and the file was closed at the court.

Farmer Y (beating victim)	*Farmer X (culprit)*
"The worker claimed at the police station that he was innocent! I went to the court because it was not up to me to find elders. I heard that the employer of the worker was going to back up his worker with money. I was afraid, but some people assured me support as well. But on the third day the court was postponed. The people told the rich man your worker is going to be jailed. The rich man decided to go the easier way and called the elders. The worker found some elders and the case was handed over to them. We sat together and the culprit confessed the deed and excused to the elders that he was drunk and therefore did it. I know that he wasn´t, but anyway he apologized to me. He paid me the hospital costs and further costs. And while I was injured the rich man has irrigated my fields. I´m satisfied with the punishment. It was the first time that I went to the court, but the elders are much better than the court. It took just one day and the court could take up to half a year!"	*"I started to beat him [farmer Y], because I was very angry, I wanted to irrigate but he took the water. I wanted to irrigate my own farm. The maize was still small and needed water. If the maize gets dry, I wouldn´t have food for my children. First I thought I could win the case, because my friend told me to help me with money to bribe the judge. This friend is a rich man I work for him as well and after I would have finished my field I would have irrigated his fields. My parents and other friends told me I would be jailed, this all is not good and I should call the elders to solve the problem. I knew there would be bad consequences when I beat someone, but I was very angry. After the anger was gone, I regretted what I had done. I understood that I was a wrongdoer and called the elders. The rich man wanted to continue with the case at the court, but the other people told me to get advice from the elders. The elders solved our problems. Now we [farmer X and Y] are not angry anymore. I apologized and we agreed that I pay the hospital. I was surprised when the Bwana Maji [farmer Y] went to the court. I felt bad because I did not expect it. I feared the court, because it can send you to jail. I was relieved when the case at the court was closed, because with the elders [wazee] there is no corruption. If the elders solve a problem and make decisions the people are friends again afterwards. If somebody is jailed by the court, this person will not like you, because you jailed him. We will hate each other."*

The two interviews in the box above show that the elders' court is the preferred way for conflict solutions. Nevertheless the court is approached, even though not directly, as first choice. Both parties do not fully trust the formal legal system. They perceive it as a long, open-ended, expensive procedure which might lead to an unwanted outcome. Corruption is rather related to the formal court, which is not approached without any support of "rich, influential friends". The case shows as well that some wealthy people try to board the arena of the formal legal system to pursuit their interests as the "rich" friend of farmer Y did.

The elders' court is socially embedded and acknowledged as a conciliative solution in contrast to the adversarial principle of the formal court system. People fear that the solution of the formal court will create hatred and haunt the people involved. It is important for the people to be reconciled and that friendly encounters for the future are possible. However it seems that people endowed with knowledge and wealth are rather inclined to approach the formal court system.

5.5 Adaptation Measures and Institutional Learning of the Governance System

In March 2001 the downstream users of the irrigation system in Mang´ola experienced a severe loss of their crops due to insufficient availability of water. This crisis had been triggered by a drought and the increasing numbers of irrigators. People remembered that before 2001 no strict regulation existed. Everyone tried to take water when it suited them best. The Village Council had chosen some persons to participate in a training of an NGO at the Kilimanjaro on irrigation and agriculture. After the event of March 2001, meetings of all leaders involved in water management took place to discuss how to solve the problem of the water distribution. These leaders were, amongst others, the Bwana Maji of every canal, the sub-village leaders, the chairman of all canals and the village chairman. Some of them who had been to the irrigation systems in Kilimanjaro remembered the rotation system they had seen there and suggested introducing a rotation program with shifting times and days. A village meeting was arranged and the new idea was presented. Some people were sceptical and not convinced, but in the end all agreed on a trial for some days. After this trial period it was agreed on the new rotation program. The rotation program determines certain days of irrigation for the downstream users and certain times of irrigation for the upstream users.

Since then severe problems like loss of crops due to dry up have not happened again. Thus the introduction of the rotation program, with the whole village participating in it, is a successful adaptation strategy. The problem of water scarcity was solved in a peaceful way, since cooperation led to a solution which was acceptable for all parties.

