Water management in the Nduruma catchment, Tanzania

An analysis of competition over water between smallholder irrigation communities and foreign horticultural companies

M.Sc. Thesis by Chris de Bont

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Water Resources Management Group

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M.Sc. thesis Water Resources Management submitted in partial fulfillment of the degree of Master of Science in International Land and Water Management at Wageningen University, the Netherlands

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Abstract

This thesis analyses the case of foreign agribusinesses and smallholder farmers competing over water in the Nduruma sub-catchment near Arusha, Tanzania. It is a case which is situated in the middle of the debate on "water grabbing" and on the benefits of foreign investment in agriculture in developing countries. The thesis is based on three months of fieldwork in Tanzania, combining methods of observation and semi-structured interviews. Analysis relies on the echelons of rights analysis framework, aiming to describe contestations around resources, rules, authorities and discourses.

The study shows how both smallholders and agribusinesses use their own, specific strategies to secure their access to water. In Nduruma, this has led to downstream smallholders securing more river water at the expense of the agribusinesses. At the same time, agribusinesses are increasingly using groundwater. This is the result of devolution of authority to a smallholder-originated river committee by state-led water organisations, leading to compulsory local negotiation over water allocation. Within this negotiation, smallholders are more successful in claiming river water by emphasising the rich and foreign character of the agribusinesses and their ability to access groundwater. Agribusinesses counteract with by claiming efficiency and contributions to development. This illustrates how arguments used by local actors reflect international and national discourses on land grabbing, foreign direct investment for development, irrigation modernisation and neoliberalism.

This thesis argues that trends in water distribution are the result of interactions between the four different echelons, and that only focussing on these interactions can bring one closer to understanding them. Ultimately, it also shows that when studying a case of competition over water between local water users and foreign investors, it is important to look at how the rules play out in practice, what different strategies actors employ to secure water access and how this changes over time.

Keywords: Tanzania, Water grabbing, Foreign direct investment, Echelons of rights analysis, Discourses, Agribusinesses, Smallholder farmers

Acknowledgements

Doing this thesis research was as driving my sweet, tiny Suzuki car on the left side of Tanzanian roads: daunting and scary at first, me being theoretically equipped but lacking experience, slowly becoming normal and finally me being happy to reach the destination, empowered by so many new experiences.

Along the road, many people were there for guidance and advice. I would like to express gratitude to my translators Eva and Emanuel, without whome none of this would have been possible. I would also like to thank Hans Komakech, who hosted me and supported me in my field work. Asante sana to Kelvin Mtei, for the fun evenings dancing, eating kuku choma and drinking Serengeti.

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Special thanks to my mom, who always shows interest in my study and moves along with any research I do. Thank you for your growing concern about Africa, development aid and land grabbing, you attempts to read my work – I am happy we are learning alongside each other. Thanks also to my dad, for your never-ending faith in me.

Finally thanks to my Wageningen family, for listening endlessly to stories about horticultural companies in Africa, for trying to understand and, most of all, for always cheering me on.

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List of abbreviations

AUWSA	Arusha Urban Water Supply and Sewerage Authority
CHADEMA	Chama cha Demokrasia na Maendeleo
CSO	Civil Society Organisation
ERA	Echelons of Rights Analysis
FAO	Food and Agricultural Organisation
FDI	Foreing Direct Investment
IUCN	International Union for the Conservation of Nature
IWRM	Integrated Water Resources Management
NGO	Non-governmental Organisation
PBWO	Pangani Basin Water Office
SAGCOT	Southern Agricultural Growth Corridor of Tanzania
TAHA	Tanzanian Horticultural Association
TIC	Tanzania Investment Centre
WUA	Water User Association

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1. Introduction

In this globalising world, an increasing amount of companies see the benefits of moving their business to developing countries to reduce production costs. Agribusinesses have also jumped on this bandwagon, and are cultivating their crops in areas where land, water and labour are said to be cheap and readily available. A good example are flower cultivators, who have started to move to countries around the equator in both Africa and South America. Here they find the perfect sun and temperature conditions, resulting in minimal energy costs (Max Havelaar, 2005), while also benefiting from paying lower wages.

Some of these flower cultivators have settled in the Pangani basin along the Nduruma River near Arusha, Tanzania (Figure 1).

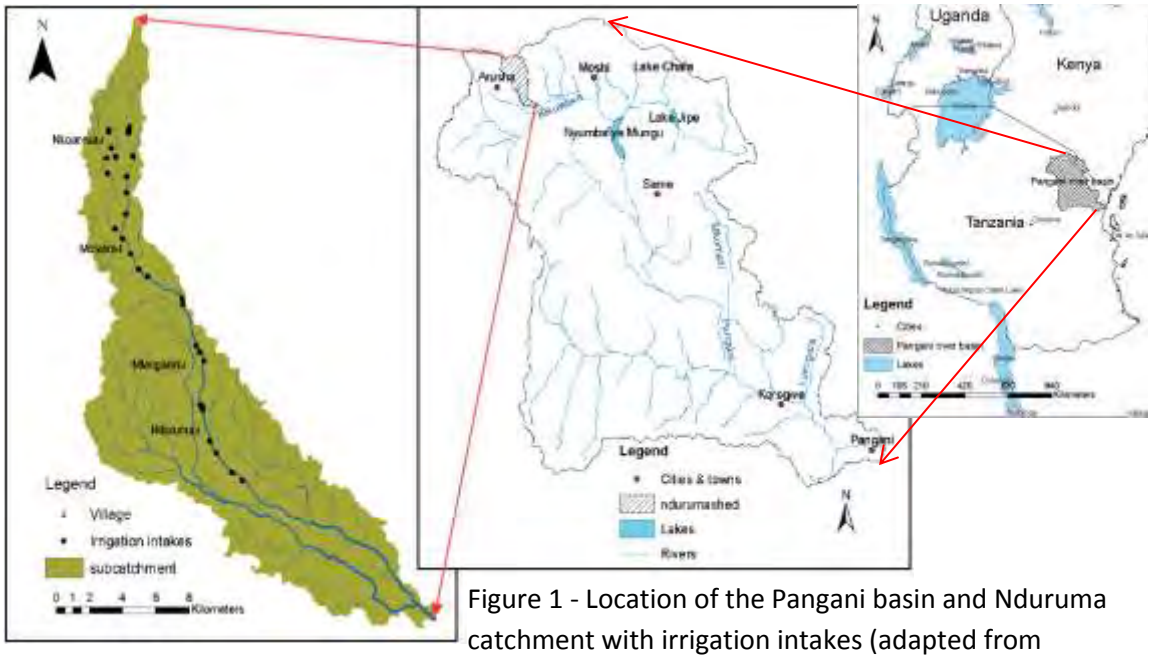

Figure 1 - Location of the Pangani basin and Nduruma catchment with irrigation intakes (adapted from Komakech et al., 2012a and Komakech et al., 2012b)

Here they have created, together with other foreign horticultural companies, what is locally known as “the plastic valley”: a band of greenhouses amidst smallholder agriculture (Komakech et al., 2012a). The smallholder farmers who surround them use the river water for irrigation and domestic purposes. They have generated employment opportunities, especially for women, and contributed to the national income through tax revenues (TPWAU, 2011). However, next to these positive impacts, there are also downsides to this development. Critics have commented on the labour conditions of workers on the horticultural farms for instance, and competition over water and land has increased.

The ambiguity about the impact of these foreign agricultural investments is not only a point of discussion for the Nduruma area, but has led to an international debate. The question is whether the investments should be framed as contributing to development or as a type of land and water grabbing. Those promoting agricultural foreign direct investments (FDI) indeed claim that it directly contributes to development by providing employment and tax revenues and by stimulating the diffusion of technology and knowledge. Those warning for a land and water grab emphasise the losses of these natural resources for local communities and question the alleged benefits.

In Nduruma, the land on which the foreign horticultural companies are now cultivating has a long history of alienation. First settled by the Germans and the British, these estates were among the few not being nationalised after Tanzanian independence (Spear, 1996). Therefore, the land has had, among others, Afrikaner, Greek, German and British owners. What is owned however, is not the land itself, but the title to use it. As stated in the 1998 land act "*All land in Tanzania shall continue to public land and remain vested in the president as trustee for and on behalf of all the citizens of Tanzania*". (Land Act, 1998, pp. 6) Individuals or communities have leases to the land, which can be based on customary tenure or state-given rights. Currently, most of the companies holding a lease in Nduruma are of Dutch origin. During the last years, land issues have returned to the centre of attention, thanks to efforts of the media, civil movements and the political opposition parties (Nelson et al., 2012). This becomes apparent in the response of a group of national and international civil society organisations (CSOs) to plans for the Southern Agricultural Growth Corridor of Tanzania (SAGCOT) (CSO, 2012). The SAGCOT is an area especially appointed as suitable for (foreign) private agricultural investment, aiming at tripling the area's agricultural output (SAGCOT, 2011). The CSOs urge the government to make sure that local communities and the environment do not suffer as a result of the land and water use of the new companies. Even more so, they argue for the extension of newly built irrigation schemes to local smallholders (CSO, 2012).

When it comes to water use in Nduruma, the newly set-up horticultural businesses meant a shift from inactive coffee estates with low water demands to businesses with higher water needs (Spear, 1997). This transition disturbed the water allocation system, as the new users had to be incorporated (Mbonile, 2005). At the same time, population growth has also increased water demand in the villages, leading to the current situation in which foreign companies and local smallholder farmers are competing over the same river water. Water is managed by both local and state-led institutions, one of which was added in 2011. This was the result of efforts to mediate the competition over water in Tanzania by creating water user associations (WUAs), according to the Integrated Water Resources Management (IWRM) principle that water user participation will improve coordination and decision making in water management (Komakech and Van der Zaag, 2013).

Komakech et al. (2012a) studied the interactions between the flower agribusinesses and local water users in 2009. They concluded that the water distribution system was stable because agribusinesses realised that they could only be successful if they co-operated with smallholder farmers along the same river. At the same time, the agribusinesses were not backed by local government in their claims based on state-issued water permits.

The theoretical framework used by Komakech et al. (2012a) is the Echelons of Rights Analysis (Zwarteveen et al., 2005; Boelens, 2008). This framework looks at contestation in four dimensions: resources, rules, authority and discourses. Komakech et al. (2012a) focussed on the first three echelons and used these to partially unravel the dynamics in Nduruma. However, the last echelon, which looks at how certain processes are justified, naturalised or objected against, was largely left out of the analysis. Furthermore, seeing Nduruma not as only a case-study of local competition over water, but rather as part of international processes, requires incorporating processes and debates at higher levels.

In this thesis, I answer the question how smallholder farmers and foreign horticultural companies compete over water in Nduruma, by using the echelons of rights analysis. I also examine the

relationships between Nduruma and the (inter)national debates on development, putting the case-study in a larger context. Results are based on field work carried out in September-December 2013.

In the next few chapters, the problem statement, research objective and conceptual framework are outlined, resulting in the research questions guiding this thesis. After a description of the methodology, three chapters describe and analyse the empirical results of the study. These are followed by a conclusion and an elaborate discussion on content, methods and concepts.

2. Problem statement

The case of the international flower agribusiness in the Nduruma sub-catchment is one in which foreign horticultural companies use local land, water and labour resources, after which they export their products to industrialised countries. At the same time, the benefits for the country of production, Tanzania, are unknown. The question arises how this situation came to be and how it is currently sustained.

Starting from the point of water allocation, this question was partially answered by Komakech et al. (2012a), who analysed the situation in Nduruma by using the echelons of rights analysis (Boelens, 2008). They showed that co-operation with smallholder farmers was the best way for agribusinesses to safeguard access to water. However, the study done by Komakech et al. has not paid attention to how water use is contested or justified at the local level. Nor has it attempted to put the single case study into a broader perspective; Tanzania is not the only country in the South seeing these international agribusinesses touch down on their soil, supported by non-governmental organisations (NGOs) and governments. This requires seeing the case of Nduruma not only as an isolated case, but in the light of an international debate on how best to achieve (agricultural/rural) development in developing countries.

Furthermore, in very recent times, Tanzania has gone through political and institutional changes, with new water management organisation being set up and an opposition party gaining more and more ground. The effects of these changes have not yet been studied.

3. Research objective

The objective of this study is to contribute to understanding how it is possible for international horticultural agribusinesses to obtain sufficient water to produce high value export crops in countries in the South, while at the same time competing with local users over resources and producing unclear benefits.

First and foremost I have the objective to add to existing knowledge on interactions between smallholder farmers and foreign horticultural companies in Nduruma, by exploring recent developments and including the realm of politics in my analysis. Secondly, I want to add to this insights on how the current situation is justified or objected against by different actors, not only locally, but also (inter)nationally. By doing this, I aim to explain how water management in a catchment in Tanzania is in fact influenced by debates at much higher levels.

Where the previous objectives are more related to gathering new empirical material and insights on water distribution itself, I also aim to explore the conceptual framework of the echelons of rights analysis. I want to do this by focussing on how the different echelons of resources, rules, authority and discourses interact at different levels, and how contestations in the different echelons are used by local stakeholders to secure access to water. Not only will this add value to my analysis of the water sharing situation in Nduruma, it will also increase the understanding on the use of the ERA framework.

4. Conceptual framework

To add to the previous research of Komakech et al. (2012a), the ERA framework will also be used in this study. Even though the basic framework is the same, it is expanded to encompass different spatial levels and to closely examine the links between different echelons.

At the basis of the ERA approach is the notion that water is a contested resource. I quickly elaborate on that below, continuing with a short description of the first three echelons and a more extensive conceptualisation of discourses and discourse analysis. I conclude the framework by outlining how I distinguish between the different levels (local, national, international) and what role they have in this study.

4.1. Water as a contested resource

The underlying assumption of this entire thesis is that water is a contested resource (Mollinga, 2008). This means that different people have different, often conflicting interests in water management. I chose the concept of *contestation* over that of *conflict*, because I mean to emphasise that contestation is more than open disputes over water use. It includes debates, negotiations and also those opposing interests which are not openly expressed, but which are there in the background, shaping the interactions around water.

4.2. Echelons of Rights Analysis

Through the echelons of rights analysis, I look at the above described contestation in four different domains: resources, rules, authority and discourses.

The first echelon is about contestations over access to water and the (physical) means to realise this. The second level looks at rules surrounding the resource. The third level examines regulatory control and decision-making authority. The fourth level is about regimes of representation, or discourses, which function to normalise the situation in the three other echelons (Boelens, 2008).

Where the first three echelons are pretty clear-cut and straightforward in their description, I feel the fourth echelon deserves some more attention and explanation. Therefore, in the next section, I discuss how I view and analyse discourses.