The leaders were strongly interested in solving the problem. They are elected by the people and accountable to them. Additionally they are also involved in agriculture so there was a direct interest in the issue and a high ambition for solving it quickly. The fact that the institutional authority structure regarding water management is locally and socially embedded enables the people to adapt to new situations in a "quicker" way, than it would be the case if decision-making structures would be placed on a higher administrative level. Local institutions are to a certain degree highly adaptive, since they have the ability for "quick" and "direct" actions. Thus water scarcity and crisis situations can lead to an institutional learning process, which enhances the resilience of the system. Local institutions are capable to manage crisis situations. Nevertheless constraining factors of an adaptation process can be factors like knowledge and power: Knowledge in the way that they have to know about certain management practices and techniques; power in the way that the new rules and management practices have to be enforced. In the scrutinized case people were sceptical about the new ideas and therefore the new ideas needed to be promoted by a person who has the power to implement it and who people trust. In this case it was the village chairman (now retired) and the chairman of all canals. The chairman of the village and the chairman of all canals are elected by the people. They are detached from the particular interests of the people from one canal like the Bwana Majis. Their rather neutral position enables them to bring all parties together and mediate between them. Still the adaptation process is marked by power struggles, as elaborated in the next chapter.

5.6 Negotiations at the Village Level

In Mang´ola all canals participate in the rotation program and have either daily times for water extraction or a certain number of days. But the interim canal does not participate in the day rotation (explained in chapter 5.2) which is perceived as unfair and unequal from the downstream canals. The leaders of the downstream canals complained that there would be no disadvantage for the people of the interim canal, if they joined the rotation program. In the opinion of the leaders of the downstream canals the water should be divided according to the numbers of farmers and field size. Therefore the interim canal should not have water more than two days a week. The people of the downstream canals request from the people of the interim canal to join the rotation program for equity reasons.

> *"The leaders of the Azimio canal should join the rotation program to equalize the water distribution, because we are one village. But they don´t want to join, because they have rice fields. They are afraid that they will experience water scarcity."* (farmer Miswakini)

The people of Azimio canal explained that they were not asked to come to the meeting in the first place and also their big canal would end in the canal which leads to the canal of Loo and Paulo Pango (Miswakini and Mayfowla). Therefore they would not be responsible for the water scarcity in Miswakini and Mayfowla. The leaders of the interim canal could not be urged so far to join the day rotation.

According to the former chairman the farmers of the interim canal should join the rotation program for the sake of equity. Although in his opinion it would not be helpful to the people of Miswakini and Mayfowla in terms of water availability. The problem of water scarcity in Miswakini and Mayfowla stems not from the non participation in the rotation program of the interim canal, but from the intensive water usage upstream in Anza during rice season. In his eyes an equal distribution would only be possible if everyone, especially the leaders, would stick to the water regulation rules. But this would not be the case in Anza, the former Chairman stated, there they would take water whenever they want.

A platform for discussion of the regulation concerning the whole irrigation scheme is given at the meetings of all Bwana Majis at the village office. Nevertheless in the meetings the author attended of the downstream Bwana Majis complained about water scarcity, but no ambitions to suggest changes were made. In the opinion of the people the Village Executive Officer is responsible for the coercion of the rules and rule decisions on the village level. In order to reduce his work his idea was to establish an irrigation committee with a chairman of all canals, with a secretary and a cashier so on. He would then authorize the committee to make decision on irrigation policies without him. A committee had been established already around the year 2000. But the in the memory of the people the committee had been active only at the beginning, but then became passive. In the two meetings which took place during the period of research nobody of that committee attended the meetings. The establishment of the new committee was not easy. In a meeting the village leaders announced to establish an irrigation committee and elected from every canal one person. A second meeting took place two weeks later, where nine persons were elected. These persons were supposed to meet again to continue the organization process. But twice the meeting was postponed after only half of the people came, due to a lack of informing. After one and a half month still no chairman had been elected. Considering that some Bwana Majis have to walk one hour to the village office it was quite annoying for some, when no meeting took place. This example shows that the process of self-organizing can be quite slowly. And there is as yet no proper institutionalized platform for water regulation negotiations. It is still not foreseeable if the new water committee could be a platform that can make decision which will lead to an improvement for the water users, since we heard that even when the interim canal would join the rotation program it would not be such a big improvement in the water availability for the downstream users. However, at least the downstream users would feel they were treated equitably.

In conclusion the examples present a dualistic picture. On the one hand, local institutions, based on self-organizing can be really quick and capable of coping with crisis situations, although they might not be strong enough to break local power structures to guarantee an equal outcome. On the other hand the process of self-organization which is not based on an urgent need (like a drought), might be a much slower one.

6. Analysis and Discussion of Findings

In Mang´ola, highly dynamic processes are taking place. The village constitutes an arena for different actors with different socio-economic backgrounds to contest access to natural resources like land and water in order to gain a benefit. The water distribution is a dynamic social process, which is shaped by rules and regulations, but still needs to be negotiated on a daily base. Therefore accessing water is understood as a negotiation process, which is bound in an institutional matrix of water governance. The institutional architecture of water governance is characterized by the self-organization of the farmers. The formal water management of the state of Tanzania is not tangent to the local water governance sphere of the village. The water users of Mang´ola have not yet registered for a water law and efforts to implement IWRM in this area could not be detected. Therefore the water governance lies in the hands of organizational structures which have evolved over time with positions filled by local farmers. This organizational structure of water regulation is a collage of different institutions with different degree of formality and informality. The post of the Bwana Maji is locally developed and strongly connected with the place. His rather customary position has been formalised by the by-law. The village authority (Village Executive Officer, Village Council, Ward Agriculture Officer) is of formal character since established by the state and constitutes the lowest level of state administration. But still it is strongly embedded into the social sphere of the village its practices and customs.

Formal institutions of the legal system, like the court, come to play a role. However the elders' court is still preferred by the people in the scrutinized cases and rather more trusted than the legal court. The elders´ court is acknowledged for propitiatory solutions in contrast to the adversarial principle of the formal court system. People fear that the solution of the formal court will create hatred. It is important for the people to be reconciled and that friendly encounters will be possible in the future. However, it seems that people endowed with knowledge and wealth are rather inclined to approach the formal court system.

With the increasing number of farmers a whole regulation system is developed. This is adapted to local and spatial circumstances. Therefore the institutional embedment of access can be quite different, depending on the site. Downstream, farmers need to fulfil a bunch of duties and consequently they access water in different ways than upstream farmers.

The self-organization process is coined by the power of different farmers. As seen, the adaptation of the new rotation program was successful, but the rotation program also expresses the different negotiation positions of the different canal leaders. Those canal leaders who have a powerful position in the village have the agency to secure the water availability at "their" canals.

The introduction of the rotation program proved that the local institutions are capable of a "quick" and flexible response in a crisis situation. Nevertheless it seemed that there had to be the pressure of a crisis, since in the case of the establishment of the new committee the process is at a much slower pace.

Everybody who has access to a field to crop (no matter if rented or owned) has the right to access water. But having the right to benefit from the water resource does not necessarily mean having the ability to benefit. The ability to benefit from a resource is often constrained by different factors. Access to markets, capital, labour and water are strongly interconnected. These structural access mechanisms play a role when it comes to the direct use of water. Farmers with different endowments and authoritative background have different options for accessing water. Thus, in the negotiation process of accessing water, farmers with superior and inferior positions enter the arena. For the poor farmers who have to rent land, the access to the resource water is constrained by the high rent prices of plots with good water availability. They are the losers in the competition for a plot with good water availability. The farmers endowed with assets like financial capital can rent good land, and additionally bypass institutional rules by "buying" water. They can either "buy" water by paying the fine, when illicitly taking water, or by bribing someone responsible for the water distribution. The most violent conflictive arguments occur when farmers do not adhere to the rules and illicitly take water. This happens between farmers from the same canal, normally downstream located canals with constrained water availability, or between farmers from a downstream and an upper stream canal. Due to the high influx of people the community is heterogeneous and social coercion is not such a strong mechanism. Nevertheless violent arguments are rather the exception and the institutional mechanisms are strong to prevent anarchic situation and transform action into collective action.

Mang´ola Barrazani has a well elaborated organizational structure. But there is a need to equalize the access to water and balancing upstream and downstream water availability. This could be done by increasing regulation and a stronger implementation of rules on the upstream site. Future research could focus on the ongoing institution building.

7. References

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8. Appendix

Interviews

Interview Partner	
National Level Ministry of Water and Irrigation	
Assistant Director	
District Level „Karatu“	
District Agriculture and Livestock Development Officer District Water Engineer	
Village Level „Mang´ola Barrazani“	
Village Executive Officer Ward Executive Officer Ward Agriculture Officer Chairman of all Canals Chairman of PADEP Previous Village Chairman First Village Executive Officer Old and experienced Bwana Maji Old and experienced Bwana Mfreji	
Subvillage Level „Narray“, „Mayfowla“, „Miswakini“, „Anza“	
Bwana Maji Sub-village Leaders Managers	Farmers owning land Farmers renting land Workers