The short description of the echelons above already implies the existence of certain linkages between the echelons. However, these linkages have not been elaborated upon to great extent in previous publications. This leads to the danger of using the framework merely as a tool for clear and orderly representation of data, which is what was done by Komakech et al. (2012a). Here a large part of the analysis is lost, for to really understand the system as a whole, understanding the linkages is crucial. In addition, I view the competition over water between smallholders and foreign agribusinesses as the expression of a global process. This means that it is not only a local issue, but embedded in larger struggles at higher levels. To elaborate on these different levels, I included the concept of a multi-level system, which I highlight at the end of this chapter.

4.3. Discourses and discourse analysis

Regimes of representation are discourses which "*establish, impose or defend particular water rights policies and regimes*" (Boelens 2008, pp. 8). A discourse can be seen as a socially constructed representation of (a part of) reality (Thomson, 2011), expressed by certain actors through different kinds of texts. The hegemonic discourse determines what is "true" at a certain point in time, and

therefore distributes power to some and not others. This power in turn allows these actors to influence what is seen as normal and "true". In this way, discourses both create and are created by power and knowledge. The "text" constituting a discourse can be more than just the spoken or written words; it can also include practices, buildings or symbols. At the same time, the environment in which the text is produced is also a part of the content of the text (Macleod, 2002). A statement in one setting can mean something very different in another. For instance, when a smallholder farmer states that negotiation is necessary to divide the river water, it might have a different meaning than when a European farm manager says the same thing. Where the first one might be very satisfied with this process, the second one might be complaining about the hassle.

Discourse analysis tries to see which discourses are present, while assuming that the "truth" they represent is not neutral, but socially constructed. It also argues that the current situation is not natural or inevitable, but rather the result of social processes. This assumption allows for analysis of a discourse in terms of how it is (re)produced and who is made powerful or powerless through it. By making this explicit, discourses and their purpose can be "unmasked" (Hacking, 2000, pp. 9). Discourse analysis in this way is not meant to show that current representations are false, but to show what its effects are on society and the power relations within it (Hacking, 2000).

Macleod (2002) proposes a similar type of discourse analysis and calls it "deconstructive discourse analysis". She looks at discourses to see how they influence what is possible or acceptable at a certain time – in other words, what the link is between the echelon of discourses and the other echelons. That is also the objective of this study: To analyse which discourses surround the water use of the foreign agribusinesses at different levels, and how these interact with struggles over authority, rules and resources. The discourse might serve to normalise the outcome of certain struggles, but is also influenced by those same outcomes. In this way, the discourse is both produced by and producing the other echelons. Analysing discourses at all levels will allow me to look at how knowledge and power play a role in normalising/contesting the arrival and current existence of flower agribusinesses in the Arusha region, and how the discourses at different levels interact and are reproduced.

Discourse analysis is partially theory and partially methodology, as it can be done in many different ways depending on interpretation of concepts and execution of data collection and analysis. Above I have explained what I will consider to be text, how I look at the relationship between power and discourse and what the aim is of this discourse analysis. How I will collect the text and analyse it in order to answer the questions presented in the next chapter, is described in the methodology.

4.4.Multi-level system

The water users in Nduruma are part of what Gibson et al. (2000) call a "*constitutive hierarchy*" (p. 220), a hierarchy where the lower elements can combine in new units with new characteristics and emergent properties. In such a system, they claim, many levels can be conceptualised, interacting with each other upwards and downwards. Due to these interactions, no phenomenon in a complex, constitutive hierarchy can be studied at one level only. Therefore, to study the competition between foreign companies and local smallholders in Nduruma in interaction with national and international political processes and discourses, I adopt the concept of a multi-level system.

Levels are “locations on a scale” (Gibson et al., 2000, pp.219), with a scale being “the spatial, temporal, quantitative, or analytical dimensions used by scientists to measure and study objects and processes” (Gibson et al., 2000, pp.219).

In this study, I use a spatial scale of jurisdictions on which I distinguish between three levels: local, national and international (Figure 2). Each level contains its own actors, as outlined in Table 1.

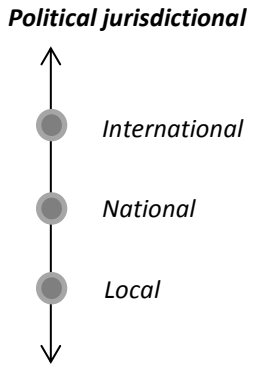

Figure 2 - Scale and levels for discourse analysis (adapted from Cash et al, 2006)

Level	Actors
International	International agencies, international NGOs, National states other than Tanzania
National	Tanzanian Government, National agencies, national NGOs
Local	Those actors directly involved with water management in Nduruma: foreign companies, local smallholders, villagers, local state (water) authorities

Table 1 - Different levels of discourse analysis

I have chosen the jurisdictional scale because its levels are arranged according to political and institutional boundaries (Cash et al., 2006), which seems to fit the analysis of discourses better than physical spatial boundaries. At each level, rules and policies are developed which reflect the dominant and opposing discourses at that level and which possibly impact water use in Nduruma. Analysing these discourses at the different levels, will shed light on how water management in Nduruma fits in the (inter)national debates on development.

5. Research questions

Main research question:

How do contestations in the echelons of resources, rules, authority and discourses shape water distribution between smallholder farmers and foreign horticultural companies in the Nduruma catchment, Tanzania, and how do these contestations interact with each other and with national and international discourses?

Sub-questions

1. *What are the contested issues in the echelons of resources, rules, authority and discourses related to water distribution in the Nduruma sub-catchment?*
2. *What are the discourse struggles around water distribution in the Nduruma sub-catchment at the international and national level?*
3. *What aspects of different echelons do smallholders and companies use in their strategies to influence water distribution?*
4. *What interactions can be observed between the different echelons?*

6. Methodology

To answer the research questions outlined above, I conducted a case study research in the Nduruma sub-catchment, near Arusha, Tanzania. There, I gathered qualitative data during four months, from September to December 2012. The unit of analysis was the water distribution between agribusinesses and their upstream and downstream smallholders in the Nduruma sub-catchment of the Pangani basin. Choosing this sub-catchment allowed me to base my research on previous findings by Komakech et al. (2012a) and to elaborate on this where necessary and possible.

The sampling was not based on statistical principles, but was rather guided by practical issues and relevance, with the aim of getting complete and varied collection of interviews. For each group, I interviewed enough people to reach the saturation point, where little relevant information was gathered by conducting more interviews.

To get more insight in the local level of water management, I used the research activities described below. I interviewed 12 representatives of the 10 different horticultural farms, 6 chairmen of smallholder furrows downstream of the companies and one group of farmers representing a similar furrow (thereby conducting interviews with representatives of 7 of the 8 smallholder furrows). I also conducted interviews with the chairman and secretary of the river committee, the chairmen of the upstream and downstream committee and the predecessor of the downstream chairman. I attended one river committee meeting where I observed and recorded the proceedings. I went for an exploratory visit in the upstream area, where I did non-structured interviews with village officers and farmers. After this, I had a group discussion with 15 farmers from an upstream furrow, including leaders and members, to confirm impressions from my first visit. To get a better insight in the state-led water management institutions, I interviewed the Hydrology Technician and a groundwater specialist at the Pangani Basin Water Office (PBWO) and the treasurer of the Water User Association (WUA) of Upper Kikuletwa.

Interviews with representatives of the agribusinesses, the PBWO and the WUA were conducted in either Dutch or English. The others were held in Swahili, with the help of a translator.

For the analysis of the national and international level, I relied mostly on scientific and grey literature and policy documents. To add to this, I conducted an interview with the First Secretary on Economic affairs and Trade at the Embassy of the Kingdom of the Netherlands in Dar es Salaam, and visited the offices of the Tanzanian Investment Centre and the Tanzania Horticultural Association in Dar es Salaam and Arusha respectively.

After collecting my field data, I presented my results at the Water Equity Workshop at the Nelson Mandela African Institute of Science and Technology outside Arusha, Tanzania, where I received feedback and discussed the results.

For my analysis, I used the concepts described in the conceptual framework. For the discourse analysis, I let myself be guided by the questions as formulated by Thomson (2011):

In this piece of text, expressed by this person –

- "*What is being represented here as a truth or as a norm?*

- *How is this constructed? What 'evidence' is used? What is left out? What is foregrounded and backgrounded? What is made problematic and what is not? What alternative meanings/explanations are ignored? What is kept apart and what is joined together?*
- *What interests are being mobilised and served by this and what are not?*
- *How has this come to be?*
- *What identities, actions, practices are made possible and /or desirable and/or required by this way of thinking/talking/understanding? What are disallowed? What is normalised and what is pathologised?*"

During my analysis, I had frequent discussions with my supervisors about the use of concepts and the outcomes of the analysis.

I used the results of these discussions and of the discussion at the Water Equity workshop, together with the analysed primary and secondary data, to write this thesis at Wageningen University. Information or quotes from interviews are referred to in the text according to the codes listed in Table 2.

Table 2 - Conducted interviews with their in-text code

Interviewee	**Month of interview**	**Code**
Farm manager 1[1]	September 2012	HF1
Farm manager 2	September 2012	HF2
Farm manager Rijkszwaan Qsem	September 2012	HF3
Farm manager Dekker Kilimanjaro	December 2012	HF4
Farm manager Mt. Meru Flowers	September 2012	HF5
Farm manager Arusha Blooms	November 2012	HF6
Executive director Kiliflora	September 2012	HF7
Farm manager Kiliflora	November 2012	HF8
Farm manager Enza Zaden	September 2012	HF9
Farm manager Dekker Bruins	September 2012	HF10
Operation manager Dekker Bruins	September 2012	HF11
Assistant farm manager Dekker Bruins	September 2012	HF12
Farm manager Tanzania Flowers	September 2012	HF13
Ward officer Mlangarini	November 2012	WO1
Ward officer Nkoanrua	October 2012	WO2
Former downstream committee leader	October 2012	DCL1
Downstream committee leader	October 2012	DCL2
Upstream committee chairman	October 2012	UCL1
River committee leader	October 2012	RC1
River committee secretary	October 2012	RC2
River committee meeting	October 2012	RC3
Maisaimini furrow leader	November 2012	DS1
Mararoi furrow leader	October 2012	DS2

[1] Farm manager 1 and farm manager 2 wished to remain anonymous.

Village executive officer Marurani, Jacob furrow leader	October 2012	DS3
Ungumini-Usandarini furrow leader	November 2012	DS4
Marurani kati furrow leader	October 2012	DS5
Nduruma kati furrow leader	November 2012	DS6
Manyire furrow members	October 2012	DS7
Ambureni furrow members and leaders (group meeting)	November 2012	US1
First Secretary on Economic affairs and Trade at the Embassy of the Kingdom of the Netherlands	October 2012	NL1
WUA treasurer	October 2012	WUA1
Yeshwanty Rajpaa	October-November 2012	YR1
Pangani Basin Water Officer – water rights	December 2012	PB1
Pangani Basin Water Officer – groundwater	December 2012	PB2

7. Forms of water use in Nduruma sub-catchment

When driving from Arusha town to the Nelson Mandela African Institute for Science and Technology in November or December 2012, one would see a remarkable sight while crossing Nduruma river: the river was diverted and a bulldozer was digging a trench for a pipe (Figure 3).

Figure 3 - groundwater pipe construction (source: field observation 1-12-2012)

The pipe brings water from a borehole on one side of the river to two flower farms on the other side (Figure 4)(HF4; HF10; HF13; YR1).

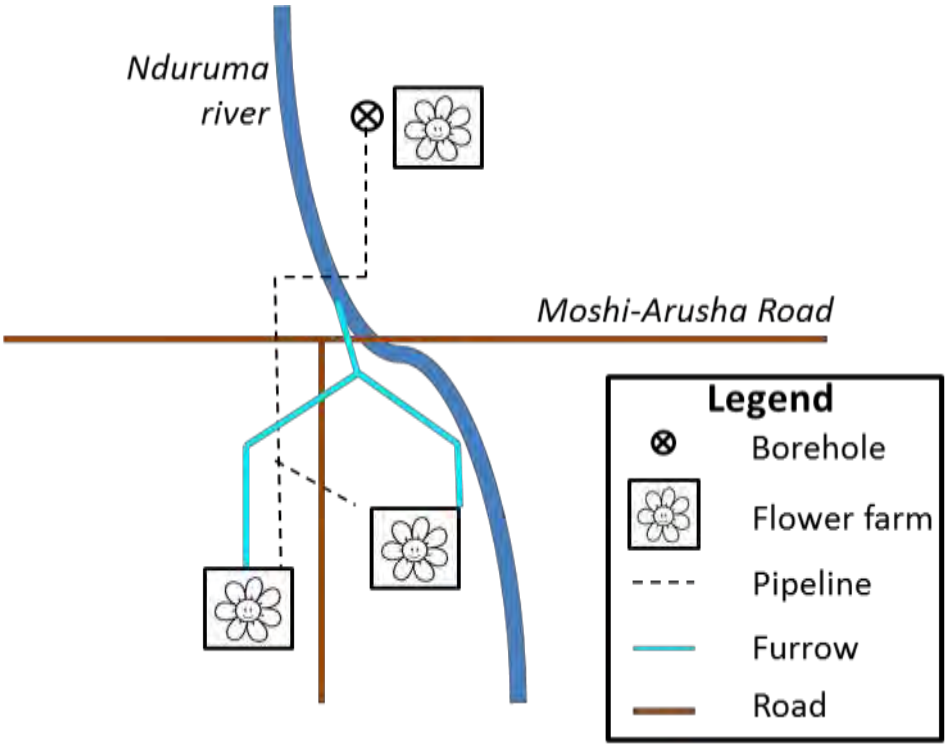

Figure 4 - schematic overview pipeline

This type of construction work by bulldozer for creating irrigation infrastructure is a rare phenomenon in an area historically characterised by mostly smallholder farmers who have predominantly used manual labour to construct their furrows. At the same time it is a perfect illustration of what is going on between smallholder farmers and foreign horticultural companies in the Nduruma area: the foreign companies are increasingly abandoning river water and investing in gaining access to groundwater, while the smallholder farmers continue to use surface water.

In this chapter I describe this phenomenon and explain how it came about. However, before going into the matter more deeply, I first elaborate more on the area and its water users.

7.1. The Nduruma sub-catchment and its users

The Nduruma river flows from Mt. Meru down to the plains, where it later joins the Kikuletwa river. Most of the time however, the water never reaches there, because it is used for irrigation further upstream. Land use in Nduruma has a particular pattern (Figure 5), due to the land alienation in the colonial times.

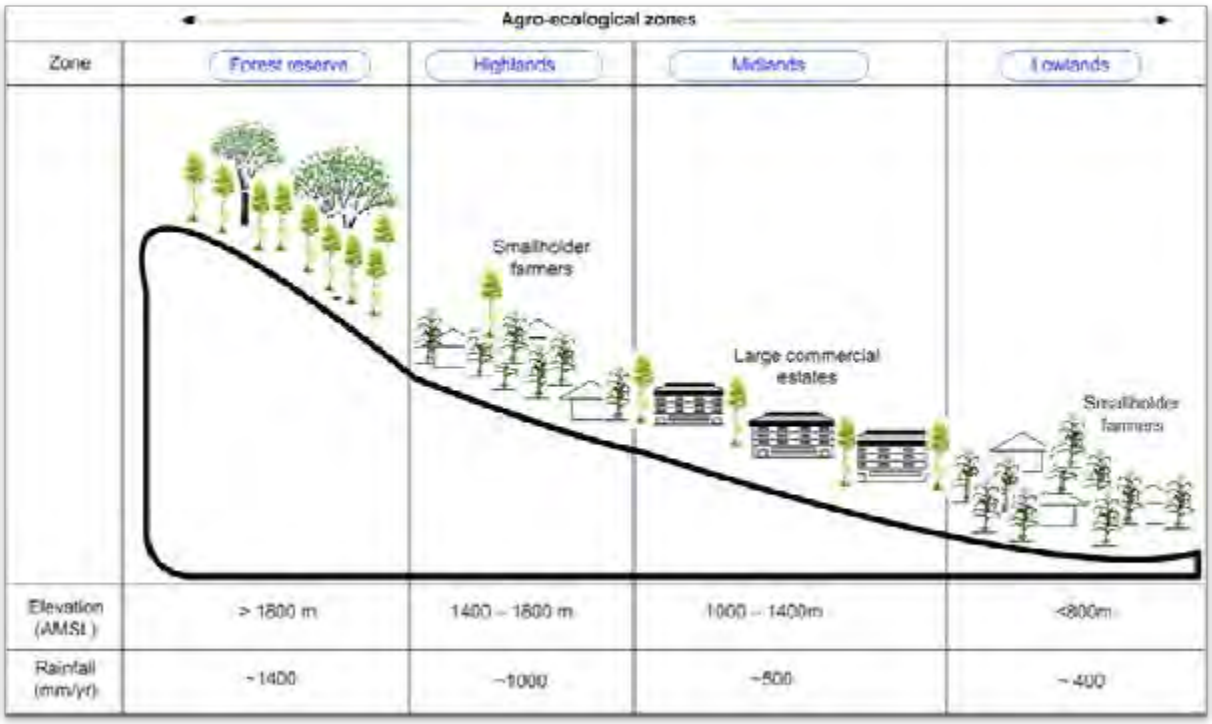

Figure 5 - The three agricultural zones of Nduruma (Komakech, 2010)

Up on the mountain, just under the forest reserve, smallholder farmers have created gravity-operated, unlined irrigation canals; locally known, and from now on referred to as “furrows”. This kind of irrigation has been used in this area for more than 200 years (Komakech et al., 2012a). Until recently, they were the first water users, but now the Water Authority of Arusha city is abstracting water above the first furrows (Komakech et al., 2012c; US1). Below the furrows, the ring of alienated land from the colonial times (Figure 6) is still in hands of foreign investors, who cultivate horticultural crops such as seeds, flowers and vegetables in greenhouses. When land on the mountain got scarce, smallholder farmers extended their cultivation to the plains, also introducing the furrow system there (Spear, 1996).

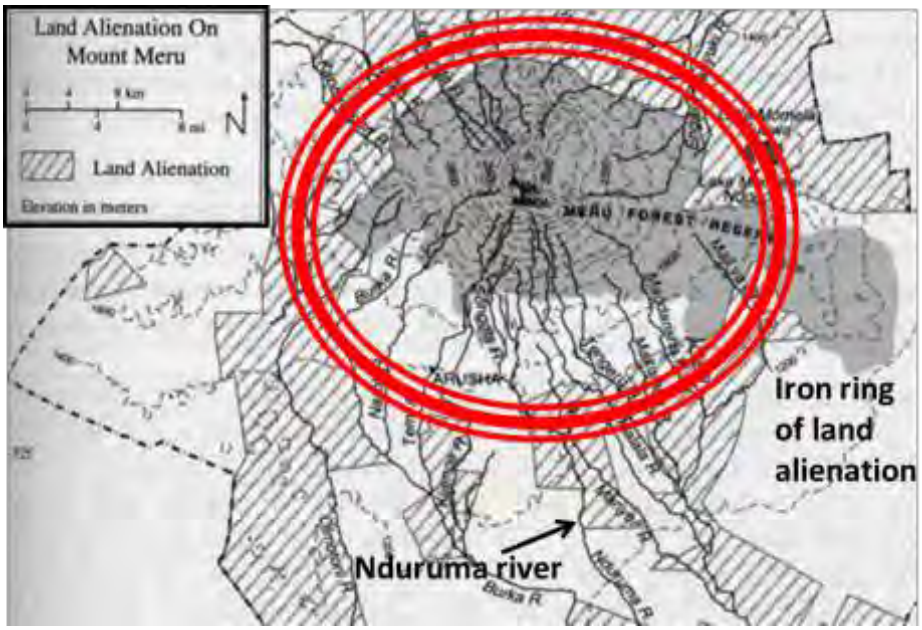

Figure 6 – "Iron ring of land alienation" around Mt. Meru, originating from colonial times (adapted from Spear, 1997)

Plots on the slopes of Mt. Meru are small (less than 1 ha on average (RC2)), but have sufficient water to sustain an intercrop of banana, coffee and vegetables. Plots in the plains are bigger, but the drier conditions only allow a maize/bean rotation. The agribusinesses in the mid-section have the largest farms, most of them using only part of their land for greenhouses. The areas under cultivation range from 4 to 365 ha, but are typically around 10 ha (HF1-HF13). They use drip or sprinkler irrigation, and the seed companies use water for processing their seeds. This results in a water demand of 100 m^3/ha/day for the seed companies, where the flower companies' requirements vary but are around 30 m^3/ha/day (HF2; HF3; HF4; HF9). Those using river water, have either concrete intakes and canals or a pump. All have storage reservoirs to overcome water scarcity, but this water does not last for more than a few days (HF6; HF11).

The furrows which are used to divert water from the river function in an on/off modus: the intake is either closed or open, and discharges are not measured. This is interesting to note, as the permits issued by the basin office are given for a certain discharge (more on this in chapter 8). Some furrows have been lined in recent times with support of NGOs (WO2; DS6), but many are still earthen. Most intakes of the upstream smallholders are constructed from stones, mud and branches and are designed to take water continuously. Some intakes have been reconstructed with concrete, again with the help of NGOs, and equipped with gates for operation. The smallholder farmers use basin irrigation and have no data on their water use.

The different zones can be clearly distinguished in the field (Figure 7).

Figure 7 - From up to down: field and intake uplands, greenhouses midlands and fields lowlands

7.2. Trends in water use in the Nduruma sub-catchment

There are ten horticultural companies along Nduruma, out of which only three rely solely on river water. Three companies are using solely groundwater and four companies use a combination of groundwater, river water or/and spring water (Table 3). The fact that companies who have access to river water still also use groundwater already indicates that this water is not satisfying their needs.

Table 3 – Complete list of horticultural companies and their water sources

Company name	Product	Water source
Mt. Meru Flowers	Roses and fillers	Groundwater
Rijkszwaan Qsem	Vegetable seeds	Groundwater and Kigongoni Lodge Spring
Fides	Chrysanthemum and Kalanchoe stems	Groundwater
Kilihortex	Berries/fruit	River water and groundwater (1 borehole)
Dekker Kilimanjaro	Chrysanthemum stems	River water and groundwater back-up
Dekker Bruins	Chrysanthemum stems	River water (groundwater access about to be established)
Tanzania Flowers	Roses	River water (groundwater access about to be established)
Enza Zaden	Vegetable seeds	Groundwater (2 boreholes)
Kiliflora	Roses	River water and groundwater (2 boreholes)
Arusha Blooms	Vegetables, maize	River water

Source: HF1; HF2; HF3; HF4; HF5; HF6; HF7; HF9; HF10; HF 12; HF13

The three companies relying on surface water have also repeatedly tried to gain groundwater access, but failed to do so (HF6; HF10; HF13). They are all three located south of the road, in a location where boreholes yield insufficient water or water of poor quality. At the Arusha Blooms farm, there were a total of nine failed attempts to drill a borehole. They tried it at depths varying from 80 to 130 meters, but so far they never had a satisfactory yield (HF6). There are plans to try again, but with a different technique, more suitable for the rock formations in place.

The fact that most foreign investors are shifting, or have shifted, towards the use of groundwater, changes the dynamics of the contestations around water. I will get back to this later. First I want to explore why these companies are using groundwater or why they are interested in starting to use it.

Even though it now seems to be normal for these foreign horticultural companies to use groundwater, this was not always the case. Over the years less and less hours of surface water use have been allocated to them (Table 4-Table 7). Water allocation in Nduruma is based on hours, not on volumes. The allocation depends on locally negotiated rules which change with the amount of river water available. The hours stated in the tables are used for the driest periods of the year (usually from June to October). In periods when water is plentiful, allocation schedules are not used.

Table 4 - river water allocation 2004

Time →		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Highlands	24 hours																								
Investors	3 am – 4 pm (13 hours)																								
Lowlands	4 pm – 3 am (11 hours)																								

Source: DCL1

Table 5 - river water allocation January 2009

Time →		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Highlands	24 hours																								
Investors	6 am – 4 pm (10 hours)																								
Lowlands	4 pm – 6 am (14 hours)																								

Source: Komakech et al., 2012a, pp. 123

Table 6 - river allocation February 2009

Time →		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Highlands	24 hours																								
Investors	5 am – 1 pm (8 hours)																								
Lowlands	1 pm – 5 am (16 hours)																								

Source: Komakech et al., 2012a, pp.123

Table 7 - river water allocation 2012

Time →		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Highlands	6 am – 6 pm (12 hours)																								
Investors	5 am – noon (7 hours)																								
Lowlands	Noon – 5 am (17 hours)																								

Source: RC1

Plotting the water allocation between zones over the years results in Figure 8.

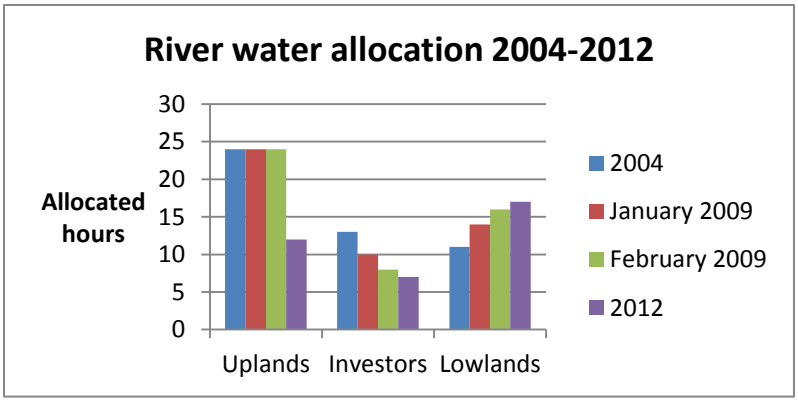

Figure 8 - Change in river water allocation 2004-2012

From Table 4-Table 7 and Figure 8, two things become clear: 1. Water allocation in Nduruma is changing over time. 2. Foreign investors have steadily been losing out (or giving up) on river water. Their hours have been reallocated to the downstream smallholder farmers and villagers, who are now collectively receiving water for most of the day in the driest season. This does not mean however, that water reaches all furrows in the lowlands. The last two furrows do not receive water at all during the dry season, as the river dries up way before that (DCL2; DS3). Also in the other furrows, not all farmers can irrigate. "*Most people only use the water for domestic purposes, not for agriculture. Only the strong guys get the water*" (RC1). Another development can be observed in the tables: the upstream farmers are now supposed to stop taking water at night. This has increased the overall river water availability for both the companies and the lowland farmers, even though enforcing the rule is still a challenge (RC1; UCL1). The relationship between de lowlands and the uplands has always been difficult, with the uplands long not being involved in negotiations (DCL1). Possibly this is the reason why lowland farmers seem to be inclined to expect water from the companies, rather than from the upstream farmers: "*Most of the water we get from the investors, not from upstream. So if the investors would release more water, let's say 1 hour early, that would help. It is not fair for the investors, they also deserve water, but they are the only ones who understand us*" (DCL1). At the same time, there is a clear distinction made between Tanzanian and foreign farmers, with the latter being considered as settlers with less right to water from Nduruma river. This is partially caused by their background, but also by the kind of business they run and the resources they have available. This is expressed in the following logic: "*There is less water in the river - They have money, so they should use groundwater*" (DCL2).

Increased groundwater use can be seen as an answer to the declining river access hours, but companies also expressed other reasons. These reasons are similar for all ten companies and can be grouped in three categories: avoiding open conflict, increasing water security and meeting hygiene protocols. Most of the times, it is a combination of factors. Hygiene protocols are mostly important for seed companies, which have to produce their seeds in a clean environment. A manager of a seed company said for instance "*If we would want more water, we would add another borehole to avoid violence*" (HF3), but added "*the borehole is also good for our hygiene protocol: the spring water we have to clean with a UV filter, which is very expensive*". At another seed company the reasoning was similar: "*We use the borehole because of the hygiene protocols, otherwise we have to treat the water*" (HF9), but they also characterised their strategy towards surface water as "*forget about it, no hassles*". At one of the flower farms aiming to get groundwater from across the road, the manager stated: "*The reason we want to put in that pipe is to get better quality water and to get more water*

to the people. It will also be more reliable, especially with a generator" (HF13). Another flower farmer explained his situation as follows: "*I get my required water from boreholes, in order to prevent senseless discussions with neighbours about me using all their water"* (HF2).

The current situation seems to be a combination of larger companies having the opportunity to access groundwater and them therefore being more inclined to accept the loss of surface water. They prefer to pay for a secure water source, rather than to having the insecurity from negotiating over river water with smallholder farmers. When it comes to getting groundwater access, companies are willing to use a variety of both technical and political means (Box 1).

Box 1: The story of mama Rajpaa, Dekker Bruins and Tanzania flowers

There are two companies along Nduruma who want to use groundwater, but do not find water of sufficient quality (too saline) on their land: Dekker Bruins Tanzania and Tanzania Flowers. Dekker Bruins has another farm location upstream (Dekker Kilimanjaro), where there is a borehole which yields good quality water. This resulted in the idea to transport water from that location, through a pipeline, to the downstream farms of Dekker Bruins and Tanzania Flowers. This pipeline runs past the river, crosses it, crosses the road and reaches the two farms. Most of the pipeline is located on land owned by one of the farms, but after crossing the river, the land is owned by Mama Rajpaa – a local, relatively large-scale, farmer of Indian decent. This lady refused to let them on her land, as she was afraid that they will steal her land and her water and destroy her crops (HF12; YR1). The issue was brought to court, villagers came to protest, the ward officer came by and negotiators from different farms went there repetitively. Villagers and their representatives got involved because the pipeline was said to also have benefits for the downstream users. As the river committee leader put it: "*Mama Rajpaa is a mess. The water they transport will be used to irrigate the farms, and that will leave more water in the river*" (RC1). The lady was said to be "*a witch*" (HF13) and depicted as the difficult lady who prevented flower farms to leave more water to the villagers. She also expressed feeling like that: "*Everybody is against me!"* (YR1). Furthermore, the Water Act of 2009 was used by those in favour of the pipeline to argue that the crops which were now grown there were not allowed to be there at all, as it was too close to the river (WO1). According to them, Mama Rajpaa was not allowed to cultivate anything there in the first place, so she should not object to their digging activities (RC3). Eventually the pipe was constructed, even though mama Rajpaa never gave her permission (YR1).

It is clear that both parties (smallholder farmers downstream and the foreign horticultural companies) prefer the foreign companies to use groundwater. The general idea is that it gives the companies more security and the downstream farmers more river water. The farmers in the uplands do not seem to care about water arrangements between the companies and downstream smallholder farmers. In a group discussion, furrow members of one of the upstream furrows came to the conclusion that: "*there are no problems with the investors and water, but* (there are) *other issues with them*" (US1). These issues were related to employment benefits, competition over land and the use of chemicals.

7.3.A glance into the future

The switch to groundwater of all foreign companies could possibly be the end of competition over water between them and the smallholder farmers. The first will rely on groundwater, while the latter rely on river water. However, this is not taking into account the interactions between surface water and groundwater. Neither the companies, nor the smallholder farmers, nor Pangani Basin Water Office (PBWO) have any idea on these relations (HF2; UCL1; RC1; PB1). PBWO is the authority responsible for studies into these matters and for issuing groundwater permits. The feasibility study for a new borehole is however focussed on assessing groundwater availability, not on the impact it might have on the overall water balance (PB2). PBWO says monetary resources are insufficient to carry out more in-depth studies (PB1). Smallholders in the area are also not demanding such a study: not a single interviewee expressed concerns about groundwater abstraction influencing river water availability. The river committee chairman summarised the thoughts of his members nicely: "*The PWBO would know that better. They give the permit. I am not scared that there will be any effects*" (RC1). The same thing was expressed by the downstream committee chairman: "*We do not believe there is a connection between the groundwater and the river. We are happy when they decide to leave the river and use the groundwater*" (DCL2).

In conclusion it can be said that companies use a diminishing amount of river water while increasing their groundwater use. Most likely it is a combination of both a decline in river water allocation and the perceived benefits from using groundwater which have resulted in the currently observed trend. The vagueness about the effects of increased groundwater use makes it difficult to pass any judgement on whether this means the end of competition over water between the companies and smallholders (as is locally believed). The general idea of a win-win situation cannot be confirmed or disputed, but at the moment it is framed by local actors as a positive development. However, it is highly unlikely that there are no linkages between the river water in Nduruma and the groundwater that is used by the companies. Competition over water might reach a new scale for the companies, with springs drying up much further downstream. It is also possibly that with increasing abstractions it becomes apparent that the river and nearby springs are after all affected, unlike current observations. It is impossible to tell at this point whether the switch to groundwater is the end of competition between companies and surrounding smallholders, but it is very unlikely that there are no drawbacks whatsoever.

8. Rule systems and governing authorities of water use in Nduruma sub-catchment

Water management in Nduruma is characterised by a multi-level system, ranging from traditional, locally developed committees to the Pangani Basin Water Office, an institute under the Tanzanian Ministry of Water. With the 2002 Tanzania National Water Policy and the 2009 Water act, the government of Tanzania has been trying to get more control over local water management practices, mostly by creating water user associations (WUAs) at sub-catchment level, which are inspired by the IWRM principles of participation and cost-recovery (Komakech et al., 2011). These WUAs form an additional state-led institutional layer, influencing local management in Nduruma by its mandate to decide on what water use is legal. Legality is achieved by acquiring a water use permit from the basin authority and by becoming a member of the WUA (WUA1; RC1; PB1; HF5). One could theorise that such a formalisation of water use is beneficial to the foreign companies, which have more resources to apply for such permits and are more familiar with such formal governance structures (eg. Van Koppen, 2007; Kemerink et al., 2013; Veldwisch et al., 2013).

In this chapter I discuss how the multi-layered system works in practice and how this impacts water distribution between smallholder farmers and foreign horticultural companies in Nduruma. It is my proposition that local management structures are actually still crucial in shaping the reality of water distribution and that this works in favour of the downstream smallholder farmers. At the same time, the power of these smallholder farmers is also limited, as their authority does not reach to managing groundwater or issuing water use permits. I elaborate on these statements in the rest of this chapter.

8.1. Building the multi-layered system

The Nduruma catchment has a long history of cooperation around water, which started far before the colonial governments began introducing formal water policies in the 20th century. The still on-going process of formalisation started in 1923 with the first water law and finally resulted in 2009 in the new Water Resources Management Act. However, despite almost a hundred years of efforts of the Tanzanian government to formalise water management, local arrangements are still very much present and influential (Komakech et al., 2011).

In an attempt to control local water management, the Tanzanian government tried to create a management structure which was to include local institutions and would eventually be subjected to the rules of an overarching WUA and the Pangani Basin Water Office (PBWO). This project was executed with the help of the International Union for Conservation of Nature (IUCN), SNV – Netherlands Development organisation and the local NGO PAMOJA. Financial support came from IUCN, the Tanzanian government, the European commission and United Nations Development Partnership (Pangani River Basin Management Project, 2011).

The resulting institutional set-up of water management in Nduruma can be schematised as in Figure 9.

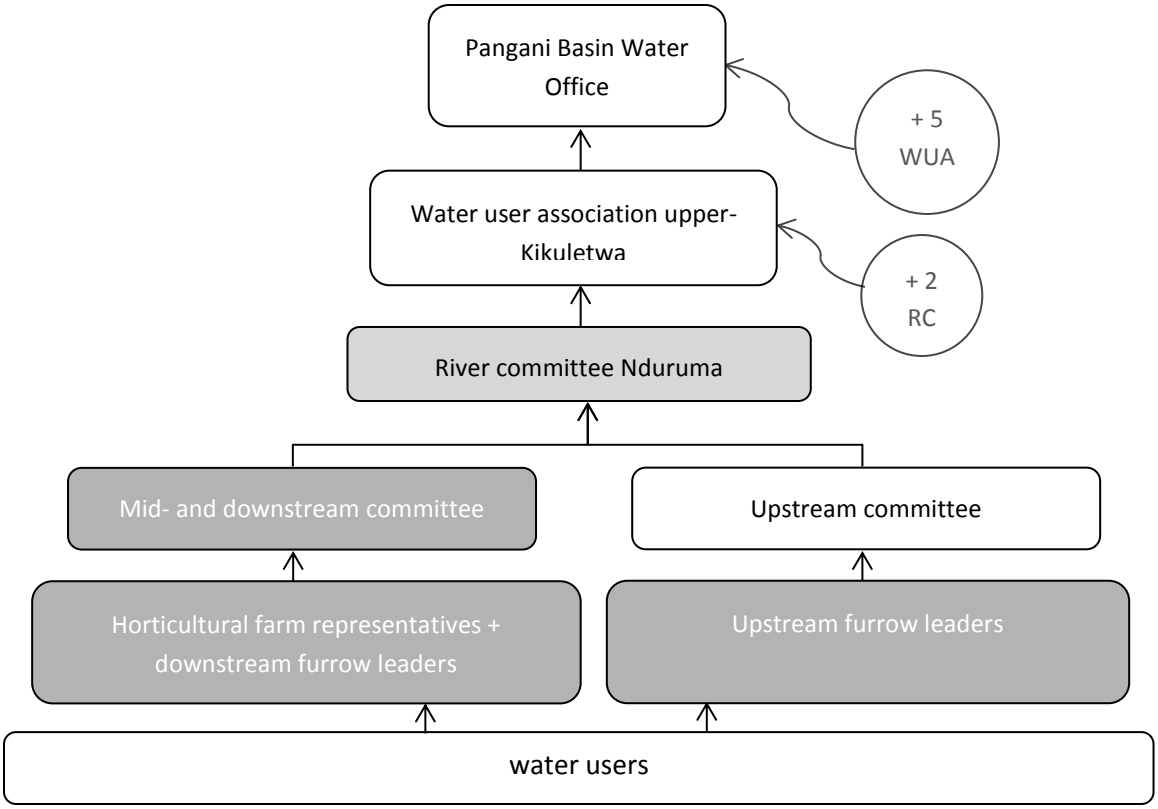

Figure 9 - Institutional set-up water management in Nduruma

All grey boxes indicate local arrangements, the white ones stem from state initiatives. The river committee used to be a local institution, but was partially transformed by state rule and has therefore an intermediate shade.

Members from each furrow elect a leader, while the foreign horticultural farms each choose a representative (RC1). These leaders and representatives sit together in zonal committees to arrange water distribution. The upstream zone runs from the first furrows on Mt. Meru to the railway line, the downstream zone from the railway line until the last furrow (UCL1; DCL2; RC1). In practice this means that the upstream committee represents the smallholders using furrows on the slopes of Mt. Meru, while the downstream committee governs the smallholder furrows in the plains and the companies using river water. Companies using solely groundwater are not part of these committees. The upstream furrows used not to have a special committee to arrange water among them; every furrow would take water all the time. Their committee was only formed when PBWO decided that this was necessary to connect up- and downstream water users (UCL1; US1).

Once the upstream committee was formed, the previous river committee (existing of the horticultural company representatives and downstream furrow leaders) was extended with the upstream committee leaders. Now the chairman of the new river committee is the chairman of the downstream committee, while the secretary is from the upstream committee (DCL2; RC1). This way representation of both zones is built into the committee.

This new river committee is part of the formal, IWRM inspired management structure, in which the three river committees of Kikuletwa, Themi and Nduruma are combined in the WUA of upper-

Kikuletwa. The upper-Kikuletwa WUA is again only one of the 6 WUAs under the command of the PBWO, which has the final responsibility for water management in the basin (PWBO, 2013a).

Alongside all these different water management institutions, there are also local authorities which can be addressed in case of conflicts. None of the interviewees indicated using this route however, and these offices will therefore not be elaborated upon in this thesis.

8.2.Nduruma water management institutions

The previous section describes what institutions are there and who put them in place, but it does not provide insight in what roles these actually play in day-to-day water management. I therefore elaborate on the different institutions below to see what their actual influence on water management is in Nduruma.

Pangani Basin Water Office

The Pangani Basin Water Office was set up in 1991 by the State. It was meant to control all forms of water use in the basin by distributing water rights among users and collecting fees in return (Komakech et al., 2011). PBWO states on its website that it is its mission to "*ensure that water resources are managed sustainably, through water governance and integrated water resources management principles*" (PBWO, 2013b). The idea is that paying for water will lead to cost-recovery for the management efforts of PBWO while at the same time reducing water use (Van Koppen et al., 2007). It is said however, that the main goal was to make sure that upstream water use was reduced, in order to free up water for power generation downstream (Komakech et al., 2011). This suspicion still plays a role for some water users in the catchment: "*Pangani used to deal with electricity, so they are difficult to trust*" (WO2).

The head office of the PBWO is located in Moshi, more than 80 kilometres away from Nduruma, and currently has very little influence on day-to-day water management. It does succeed in making most furrows and companies pay their yearly water permit fee (DCL2; UCL1). Smallholders pay less than companies: ±€17.50 for the first 37 l/s, above that ±€0.02 for each 1000m^3. One furrow is considered one water user. Companies pay ±€17.50 for the first 18.5 l/s and above that ±€0.50 for each additional 1000m^3 (Ministry of Water and Livestock Development, 2002). Looking at these tariffs, it is interesting to note three things. First of all, the prices are determined in a fairly strange way: if a company uses 37 l/s it pays €17.50. When use is increased to 40 l/s, it uses 3 l/s extra and calculations get complicated. The additional costs have to be calculated by determining the time of use and the discharge at the intake, subsequently leading to an amount that the company has to be extra. This requires detailed data about the water use of both companies and furrows. However, this is where the second point comes in: as stated before, there are no flow measurement devices in place to measure and charge furrows or companies for their actual water use. This perhaps has led to the third point: the fees for each water user are fixed and date back from 2002, when measurements were done and permits were issued (PB1). These permits were based on the actual abstractions back then and are not yet adjusted for the new situation, in which negotiation lies at the base of water allocation. This means that the fees paid almost never reflect the water used.

All water users - smallholders and companies, groundwater and river water users – are obliged to get a water use permit from PBWO. This means that PBWO is the one ultimately responsible for assessing the sustainability of different abstractions. Due to lack of funds and time however, there is no knowledge on hydrological linkages in the basin (PB1; PB2). When a new borehole is created, PBWO only checks whether it is at the required distance from other water sources and what the yield is. There are no studies done on the influence on overall water availability. This is worrying considering the developments described in the previous chapter.

Smallholders and companies agree on the fact that PBWO does little to improve water management in Nduruma. One farm manager states for instance that "*they do not move from their chairs*" (HF12) and another claims that "*PBWO only issues water rights*" (HF3). A downstream furrow chairman could add to this: "*We paid Pangani for many years, they never do anything*" (DS6). None of the interviewed smallholder farmers believed that PBWO would ever assist them financially in for instance constructing new infrastructure or enforcing local rules.

This matches the attitude of the Pangani Basin Water officers, one of which stated that they "*want people to manage among themselves*" (PB1). The general opinion within PBWO is that water issues should be managed at the local level and that only in cases of unresolvable open conflict PBWO should be involved. This idea of subsidiarity conveniently also means that few or no services are provided to the users paying their water permit fees.

Water user association of upper-Kikuletwa

The Water User Association is an expression of the IWRM principle of participation and is supported by the 2002 National Water Policy and the 2009 Water Resources Management Act. It should combine all water users (not only irrigators) from one water source, who can elect representatives to execute the WUA's tasks. These tasks include collecting fees for the PBWO, registering users and managing and protecting the water source (Pangani River Basin Management Project, 2011). In a way, it is thus an extension of the PBWO.

The WUA of upper-Kikuletwa combines three rivers: Themi, Nduruma and Kikuletwa. It is a remarkable arrangement, as the water users from one river do not actually compete over water with users from the other two rivers. Eventually all three rivers would come together, but this only happens in the rainy season. Nonetheless, these three rivers have one WUA, which has a board of six elected members. Below this board, there is an executive committee, with 8 members from Themi, 14 from Kikuletwa and 14 from Nduruma (WUA1). A constitution was made for the WUA, stating its rules and norms (Uwamakiju, 2011).

The WUA started in 2010 and has since then been registering users. It is mandatory for each water user to become a member of the WUA and to pay for that membership. The fees are different for different users, and can be seen in Table 8. If water users do not pay their membership fees, they receive a fine of 30% on top of the original fee (WUA1; RC3). In theory their water use is illegal if they do no pay fees at all, which would mean they should be cut off from using water completely. However, the capacity of the WUA to enforce this is highly questionable.

Table 8 - WUA fees

Type of user	Initial fee	Yearly fee
Furrows	€25	€10/year
Small communities[2]	€10	€10/year
Big users	€100	€75/year

Source: WUA1

However, regardless of all these structures, rules and its mandate to manage and protect the water source, the WUA does not actually interfere much in water management at the local level. This also becomes clear when the treasurer describes the WUA activities: *"The WUA does not implement any measures nor enforces any rules; the river committee is responsible for that"* (WUA1). Activities are directed at making water users WUA members and at collecting the fees, hardly at enforcing rules, building infrastructure or negotiating with water users. The levied WUA fees (these are on top of the PBWO fees) are used to provide transport and allowances to the board and committee members attending meetings (UCL1; WUA1). Since there are no other clear services or benefits for water users, this has led to a low level of legitimacy of the WUA. Several furrow leaders have already mentioned not to be happy paying more fees while not getting any support (DS6; DS7; DCL2). An example of this desired support is the Nduruma river committee wanting to use the WUA motorbikes to check whether farmers are complying with the rules in different locations along the river (RC3). The WUA refuses to allow this, saying the motorbikes were necessary for their own work (WUA1).

Downstream smallholder farmers do also see positive things coming from setting-up a WUA. Since the river committee has been recognised by the constitution of the WUA, they now have more leverage in negotiating with upstream smallholders. These were forced to organise themselves, at least on paper, and can now be held accountable. That this was not a voluntary decision is expressed by the upstream chairman: "*PWBO decided to create the WUA and to connect up and down. If we did not agree to this, we would lose our water permit*" (UCL1). This shows that even though it is unlikely that the WUA or PBWO would be able to cut off their water, there is still some fear of these state-led organisations (UCL1; DS7). The downstream committee chairman expressed their gains as follows: "*The WUA helps to unite us. Before you would get chopped up if you would cross to the upstream area"* (DCL2). The river committee chairman added to this that "*the constitution is recognised by the government, so we are able to take that to the* (government) *office*" (RC1). This last statement indicates that agreements reached during the river committee meetings are now seen as valid by government officials. As a result of this, there were cases where police officers went with the committee chairman to check whether upstream users were following the rules (DS4; US1). The WUA also functions as some sort of safe-guard: if the people cannot resolve arguments at the local level, they can ask the WUA to mediate (WUA1; DCL2). Farmers also identify some problems with the functioning of the WUA. They criticise a WUA board member for wanting to be paid additional money to show up at a river committee meeting and the WUA's lack of action (DCL2; DS6; DS7).

All companies are involved in the WUA, regardless of their water source (RC1; WUA1; HF5). Their general attitude towards the WUA is that they do not expect it to help in any way, but the fees are

[2] These include hotels, restaurants and other small non-agricultural businesses.

seen as just another thing they have to pay. There is one European farm manager on the WUA board, which is a relief for some of the companies: "*I like that there is a European in the board, it gives me more confidence that things will be managed well*" (WUA2). This is a big difference with the river committee, where foreign companies could never have somebody on the board. A reason for the election of the European farm manager might be that one can only be elected when he or she speaks English and has graduated school (DCL2). This eliminates almost all farmers in Nduruma from being elected.

River committee

The current river committee stems from an initiative of downstream smallholder farmers and foreign horticultural companies to manage river water among them. This committee, also called the Nduruma river committee, was set up in 1999 and allocated water between the smallholders and companies in the mid- and lowlands until the summer of 2012 (Komakech et al., 2012a). When the WUA constitution was drafted it stipulated that each river should have its own committee, representing all users. This meant that the river committee was partially formalised and that its mandate was extended to cover the upstream smallholders (RC1). Since then the river committee has tried to enforce new allocation rules, which resulted in upstream farmers having to close their intakes at night (Table 4-Table 7 and Figure 8, chapter 7). This made more water available for both companies and downstream smallholders. The rationale behind the closing of the intakes, as expressed by downstream farmers, is that downstream there is water shortage, while upstream they have plenty (DS1; DS2; DS4; DS6; RC1). Upstream farmers recognise this need of the downstream smallholders, but are still not happy about the change (WO2; UCL1; US1). As said before, the downstream leaders thank the WUA and the government backing for this achievement (RC1; DCL2). It seems that the inexperience and unawareness of the upstream farmers has played a role in the negative impacts they have seen from joining the river committee.

However, in practice the upstream farmers do not actually close their intakes every night, and it is a difficult rule to enforce (RC2; UCL1). Most intakes consists of stones and branches and are far from the road, which means that somebody has to walk to the intake every night to move a big rock to close the intake. Also, there are no incentives to do this and it is difficult to check whether an intake has been closed. As the upstream committee secretary put it: "*there is a problem with returning the water*" (UCL1). The river committee leader also acknowledged that it is difficult to enforce the new rules: "*People are making problems because they are not educated by their leaders, they are used to eating the full orange*" (RC1). In the first half year of the new river committee, five furrows were fined for €50.00 each (RC1; RC3). After the fine was set in the river committee meeting, the different furrows actually also paid the set amount. This is positive indicator for the authority of the river committee. The fact that not more furrows were fined, is a result of the belief that "*before we start enforcing the law strictly, we have to educate people*" (RC1) and that many people are actually not yet recognising the new rules. The notion of having to obey the new constitution is slowly growing however, even though not all water users like it. During a meeting with upstream furrow members, this was translated into: "*it is the law, we have to follow it*", but also: "*Before there was no constitution. Now we have to follow the rules, whether we like it or not*" (US1). The problems with

reinforcing the rules remain however, as it is difficult to go check at night whether furrows are closed and downstream farmers have to trust upstream farmers to do this.

Upstream farmers do not get many benefits, either from the river committee or the WUA. Upstream farmers often do not even know these institutions exist, and the new rules do not benefit them in any way. The biggest issue on their agenda is for the Arusha Urban Water and Sewerage Authority (AUWSA) to release more water to them (UCL1; RC3). AUWSA is the first one to abstract water from Nduruma, taking water to Arusha town through a pipeline, causing the first three furrows to experience water shortage in the dry season (Komakech et al., 2012c). Ideally, AUWSA would sit in on both the WUA and the river committee meetings, but this is not the case (RC3; WUA1). The WUA, being a state-led institution with a mandate to control all water use, should be able to start negotiations with AUWSA, but claims to be unable (RC3). The fact that this issue is low on the agenda of both the river committee and the WUA, indicates an overall underrepresentation of the upstream farmers. However, as an upstream farmer demanded during a river committee meeting: "*If you are hard on us, you should be hard on them too!*" (RC3).

The companies which are involved in the river committee are only those who use water from Nduruma river. The others, using groundwater or spring water, often do not even know of its existence: "*I do not know them"* (HF2), *"I do not know for sure what they do"* (HF3) and *"Nice idea, but it won't work"* (HF1) are some of the responses farm managers to questions about the river committee. Dekker Bruins, one of the companies still using river water, normally provides space for meetings and pays for a bus to go around and pick up river committee members (RC1).

In conclusion one can say that the river committee is very influential in shaping water distribution in the Nduruma catchment. It has the historical advantage of being well-organised and legitimate for downstream farmers, and the new advantage of being recognised by the state. It shapes both the relation between downstream smallholders and companies, and those two parties and the upstream smallholders. The biggest challenge for the river committee is that it does not have enough means to do interventions or to monitor water use.

When it comes to recent developments, the upstream committee chairman put it plain and simple: "*Upstream farmers are very upset, downstream farmers are very happy*" (UCL1).

Zonal committees

The upstream committee is very new and unknown among the smallholders it is supposed to represent. The chairman of the upstream committee explained during the river meeting that he is having problems because of this: "*Every time I ask the leader of a furrow, he says that he has closed the intake, but he hasn't. All leaders are like that. I am the only one, so I am defeated. The leaders upstream are weak; they are overtaken by their members*" (RC3). During that same meeting other upstream furrow leaders also indicated that they are having trouble explaining the new rules to their members: "T*he people are not educated, and you cannot educate them. Every time they come and remove the stones we put*" (RC3). Others blame the infrastructure and a lack of enforcement measures: "*I did not return water, because there was a crack. I need funds to rebuild it. We want to look for guards; otherwise the chairman will have to sleep outside every time*" (RC3). These issues

show that the upstream committee does not have the feeling it can influence the behaviour of the people they are representing towards reducing their water use. The elected members from the WUA creation process are not able to make the water users in their area commit to the new rules. An explanation for this problem could be that most water users were not involved in drafting the new constitution: "*They only involved the leaders when creating the WUA, not the farmers. So now most farmers do not agree. We wish we would have been involved since the beginning*" (US1).

The downstream committee has a very different story. It was started by farmers and is recognised by most downstream farmers and the companies as the authority on water allocation in their area. They have a successful track record in securing more water for themselves (Figure 8, previous chapter), even though many furrows are still dry for part of the year. The downstream committee has always functioned as the negotiation platform between downstream farmers and foreign companies and according to both parties this has contributed to creating a good understanding between them (HF12; DCL1; RC1). The companies are easy to access for the downstream leaders, both because of its geographical closeness and the social ties that have been developed. The best indicator that the downstream committee has been successful is that farmers are generally happy with the current arrangements between them and the companies. Now they look upstream for more water. This is summarised when the downstream committee chairman says: "*Downstream we don't have any problems. Only problem is that there is not enough water* (…) *Upstream in this area they do not think people downstream should get water*" (DCL2).

8.3.Impact of the multi-level system on local water management

From the descriptions above, one can easily assume a legal pluralism perspective and distinguish between the state-led and the local institutions. However, the division of authority seems to be agreed upon by all and rarely contested: PBWO has the authority to issue permits for both groundwater and river water and levy fines, with the WUA functioning as its extension at a lower level. The water permits do not play a role in water allocations, which is recognised by PBWO, WUA, smallholders and companies (WUA1; HF10; RC1). Instead, the river committee deals with actual river water allocation at the local level, according to locally negotiated rules. It finds itself backed by the WUA and the PBWO, as their rules are now documented in a legally valid constitution. In turn, they back the state-led organisations, by educating their members about the use of the PBWO and the WUA. The river committee also strongly relies on the upstream and downstream committees for water sharing within the zones. The subsidiarity principle is applied to all contestations: they should be dealt with at the lowest possible level. Only when issues cannot be managed locally, they can be taken up to the WUA or the PBWO. By this time it has already passed through the zonal committee and the river committee. A downstream furrow leader put it like this: "*If there is a problem downstream, we discuss it with that committee. If there is a problem with the uplands, we discuss it in the river committee*" (DS2).

The attitude of PBWO and the limited activities of the WUA have thus allowed smallholder farmers and companies to manage river water according to their own rules. However, even though the river committee is powerful in dealing with the allocation of river water, it has no influence on those companies dealing with groundwater (DCL2).

This current institutional set-up shapes the way in which companies and smallholder farmers use water. Companies for instance, have to engage with local institutions if they want to use river water. The clear division of tasks and responsibilities between the state-led and the local institutions makes it difficult to go forum shopping: PBWO will always refer a commercial farmer back to the river committee. This is clear from the example of the Gomba estate, where a commercial farmer tried to appeal to formal institutions (including the president), but eventually went out of business because of water shortage (Komakech et al., 2012a). Because of this, the formalisation of the river committee and adding another state-led institutional layer has not changed the position of the foreign companies. However, there is another possibility for companies to avoid the local negotiations: use groundwater instead of surface water. At the moment, most companies are not involved in the river committee and only pay their WUA and PBWO fees. For them, this is a clear-cut procedure which has nothing to do with negotiating: you pay and you get your water. They do not feel either organisation is going to benefit them, but it is also not bringing them any problems. This is also a way of forum shopping: you change to (what is considered) another water source, and are therefore under somebody else's authority and rules.

When it comes to the smallholder farmers, matters are quite different. Especially the downstream smallholders have succeeded in creating a space for themselves in the downstream committee and the river committee where they can positively influence their access to water. They find themselves backed by the state-led organisations, which gives them leverage over the upstream smallholders. This has resulted in upstream farmers closing their intakes at night. This extra water also benefits the companies which are still cultivating using river water, but this does not seem to stop these from trying to shift to groundwater. Board members of both the downstream and the river committee are smallholder farmers, giving them a larger say in the committee proceedings than companies. They have shown in the past to be able to destroy intakes of companies (Komakech et al., 2012a), who have few places to turn to (as explained above). In December 2012, I observed that the intake of a flower farm had been blocked by villagers. The farm manager said he would have the intake cleared by his workers and that he would report it to the river committee. The fact that companies acknowledge that the local committees are the ones to address in case of trouble, adds to the authority of the local institutions.

The upstream smallholders seem to have failed in exerting much influence within the river committee, most likely because of a lack of experience in these matters. They were confronted with a constitution which they did not agree with, but was already signed by some people said to represent them. Since then, a struggle is going on over the closing of their intakes at night. Completely withdrawing from the river committee seems not to be an option so far, also because of the support the river committee receives from the state.

The state-led institutions on their own however, lack credibility and authority with both groups of smallholders because of their absence from the local water management scene. They collect fees, but do not deliver services in return. As of yet, furrow leaders still express some fear of the WUA and PBWO *("We do not have a choice. If we do not pay, they will come and close our intake*" (DS7)), but at the same time there is the realisation that no matter how many fees they pay, they should not expect any support from these organisations. The result is a strange balance of fear and disrespect, in which the support for especially the WUA is slowly declining.

In conclusion one could say that the current institutional set-up supports the downstream smallholder farmers in securing their access to river water, both by using the river committee (in competition with upstream smallholders) and the downstream committee (in competition with companies). This is mostly because IWRM inspired, state-led institutions have decided to back and strengthen the local institutions without trying to interfere much. At the same time, for the companies there is still the possibility to go around the local institutions by accessing groundwater, a development of which the effects are not yet clear.

9. Justifying water use in Nduruma sub-catchment

Within any water management system, users will attempt to reinforce or challenge the current water distribution patterns. This is the same for water use in Nduruma: farmers and companies have their own ideas on how water should be managed. However, the horticultural companies in Nduruma are also part of a much larger process of agricultural foreign investment in developing countries. With this, they become part of debates at a much higher level. In these debates scientists, politicians and development corporations discuss how to frame foreign companies investing in land and water in developing countries: is it a case of land and water grabbing, or does it have positive developmental impacts? Nation states also play a role in these debates, as they receive foreign investors and create the boundary conditions.

In this chapter I elaborate on the different discussions and justifications around water management in Nduruma. I start out at the international level, to then continue to the national and local levels. After describing these different levels, I analyse what the relation is between them: does the international debate in any way resonate with the local level? How does this in turn influence water management? I answer these questions in the last section of this chapter.

9.1. International debate on development

Agribusinesses are settling in many African and Latin American countries, not just in Tanzania. As a result, much has been written about foreign companies using land and other resources in developing countries. Some frame it as "land grabbing", which has a clear negative connotation. Others call it "foreign direct investment in agriculture", a more positive or neutral phrase.

Land grabbing has a water equivalent in "water grabbing", defined by Mehta et al. (2012) as "*a situation where powerful actors are able to take control of, or reallocate to their own benefits, water resources already used by local communities or feeding aquatic ecosystems on which their livelihoods are based*" (pp. 197). Land and water grabbing often go hand in hand, as both are among the inputs required for agricultural production. In this case however, things are more complicated, as most of the land was already "grabbed" during the German colonial rule by others than those now on the land (Spear, 1997, pp.88). Most of the owners are foreigners, even though recently a failed estate was divided in small plots and sold. It seems however, that this land is being turned into residential rather than agricultural area.

The "land/water grabbing" discourse sees foreign investments in land as threatening food security and livelihoods and in some cases forcing the displacement of people in the recipient countries. At the same time, it questions the extent of the benefits claimed by the "FDI for development" discourse: increased levels of GDP, higher government revenues, technology/knowledge transfer and employment opportunities (Cotula et al., 2011).

Even though both discourses have been coming together, accepting some of each other's claims on possible dangers and benefits, there is still a clear distinction.

The land/water grabbing discourse, denies that these land deals are possibly good for development or poverty alleviation. An example of an article adhering to this discourse is McMichael's (2011) 'Interpreting the land grab', published on the site of the Transnational Institute (TNI) of Policy Studies under the heading of agrarian justice. McMichael provides a critical analysis of investments in land in the South, typical for those warning for a land grab. He for instance states that the current land deals

are only serving the interests of the investing states and the governments of receiving countries, but do not help the poor living in the area. He uses an analogy between current land deals and colonialism. By doing this, he implies that there is an illegitimate claim to land and the resources that go with it, with actors from Western countries benefiting and actors in developing countries losing out. He also claims that the only reason countries and companies are buying land, is as an investment to secure profit and food/fuel availability. He denies the claims that agribusinesses are always more efficient and sustainable in terms of natural resources used for production. He identifies that notion in the rhetoric of organisations such as the World Bank, which emphasises the yield gap in African countries and sees agribusinesses as a way to reduce this. He also objects to the idea of smallholder farmers being poor and in need of development through job creation and new technologies.

It is a clear stance against foreign investors and in favour of smallholder farmers. He denounces foreign investments in land and promotes smallholder support.

The "FDI for development" discourse sees foreign investment in land as a good opportunity for development of the country, and of agriculture more specifically. Especially in Africa, where it is claimed that there are many unused resources, foreign companies can bring the capital, knowledge and technologies to increase production, create jobs and raise state income through tax revenues (Cotula and Vermeulen, 2011). An underlying assumption is the neoliberal idea that foreign, bigger farms are more efficient and capable of producing more economic benefits than smallholder agriculture. Alongside it runs the modernisation discourse, which claims "modern" farms waste less water by using water-saving technologies, which makes them able to derive more profit from a certain volume of water.

Apart from the positive and negative discourse surrounding these foreign investments in agricultural land, there are also people who use arguments derived from the two previously described discourses. An example is the Food and Agricultural Organisation (FAO) who argues that these forms of FDI are not necessarily bad, but require a code of conduct for the parties involved (FAO, 2009). A similar claim is made by Mann and Smaller (2010) in one of the United Nations Innovation Briefs: "*There is no question that more investment in agriculture is critically needed. The question that needs to be addressed is how foreign investments in agriculture can make a positive contribution to development and food security.*" How, not if. Their answer lies in better assessing benefits and risks, capacity building for recipient countries, including stakeholders and creating development and employment opportunities.
These calls for better regulating investments in land resulted in the FAO tenure guidelines (CFS and FAO, 2012), a forty-page document written for all those involved in the tenure of land, fisheries and forests. It gives guidance on how to achieve transparent and fair tenure rights, focussing on protecting the position of smallholders and communities. For investments in particular, 15 guidelines are set-up, ranging from promoting smallholder investment to providing opportunities for independent surveys prior to investment. When the guidelines are followed, they aim to contribute to "*food security and progressive realization of the right to adequate food, poverty eradication, sustainable livelihoods, social stability, housing security, rural development, environmental protection and sustainable social and economic development*" (CFS and FAO, 2012, pp.1). However, these guidelines are voluntary and fail to give an indication on how governments in developing countries should establish and maintain this new transparent land tenure governance.

I would argue that the discourse described above is a weaker version of the "FDI for development" discourse, as it still stresses the need for foreign investment. The normal situation is to have FDI to achieve further development of a country, even though this FDI should meet certain requirements.

As the majority of companies in Nduruma are of Dutch origin, and because of recent debates in The Netherland on development aid, I find it important to include what the position of the Dutch government is in this debate. One of the telling signs might be the title of the Minister dealing with development cooperation at the moment: Minister for Foreign Trade and Development cooperation. This link is also clearly expressed on the ministry's website: "*Dutch companies can contribute to economic growth and independence of developing countries. That is good for the companies (they make money and develop knowledge). It is also good for developing countries, because aid ends up in a better place (via companies at the people)*" (Rijksoverheid, 2013). At the same time, the Dutch policy on "aid, trade and investment", published in April 2013, proposes setting up a new fund: the Dutch Good Growth Fund (Min. BUZA, 2013). This Fund is meant, amongst others, to support Dutch companies that want to invest in developing countries, as long as they have some development benefits: creating employment, knowledge transition or increasing agricultural production.

The Dutch pro-FDI attitude also shows in Tanzania, where the Dutch embassy is mirroring the British embassy in setting up the "Netherlands Business Group" which can inform the embassy about problems Dutch companies are experiencing. The embassy felt this was necessary, because more and more companies were coming to the embassy with problems. Most of these problems were related to different kinds of taxes. There was one case where a Dutch company did not get the amount of water rights as promised by the Tanzanian government, after which the embassy contacted the Ministry of Water (NL1).

However, even though the Dutch government supports the investments in theory, companies in Ndurma reported they receive little actual support. According to the embassy, this is largely due to the fact that Tanzania is not one of the 15 partner countries of The Netherlands, therefore receiving less money and attention (NL1).

9.2. Tanzanian government's position on foreign investors

Based on official documents and policies, Tanzania can be described as a pro-investor country. It can be seen as actively promoting itself as a safe country to invest in and it has set up a special office to support foreign (and local) investors: the Tanzania Investment Centre (TIC). TIC is the "*the primary agency of Government to coordinate, encourage, promote and facilitate investment in Tanzania*" (TIC, 2006). It gives tax exemptions to those companies which are TIC approved, mediates in administrative matters such as work permits and assists foreign investors in acquiring land titles (TIC, 2008). TIC gives different reasons why both the foreign companies and Tanzania will benefit from new investments in Tanzania. One of the reasons for foreign investors to come to Tanzania are the "*abundant natural resources*" (TIC, 2008, pp. 2) the fiscal advantages, the labour availability and the stable political situation. Tanzania is seen to benefit from the foreign investors because agriculture "(…) *remains critical for achieving sustained growth, poverty reduction and rural development. Smallholder farmers, responsible for 90% of all farm produce, underutilise arable land, as production systems remain archaic in tillage, storage and processing*." (TIC, 2008, pp. 10) Investors are to use the land to its full potential, thereby modernising agriculture and contributing to the growth of the agricultural GDP.

Besides the fact that the Government of Tanzania clearly has the objective to attract foreign investors, it has also recognised the importance of the horticultural sector. The permanent secretary of the Tanzanian ministry of agriculture, food security and cooperatives stated that "*the (horticultural) industry plays a big role in generating employment opportunities through cultivation, processing and transportation of the products*" (TAHA, 2010). The government of Tanzania is also supporting the emerging flower industry and has identified it as a priority growth sector (Kearny, 2006; United Republic of Tanzania, 2012). This is supported by the international community, as "*Tanzanian horticulture has been promoted by international agreements and foreign aid. The World Symposium of Sustainable Development (WSSD) identified Tanzania as a priority country and horticulture as a priority sector*" (Cooksey, 2011).

Foreign horticultural investors have made sure they have ways to influence the governmental policies. They have set up the Tanzanian Horticultural Association (TAHA), which looks after the interests of foreign companies and aims to stimulate the horticultural sector in Tanzania as a whole. On its website it states that it believes that "*Horticulture has great potential in contributing to poverty alleviation in Tanzania because of its potential in creating employment and increasing export revenue*" (TAHA, 2008). It has published a brochure called "opportunities for horticultural investment in Tanzania" (TAHA, 2009), in which it again emphasises the "*enormous water resources*", the "*large, willing and able work force*" and "*safe and stable environment*", calling Tanzania the "*land of opportunity*" for horticultural investors.

From the descriptions above, one can say that the Tanzanian government has a positive attitude towards foreign investors. However, where farm managers of several companies have confirmed that TAHA works hard to protect their interests, they complain about not receiving any support from the Tanzanian government. The general perception of the companies was nicely put into words by one farm manager: "*They try to lure companies this way, but after that they only want to see money*" (HF9). Complaints are directed at promised tax exemptions that were not given, hap-hazard rule-making, additional fees that had to be paid and problems importing and exporting goods (HF1; HF2; HF3; HF9; HF10). The overall conclusion of another farm manager: "*The Government of Tanzania might advocate investment online, but they do not support it much in practice*" (HF10).

Furthermore, the political climate which is said to be very stable has been stirred up over the last years. The opposition party Chama cha Demokrasia na Maendeleo[3] (CHADEMA) has been gaining ground and companies worry about its negative attitude towards foreign investors. For one company this was a reason to lay low during my research: "*The (local) government is currently very anti foreign investor, so I am not keen on getting any publicity in any form*" (HF2). Another mentioned: "*We are indeed curious what is going to happen when CHADEMA takes over, because CHADEMA say they do not need white people*" (HF9). Nelson et al. (2012) observe a similar trend in, where they still see a strong narrative from the Tanzanian government on the need for foreign investment for generating wealth and employment, but also observe an increase in scrutiny and critique by both civil society and the main opposition party. They describe for instance how cases of complaints of villagers about losing their land to failed biofuel estates resulted in stricter rules on the duration of leases and how Maasai continue to fight with a hunting company from the United Arab Emirates, making international and national headlines (eg. CNN, 2013).

[3] Swahili for "party for democracy and progress

When it comes to water use, the governmental offices do not seem to benefit foreign investors. As described in the previous chapter, water permits are more expensive for them and give little security. The general attitude is that water users should manage among themselves, without bothering the state offices. This attitude prevents companies to try and secure water at a higher level.

In summary, the attitude of Government of Tanzania can be called ambiguous, as policies are clearly in favour of agricultural FDI, but the lack of actual support for companies and a changing political climate suggest otherwise.

9.3.Justifying water use at a local level

At the local level of water management in Nduruma, there are two main points of discussion among smallholders and between smallholders and companies. The first is about whether the foreign companies should be there at all, the second about what kind of water rights they should have.

9.3.1. Discussion one: Benefits of the foreign companies

The first discussion revolves around the foreign character of these companies and whether they benefit the local communities or not. The fact that the companies are not from Tanzania, makes it possible to ask the question whether they are allowed to be there in the first place. The issue of land is a sensitive one, as already described in the background chapter, because of the colonial history and the decision of the government to leave the land in the hands of foreigners. The foreign nature of these investors is not only apparent in their use of technology and their modes of production (horticultural crops for export) (Figure 10), but is also reinforced by the way they run their business.

Figure 10 – Clockwise, starting top left: Sprinkler irrigation for Chrysanthemum, greenhouses, fertigation and storage reservoir at

While all manual labourers are Tanzanian, all managers are European or Asian (HF1-HF13). For the Dutch companies, most materials such as sand filters and packaging material are imported from The Netherlands, few things are purchased locally (HF2; HF10). Products are also flown back to the mother company in Europe or to Western supermarkets. The seed and chrysanthemum producing companies sell their product at production prices to the mother company. The chrysanthemums are also not grown beyond stems, as it would be too expensive for air freight (HF11). These two things

minimise the produced value, and thus the taxes companies pay in Tanzania. This could be seen as an example of tax avoidance (SOMO, 2011). All these things together make that the companies can been seen as functioning as little foreign islands within the Tanzanian system, rather than as drivers for Tanzanian development.

The foreign companies also do not see a large role for themselves in the development of Tanzanian agriculture, other than providing jobs. Flower farm manager: "*Flower farming is good, because it creates a small economy with employment opportunities*" (HF10). Another flower farm manager speaks about the necessity to improve irrigation systems and water use, but does not see a role for his company in that: "*A joint venture between the river committee, communities and WUA can help identifying issues, but eventually an NGO or the government has to pay and organise it*" (HF5). Several companies do think that what they are doing might contribute more than most development aid: "*We do more than NGOs. We have 400 employees. People get 120,000 shillings a month* (±60 euros at time of research)*, for a 45 hour week. That is not exploitation; it is twice the minimum wage of Tanzania"* (HF2). Companies also seem to realise that it is important to be seen as good and responsible by their clients, as all of them have different (social) certifications and three of them are also fair trade certified (HF5; HF7; HF13) (Figure 11). Those three are the three rose growers in the area, and seem to have adopted the fair trade practices mostly because of market demands and public opinion. This reflected nicely in the answer of one of the flower companies to why they were fair trade certified: "*because most of the customers… Mostly to help the communities and to take care of our employees*" (HF7). This same company has an elaborate website on which 10 certifications, 10 awards and 20 community projects are highlighted to show its corporate responsibility[4]. It is remarkable that this is also the company which is mentioned most by farmers for violating the local agreements and which refused to be interviewed by me on their Nduruma location (DS4; DS6). None of the certifications issued to companies in Nduruma have specifications about water institutions or cooperation with local water users. When visiting the company, the farm manager told me he could not talk to me about water issues, as that was "*secret information*" (HF8).

Figure 11 - certificates at one of the flower farms

Considering the foreign character of the companies, and with that their visitor status and their financial resources, local smallholders expect to benefit from their arrival: "*We are okay with them investing in our country, but then they should give something back*" (DS7). Whether smallholder farmers actually feel this is the case, depends on where you are. Those interviewed farmers from villages directly around the companies did see benefits from them and were more inclined to say that the companies should stay. In these villages, I would hear statements like: "*The investors should stay. How are the employees otherwise going to survive?*" (DS2) and "*Our children are working there, so it is good for employment. One day without water and the flowers die. This means that there are no more jobs for the children*" (RC1). Those farmers further upstream and downstream on the other

[4] www.mount-meru-flowers.com, last accessed on 26-05-2013

hand, did not feel like they benefited and mostly preferred the companies to go: "*The investors should build schools, clinics, roads. They take a lot, but they do not give back*" (DS2) and "*We should kick them out, because 1. They took a lot of land, 2. They don't help at all, 3. They don't even employ anybody here*" (DS3).

Several interviewed farmers expressed concerns over the chemicals used in the different farms, and claimed that employees were not being protected enough (US1; RC1; DCL1; DS6; DS7). Despite this they still worked there, as there were no other job opportunities for them. Companies claim to take all precautions to protect their workers however. From a study executed by the Tanzania Plantation and Agricultural Workers Union in 2009, it became clear that horticultural farms in Nduruma comply 75-100% with the international code of conduct for cut-flower production when it comes to the use of chemicals and comply 100% when it comes to workers' safety (TPWAU, 2011). These stories clearly do not match, and my study cannot give any definite statement on the issue either.

The negative sentiments of especially downstream farmers have not resulted in any attempts to actually drive out the foreign investors, nor did companies or farmers report any serious recent efforts to stop them from taking water as long as they comply with the rules. This in in line with what Komakech et al. (2012a) observed between 2009 and 2011. Generally, farmers feel that they are not able to do much about the companies' presence, because the government supports the companies: "*The government first looks to help the big farms, because they raise income through tax*" (RC1) and "*Their roots are too deep in the government*" (DS4).

When doing field work, I found one example which indicated the power companies have on the government. Early October 2012, a company manager complained to me about the fact that he had trouble importing packaging material for his flowers. He also reported that he had gone to the Dutch embassy and contacted TAHA to make sure that he could receive the bags he was trying to import (HF2). Later October, the government of Tanzania, pressured by TAHA, decided to lift the import ban on those specific plastic bags (The East African, 2012). The newspaper reporting the lift of the ban emphasised the horticultural sector as the third-largest foreign currency earner and employer of 6,000 Tanzanians in the Moshi/Arusha region. It also emphasised that the ban could not only damage the horticultural sector, but also the government's image in the eyes of foreign investors. These statements show the different ways in which the foreign companies can have leverage over the Tanzanian government. At the same time it also shows that governmental benefits are not easily obtained, but require lobbying from TAHA. This lobbying however, does not seem to cover the domain of water management in any way.

The conclusion of the first discussion is thus that even though farmers which are geographically far from the companies would rather see them leave, most smallholders recognise that there is little to be done about it and those near to the companies even want them to stay because of employment benefits. The next discussion is about how much water they can use, and where that water is supposed to come from.

9.3.2. Discussion two: The origin and quantities of water for companies

This struggle is mostly between companies who try to secure their water access, and smallholders who try to minimise the use of river water by the companies. The companies' main argument is based on their water-saving technologies and water use efficiency. They state that they use a lot less water than smallholder farmers to produce more value, and should therefore be granted that little

bit they require: "*the investors are not as bad as people think, we actually use water more efficient: we get more value per litre*" (HF5); "*1 ha of tomato with furrow irrigation, uses more water than this farm in one day*" (HF13); "*The farmers upstream waste a lot of water in their furrows. We on the other hand, are very economical with our water as we only use overhead sprinklers*" (HF10). In these arguments, the fact that the value produced is not benefiting Tanzanians through taxes is clearly backgrounded. Also, other possible downsides like pollution and competition over water are not mentioned. The emphasis on the benefits of saving water upstream in the "wasteful" furrow systems should also be regarded with suspicion. The savings that could be made upstream are most likely "*dry water savings*" (Seckler, 1996): the water that is now "wasted" through percolation, most likely resurfaces further downstream through springs. When water upstream does not percolate, discharges from those springs will decrease, therefore not leading to an increase in overall water availability within the catchment. In other words, the water losses in the furrows and on the fields are likely to be "*recovered losses"* (Lankford, 2006), seepage losses which feed the groundwater, which in turn supplies downstream surface water bodies or is tapped through pumps.

Smallholders tend to agree that the foreign companies are using water more efficiently (DCL1; DS2; US1). This seems to be the result of prolonged interaction between smallholders and companies. Several companies expressed explaining to smallholders how they use water, after which the smallholders stopped destroying their intakes. This is confirmed by the downstream committee leader, who states: "*before, we were not educated and we did not want to work with the investors. We would go and destroy their furrows*" (DCL2). However, there is still a feeling that the companies should leave the river water for the smallholders. As one farmer from the downstream area put it: "*They think of their flowers, we think of drinking water. The government could tell them to dig for their own water*" (DS3). According to many of the interviewed smallholders, the companies have enough money to look for alternative sources of water (DS2; DS3; DS5; DS7; DCL2; RC1; RC2). They feel that the river water should be left for those who cannot afford it to access groundwater. This was nicely summarised by a group of smallholders: "*The investors should use groundwater, because they have money. They are lucky to be getting any river water*" (DS7). As explained in chapter 7, groundwater and river water are seen by smallholders and companies as completely independent resources. This is not challenged by the water authorities, which makes that companies switching to groundwater is seen as a positive development for everybody.

In this second discussion, the arguments used are based on efficiency and ability to pay for alternative water sources. It has resulted in a situation where companies are encouraged to use groundwater, both by smallholder farmers and water officials, but where they are also still able to use river water.

9.4.Discourses coming together in Nduruma

When reading the descriptions above, it becomes clear that there are certain similarities between the discussions and justifications at different levels. The international debate for instance, is reflected in the opposing viewpoints of the two biggest political parties in Tanzania. However, this is mostly true on paper. In practice, companies experience little support from the government. This is expressed in all sorts of problems with tax benefits and import goods, but also in water management. The governmental water offices have no intention of standing up for foreign investors, which means that companies have to negotiate with local users. In these negotiations, they use neoliberal and modernisation arguments of efficiency to justify their water use. Smallholders are also aware of the

government's generally positive attitude towards foreign investors, and they know they cannot make these leave or cut them off from water completely. Those who are receiving developmental benefits from the companies, actually also do not want them to leave. These smallholders are perfectly supporting the claims from the international and national pro-FDI discourse: they are happy that they have jobs and that their community is receiving support from these companies. This support is partially given because it is a requirement of international customers (for those companies which are fair trade certified), but also to establish good relations with the neighbouring communities. Other farmers further upstream and downstream are however supporting the claims of the land/water grabbing discourse. They feel the foreign companies have only come to use their land and water, but do not give anything back. Even though Nduruma might not be known to most people debating these issues at higher levels, similar cases are instrumental in supporting their positions.

This short description illustrates how Nduruma is part of a wider web of arguments and discussions, all interacting with each other in ways which are difficult to see. I present a more structured analysis of the different discourses in the next chapter.

10. Conclusion

This study explored the interactions between smallholder farmers and foreign horticultural companies in the Nduruma sub-catchment in the realm of water management. A large part of the research aimed at better understanding how water distribution was justified or objected to by different actors, at the local and (inter)national level. The research question to be answered in this conclusion is:

How do contestations in the echelons of resources, rules, authority and discourses shape water distribution between smallholder farmers and foreign horticultural companies in the Nduruma catchment, Tanzania, and how do these contestations interact with each other and with national and international discourses?

I start out by analysing the different echelons in Nduruma, outlining the different contested issues in each of them. This will sum up the main research results. In the echelon of discourses, I describe the discourses which overarch the local, national and international level. While describing the four echelons, I point out some interactions between them. I then show how companies and smallholder farmers use the contestations in the different echelons to secure their access to water. This is where the interactions between the echelons become more tangible.

10.1. Outlining the echelons in Nduruma

The elaborate, empirical descriptions in the previous chapters can be analysed and organised according to the four echelons. I start out by describing resources, moving on to rules, authority and finally discourses.

Resources

In the echelon of resources, a clear divide can be made in the ability of smallholders and companies to access water and its benefits. Smallholders can only use river water for small-scale maize, bean and vegetable production, of which parts are for home consumption and parts are for the local market. At the same time, companies have the resources, knowledge and contacts to increase their water security (through boreholes, reservoirs and water-saving technologies) and to cultivate horticultural crops for export. The irrigation system has a history of more than 200 years and its form has not changed much; especially in the uplands intakes are still made from stones, branches and mud and none of the intakes are equipped with water meters. The few companies which use river water either pump the water directly from the river into their reservoir or rely on the furrow system to divert water to their farm, like the smallholders. River water and groundwater (only used by companies) are seen as two separate resources. However, it is unlikely that they indeed do not interact, and upstream groundwater use is bound to have an influence on downstream water availability.

Rules

In the echelon of rules, there is a division between the local rules and the state rules, which both govern other aspects of water management. The state-led PBWO formally decides who should receive a permit and hence become a legal water user. Companies apply for a permit on an individual

basis, furrow members apply as a group. After the application has been granted and fees have been paid, a permit is issued. Water permits are issued for a certain volume of ground or surface water, based on measurements in 2002. A permit states the maximum amount of water which can be abstracted, but does not give a right to a minimum quantity. In case of drought, a permit does not give water security. Local institutions govern river water allocation between different water users, expressed in hours of water use. These rule systems seem conflicting, but exist next to each other without much trouble. The water permits are seen as a fee to be paid to use water, after which the local rules determine how much water one exactly gets. However, now that local water allocations have been changing recently, these water permits might become contested in the future. The fact that the local negotiations are used in practice to manage water has partially to do with an idea of devolving water management, but also with a practical issue in the echelon of resources: the current system is not equipped to measure the flows going to different water users.

Authority

The division observed in the echelon of rules directly relates to the two different sources of authority in Nduruma: the state-led organisations and the local upstream, downstream and river committees. The state-led organisations seem to have authority on the basis of being representatives of the state, and thus entitled to take away water permits. However, they lose authority by not providing services in return of the fees they collect. This makes that their authority will possibly be contested in the future, especially that of the WUA of Upper Kikuletwa. State-led organisations have handed over the authority over day-to-day water management issues to local river committee, who in turn hands over responsibilities to the zonal committees. The lowland and river committees have evolved alongside the irrigation system over time, which grants them authority with the mid- and lowland water users. The recent formalisation of the river committee has increased their authority in the uplands. The local institutions have the right to manage river water, but not groundwater. This shows how the four echelons in Nduruma are linked: once one uses groundwater (resource), one obeys to the set of rules of the PBWO (authority). If one uses river water, one obeys to the rules of the river committee. This situation is the result of a specific set of discourses.

Discourses

The discourses concerning water use by companies in Nduruma which are recognisable at all levels are four: the FDI for development discourse, an irrigation modernisation discourse, a neoliberal discourse and the land/water grabbing discourse. The FDI for development and the land/water grabbing discourses are the most dominant ones, where the first is supported by the modernisation and neoliberal discourses.

The FDI for development discourse focusses on the benefits of foreign investment in developing countries. Elements of increased employment and tax revenues are foregrounded, while issues of competition over natural resources and possible exploitation of labourers are backgrounded. The FDI for development discourse has resulted in a new approach to development cooperation, where first world countries encourage investments of their companies in developing countries. This is claimed to benefit all actors involved, in contrast with “traditional” development efforts, in which money was wasted with little or no results. This discourse mainly serves the interests of companies in developed countries. It also claims to serve the interests of local communities and the recipient country as a whole, as it emphasises the benefits they receive. These benefits are doubtful however. It is a

discourse which makes companies powerful, reinforcing their position in wanting to move production to a developing country. It also gives power to governments of recipient countries, who see benefits and promote investment in their country.

The neoliberal discourse nicely supports the FDI for development discourse, as it claims higher efficiencies in agribusinesses, making them more competitive in a free market. Agribusinesses make better use of resources (labour, land, water, fertiliser, pesticides), therefore getting higher returns. Switching from small-scale agriculture to agribusinesses increases the overall revenues. In this discourse, the distribution of the increased revenues is backgrounded, as these are unlikely to benefit the smallholders the agribusiness is competing with. At the same time, smallholders are ignored as being commercial producers themselves, producing crops for the local market and contributing to the economy. This discourse again gives power to agribusinesses, while taking it away from smallholder farmers.

Within the irrigation modernisation discourse, a reason why agribusinesses are more efficient (more value per drop), is because they use modern technologies which waste less water. The fact that "lost" water in surface irrigation often resurfaces downstream to be used by others (dry water savings) is backgrounded. Using drip or sprinkler irrigation is seen as better, more sophisticated and modern, where basin or furrow irrigation is bad, wasteful and backward. Those actors who can use water-saving technologies are made powerful within this discourse (in Nduruma that means the agribusinesses). Their claim to water is portrayed as more legitimate, as they are seen to use it in a better way. Using traditional irrigation technologies is pathologised.

The land and water grabbing discourse disputes the other three discourses. It questions the benefits of FDI and foregrounds competition over natural resources, dispossession, labour exploitation, pollution and tax evasion. It emphasises the role of smallholders in development, using evidence of studies which state small-scale or organic agriculture can have higher and more sustainable yields. This discourse attempts to put investments by foreign companies in developing countries in a bad light, thereby empowering smallholders and disempowering agribusinesses.

These four discourses are mostly used to justify or object to changes in the echelon of rules and resources. How these interactions, and others, work is illustrated in the next section.

10.2. Analysing the linkages between the echelons

Both smallholders and companies try to secure access to water. In doing this, they employ different, reinforcing elements from the four echelons at the same time. Analysing efforts to secure water access therefore nicely illustrates the interactions between the echelons.

Smallholder farmers' efforts to secure water access

During this entire study I have divided smallholders in upstream and downstream farmers. It has become apparent that companies interact little with upstream smallholders, who are successful in using their upstream position to secure access to water. Only recently they have been forced to negotiate with downstream users, but it seems that this has been mostly to the benefit of downstream smallholders. Due to lack of interaction with the companies, the upstream smallholders will further be left out of this analysis.

Downstream smallholders (from here on: smallholders) have successfully managed over the years to increase their share in river water. They use their lack of resources as an argument to claim river water, in a way using the neoliberal and modernisation discourse against the companies: the companies are efficient, rich and can access groundwater; they do not need the river water as much as the smallholders. Furthermore, the foreign character of the companies is emphasised, much as in the land grabbing discourse, leading to the idea that companies should be thankful to be allowed to settle and use water. Smallholders also have a strong voice in the local water management committees, which evolved alongside their irrigation system and in which only smallholders can have a board function. The fact that the state-led institutions have decided to grant authority to these local committees and therefore refuse to support claims of companies based on official water use permits, further strengthens the position of smallholders. Companies are in a way forced to negotiate over rules in arenas where the smallholders have a bigger say.

Companies' efforts to secure water access

In those arenas of the river committee and downstream committee, the companies try to justify their water use by reasoning that they are not wasting water like the upstream users. They use arguments from the neoliberal discourse and the modernisation discourse, claiming they are more efficient in terms of money per drop and in terms of conveyance and application losses. This is something which resonates with farmers, who also say that the water use of companies is not so big, because of their technologies. Companies also emphasise that they employ a lot of people and spend money on community projects, therefore helping in the development of the communities. Those farmers who live close-by and indeed work there agree with these arguments from the FDI discourse. Smallholders who are further away and do not see any benefits from the companies argue against this notion and use arguments from the land grabbing discourse.

Apart from these arguments to secure access to river water, another way to ensure a stable supply of irrigation water is to switch to another abstraction method. Instead of using river water, companies try to access groundwater. This means that they are no longer dependent on local negotiations, but deal straight with PBWO. They avoid the local struggle over resources, rules and authority, and simply no longer interact with smallholders. This is possible because of the divide in authority and rules between river and groundwater. In turn, this division is made natural by the local perception that groundwater and surface water are not linked. When in the future this turns out to be different, the institutional set-up will not be sufficient to manage that situation.

In conclusion, it can be said that contestations in all four echelons shape water management between smallholder farmers and foreign horticultural companies in Nduruma, with smallholder farmers securing more river water and companies moving to groundwater. It has become apparent that discourses reappear at the local, national and international level, and are used by both companies and smallholders in attempts to secure water access. It has also become clear that the echelons do not stand alone. Only by analysing the interactions, one can get closer to understanding the system.

11. Discussion

In this section, I subsequently discuss the content, the methodology and the concepts of this study. In the first section, I assessed what wider lessons can be drawn from my particular case-study when it comes to studying the impact of foreign investment in developing countries on water distribution. In the second section, I describe my own influence as a researcher and a methodological flaw which caused me to only partially reach one of my research objectives. In the final section I reflect on how useful and appropriate the Echelons of Rights Analysis was as a conceptual framework for this study.

11.1. Discussion of content

I would position this case-study of the Nduruma catchment as an example of foreign agribusinesses and smallholder farmers competing over the same water source, both employing their own specific strategies to secure their access to water. It can be seen as a contribution to the study of "water grabbing", a somewhat less studied phenomenon compared to the more famous "land grabbing" (Mehta et al., 2012). Because studying the effects of foreign direct investment in developing countries on water distribution is still a fairly new topic, the literature on it is also still limited. Where more authors have observed the investment trends and modelled or theorised about the outcomes using secondary data (e.g. De Fraiture et al, 2008; Woodhouse, 2012; Bossio et al., 2012), less have documented and published case-studies which show the impacts on the water access on the ground (e.g. Bues and Theesfeld, 2012). In this section, I compare the case-study of Nduruma with some of the other documented cases from water grabbing contexts, pointing out differences and similarities and drawing lessons from these.

While doing this, three things stand out: the difference between rules on paper and rules in practice, the diversity and importance of smallholders' water securing strategies and the dynamic nature of competition between smallholders and agribusinesses.

Rules on paper versus rules in practice

Rules on paper and rules in practice are two different things, especially in a developing country context where government influences are often weak. Other authors have zoomed in on this difference for water grabbing cases (Veldwisch et al., 2013; Bues and Theesfeld, 2012) and the notion was also instrumental and applicable in Nduruma. When looking at formal water rights in terms of water permits and government policies, companies would have seemed to have secure water access and to be supported heavily by government. In reality however, local institutions were much more influential in dividing water, providing a very different arena for farmers and companies to compete over water.

Diversity and importance of water securing strategies

In this aforementioned arena, both smallholders and companies have their own strategies to secure water access, shaping the reality around water distribution. Even though power relations might be unequal, the attempts of smallholder farmers to gain access to (more) water should not be ignored or underestimated. Where some authors do not mention these responses or say that they were unable to really benefit farmers (Mehta et al., 2012), they were crucial in Nduruma in attempts to secure water access for smallholders. Most notably, the initiative of farmers to set-up a committee

(which was later on supported by the government) to allocate water in which they were holding the main positions proved to be crucial in increasing their access to river water. In other cases however, different strategies such as public protest, legal responses or physical struggles might be employed by different actors.
Veldwish et al. (2013) illustrates this variability in farmers' responses by describing two cases of water grabbing by foreign companies in Mozambique. In one case, farmers were successful in at least gaining some land and water security by showing their economic viability, while in the other case most smallholders were displaced and dispossessed by a contract-farming scheme.

Bues and Theesfeld (2012) describe a case in Ethiopia which is very similar to Nduruma: foreign horticultural companies have settled in an area where they share water with smallholder farmers, both upstream and downstream. They use some river water, but mostly rely on groundwater. A committee was set-up to manage water and to allocate it among the different users. However, the outcomes described by Bues and Theesfeld are quite different than those in Nduruma. Smallholder farmers feel powerless in influencing water allocation, did not feel represented and rules were broken by both smallholders and companies. One of the main differences between the two cases is the origin of the committee. Where the one in Nduruma was an initiative of the smallholders, the one in Ethiopia was set up by the companies. The leader of the committee was also selected by them, unlike in Nduruma. In addition, the government was perceived as strongly and actively supporting the companies, which made farmers afraid to speak out. In Nduruma, the government supports the local river committee, and therefore strengthens the position of the smallholders. The comparison of these two cases shows that the institutional strength of local water users and the government's attitude can have a major impact on the ability of smallholders to secure their access to water.

These differences observed in the few cases studied in-depth, shows that water grabbing should be studied in detail at the local level, in order to assess what strategies are employed by what actors and why they are (un)successful.

Dynamics of competition between smallholders and agribusinesses

Mehta et al. (2012) emphasise how the fluid nature of water complicates analysing the water grab (compared to land grabbing). However, the fluid nature of water and its regenerative character also gives reason for optimism. The case in Nduruma is an illustration of how rules were changed over time and water was re-allocated to smallholder farmers. It shows how the position of smallholders was strengthened due to recent developments, and how that led to them successfully negotiating with agribusinesses.

And still, at the same time Nduruma also shows that companies might change their strategy and move to groundwater. This is where the fluid nature of water becomes a problem due to the vague boundaries of the resource: with a change in strategy, the arena where water is contested might change dramatically.

These developments over time in cases of water grabbing are not yet studied, also because of the fairly recent character of the phenomenon and the even more recent awareness of scholars, but seem to be interesting for future research.

11.2. Discussion of methodology

In this section, I discuss two issues I think are worth reflecting on when it comes to the methodology I employed. The first issue is my own role as a researcher, and the influence of being white and Dutch in a context where this clearly matters. Secondly, I reflect on whether my methodology has allowed me to achieve my research objectives, especially in terms of analysing the influence of higher domains on lower levels and the other way around.

More than half of the companies in the Nduruma sub-catchment were owned or managed by Dutch people, and all but one were owned or managed by white Europeans. The fact that I am also a white European (and Dutch) facilitated my communication with the companies. Several of the interviews took place in Dutch and some interviewees attended the same university I am currently studying at. This created an atmosphere of understanding and trust, in which people seemed to feel free to say what was on their mind. We were able to discuss what it is like being a European doing business in Tanzania, as they did not feel judged or threatened by me. People who did not respond to e-mails from researchers from the local university, did respond to my e-mails and phone calls. So in this respect my background was a benefit.

However, when interacting with smallholder farmers, there were several incidents where I was suspected of being sent by the horticultural companies. On one occasion, upstream smallholders even thought I came to steal their water. In these situations, I was helped by my translator and local contacts who could explain my research to worried interviewees. However, I do feel that the fact that I am a white, European researcher influenced the answers I got from furrow leaders and farmers, as people might not have felt free to say anything they wanted. This was exactly the opposite situation from the companies.

It is difficult to say how my background eventually influenced my research. It made some people more accessible and open, while others were more difficult to reach and understand. In the end though, I was able to talk to the people I wanted and tried my best to take most suspicions away. Possibly, the positive and open attitude of the agribusiness managers largely changed the negative impression I had of them before arriving. This in turn helped me to postpone my judgement of them and the situation and reassess the situation in a more balanced way.

A completely different methodological issue is not related to my own influence as a researcher, but to the research set-up. I had the original intention to see how discourses and processes at higher levels influence those at lower spatial levels. In my methodology, I only planned for gathering information at the different levels, but omitted an approach to study the interactions. This resulted in observed similarities at different levels, while not being able to conclude anything on how they were related. To be able to analyse this, one should look at the interfaces, the places where different levels meet. I can imagine that international NGOs and researchers (myself included) in the area can form one of these interfaces between the local and the (inter)national, but also radio, newspapers, television (in some areas), churches, political rallies and elections. For the link between the national and the international level, international conferences and meetings, state visits, policy documents and communications with international donor agencies could be interfaces. There must be many more, and identifying them and analysing how information and ideas travel is a challenging undertaking. It would involve actually selecting and visiting these places which function as interfaces, seeing how parties from different levels present, receive and spread each other's' ideas. I

did not foresee this in my research design, resulting in an inability to reach this particular research objective. These interactions might be highly interesting however, and I therefore propose this as a topic for further research.

11.3. Discussion of concepts

One of the objectives of this research was to explore the conceptual framework of the echelons of rights analysis, in order to increase the understanding of its relevance and use in case study research. Here I would like to discuss how instrumental and applicable the framework was for guiding analysis for the case in Nduruma. Let's assume that good "*conceptual frameworks (…) act like maps that give coherence to empirical inquiry*" (Bolding et al, 2011) in the case at hand. It should guide the researcher in which data to collect, but should also help to structure, analyse and explain that data.

The ERA functions much like an inventory system, in which there are four boxes (resources, rules, authority and discourses) in which observations can be placed. The short descriptions of the echelons provide some guidance for which data to collect, but they are at the same time loosely defined: the boxes are rather large. This makes it a theory about many things: there are few clear thematic boundaries within which to collect data. It is up to the researcher him/herself what he/she finds relevant in the field. I personally set the boundaries in the field after initial, very broad, interviews with different actors. In these interviews, I tried to cover all echelons in the widest possible sense, from which I distilled some on-going trends in water management in the area. Looking for the issues which seem to be most contested can also guide further investigations. Once the trends or major contestations are identified, one can look for elements in the different echelons which explain these.

The echelon of discourses is the one with the broadest description, both in where to set the boundaries for data collection and which kind of analysis to apply. The ERA framework does not give much of an indication on which discourses to include, how to distinguish between them and where to draw the line in terms of scale and themes. In Nduruma for instance, discourses on modernisation, land ownership, efficiency and development (and possibly more) run through each other, influencing water management in a variety of ways. In my eyes, the ERA does not give sufficient direction how to find, order and analyse these discourses. The map ERA provides to go and collect data is thus one with very few and blurred lines.

To give more direction to the research, the researcher has to come up with his/her own interpretation of discourses and a methodology to match that. It is important to make very clear which interpretation one employs, to prevent confusion: a linguistic analysis is something quite different from a Foucauldian approach, and again different from the rather practical approach I took to discourse analysis. This freedom to choose one's own approach is maybe one of the strengths of the ERA framework, but it also limits the possibilities to use it for comparing case-studies. This comparison is something I am particularly interested in, especially in cases of water grabbing, to see which similarities and differences there are in water grabbing cases in different parts of the world.

In my analysis, I had the intention of using the ERA in a thorough way, going beyond the echelons as just an index and studying the linkages between them. However, in spite of my good intentions and best efforts, I do not feel the ERA facilitated this very well. It is fairly easy to divide the data into the first three echelons, even though situations are sometimes so intertwined dividing them makes it

artificial (hence the chapter combining the echelons of rules and authority). The fourth one requires additional conceptualisation of the term discourses, as explained before. However, simply structuring the empirical data according to the echelons brings very few new insights. It might even bring confusion to the reader, as elements from the different echelons are pried apart and described outside their complex environment. In some cases this makes phenomena seem unexpected, even though they might make sense when placed in the larger picture of the case-study. For instance, when looking solely at the rules system, it might be surprising that the allocation of river water to agribusinesses is declining. However, once you know that they have the ability to access groundwater and that smallholders have been granted authority by the state water authority, it starts to make sense. If you add to this the successful argument of smallholders that those who have money should invest in using groundwater and the government policy of water management devolution, things get even clearer.

To come to new insights, I focussed on the interactions between the different echelons, in order to reconstruct the case from these separate elements. I did this by linking different features of the different echelons in the Nduruma system to each other, by assessing which ones reinforce each other. In this way, I tried to analyse how the current situation and trends are shaped by the different echelons. This reconstruction however, is not emphasised within the ERA, even though it provides for a more interesting analysis. The only link made explicit between the echelons is how the echelon of discourses justifies/contests what is going on in the other echelons. There are no feedback loops described from resources to rules (how does the nature of the resource and technology shape the rules?) from rules to authority (how do the different rule systems impact who has authority?) or from any of the echelons back to discourses. These last linkages do not even exist when discourses are seen in the Foucauldian sense as not belonging to actors, but rather as transcending society. However, in the case-study in Nduruma, I did feel that reality was shaped through an interplay of resources, rules, authorities and discourses, which were all called upon to justify one's water use. I observed an instrumental use of arguments from different discourses, which resulted in a much more tangible interpretation of discourses than in the Foucauldian approach.

One example of this interplay I gave above in describing the elements contributing to the decreasing river water allocation for companies. Another example is how the lack of measuring equipment facilitates dividing water on an hourly basis instead of volumetric, which favours local arrangements over state-led ones, confirming the authority of local institutions. When attempting to analyse these linkages between the echelons, it is apparent which elements are reinforcing each other, but it is more difficult to explain why it is like that or to derive any wider conclusions from that. For instance, is there no measuring equipment because local authorities who are in charge cannot pay for it? Or did the state decide they could not invest in measuring equipment and therefore failed to enforce its rules, eventually handing over authority to local institutions. To answer these questions, one has to go beyond observing the interactions, analysing them more deeply by asking questions on how they came to be. Otherwise, there is still a risk that the analysis remains descriptive, and insights beyond the first empirical data will not be as rich as they could be.

Remaining with the map analogy, I would say that this approach of using the ERA as a deconstruction-reconstruction tool is like taking a complicated map, eliminating everything but four cities and then redrawing only the main routes between them. It is unclear what the exact nature of

these routes is and which way they are going, but it possible to show the main structure of the area and the most important strategies of different actors to secure and justify their access to water.

In summary, the ERA as it is does provide a framework within which to develop a methodology and collect data, but it does not give a lot of guidance in analysing the data. It works as a strong ordering system, simplifying and taking apart complex systems. To move away from this purely descriptive ordering, I suggest studying the linkages between the echelons. These linkages should not only be identified, but the researcher should aim to explain how they came to be and how they are currently reinforcing the existing situation.

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