

www.water-alternatives.org

Volume 6 | Issue 1

Veldwisch, G.J.; Beekman, W. and Bolding, A. 2013.
Smallholder irrigators, water rights and investments
in agriculture: Three cases from rural Mozambique
Water Alternatives 6(1): 125-141



Smallholder Irrigators, Water Rights and Investments in Agriculture: Three Cases from Rural Mozambique

Gert Jan Veldwisch

Irrigation and Water Engineering Group of Wageningen University, Wageningen, the Netherlands;
gertjan.veldwisch@wur.nl

Wouter Beekman

Resilience BV, Wageningen, the Netherlands; wouter@resiliencebv.com

Alex Bolding

Irrigation and Water Engineering Group of Wageningen University, Wageningen, the Netherlands;
alex.bolding@wur.nl

ABSTRACT: In the context of the prevalent neo-liberal discourse on rural development through improved markets, involvement of companies and a strong reliance on foreign investors this article examines the vulnerable position of smallholder irrigators and their water rights. Through the parallel analysis of three contrasting cases of smallholder irrigation in Mozambique and a comparison with formal Mozambican law, it is shown that a big gap exists between formal water rights and water rights in practice. For each case, it is shown how land and water rights are connected and how a successful defence of land rights provides a good basis for a defence of smallholder water rights. Furthermore, as productivity and efficiency arguments are prominent and influential, those smallholders who are able to turn their use into the production of economic value manage best to materialise their claims on both land and water. The paper concludes with recommendations to strengthen the position of smallholders in response to increasing threats of land and water grabbing.

KEYWORDS: Irrigation, smallholder production, water rights, land and water grabbing, Mozambique

INTRODUCTION

Through our longer-term involvement in three contrasting settings of irrigated smallholder production in Mozambique we observed a big gap between formal water rights and water rights in practice. In this article we analyse the processes that underpin successful defence of smallholder water rights in these three cases and propose a framework for action to strengthen them. This is particularly relevant in the context of quickly increasing (foreign) private sector investments in agricultural intensification, which by civil society and critical scholars have been termed land and water grabbing (cf. White et al., 2012; Mehta et al., 2012).

Water rights are often defined as "authorised demands to use (parts of) a flow of water" (Beccar et al., 2002). Formal laws and regulations can provide opportunities and/or barriers to sustain one's claim and mobilise resources and people. In the discussion of the formal land and water law of Mozambique (next section) we show that the formalisation of water rights may actually make smallholders' use of water invisible or render them culpable for failing to register their use. Both phenomena weaken smallholders' claim to water. There is thus a need to look beyond formal law and analyse water rights in

the context of how they function in practice. We refer to this as *water rights in action*, defined as the ability to materialise one's claim through actual use (Beccar et al., 2002), which depends on the ability to mobilise intermediaries like land, technologies, infrastructure and power relations.

In the next sections we present three case studies of smallholder irrigation in various parts of Mozambique (Zambézia, Manica and Gaza). Case study analyses show that for smallholders a successful defence of land rights provides a good basis for a defence of water rights. Secondly we show that people who are able to turn their water use into economic value manage best to materialise their claims on both land and water. Each case description starts with a general introduction to the agricultural practices in the area, the main actors involved and the historical background. This is followed by a description of the mechanisms through which actors access land and water and how these are related to each other. Each case description concludes with an analysis of how investments in agriculture and water management are being made, demonstrating how, in all three cases, investments in productive means and the ability to produce play an important role in the acquisition and defence of land and water rights.

In the first case, about the conflicting claims over Munda Munda irrigation system, it is shown that despite a series of competing land claims by former Portuguese landowners and aspiring foreign investors, a consortium of smallholder irrigators and supporting NGOs succeed in securing a tenuous hold on their land and water through a combination of legal action and continued investment in both the infrastructure and marketing facilities of the system. This smallholder development model contrasts sharply with the (second) case of Chókwè irrigation system which illustrates how the largest smallholder irrigation scheme in Mozambique is in the process of being transformed into a commercial farming venture by an outside company engaging in contract farming of irrigated rice with a limited number of entrepreneurial smallholder producers at the expense of the majority of smallholder subsistence farmers. The case highlights how corporate production of rice in close alliance with the Mozambican government and local elites can displace and dispossess the majority of smallholder producers. The final case on spontaneously emerging furrow irrigation systems in mountainous zones of central Mozambique highlights locally recognised mechanisms of access to land and water rights. The latter are intricately intertwined with local principles of sharing access to land and water and the recurrent need to invest in construction and maintenance of such furrow irrigation systems. The main threat affecting the sustained functioning of these numerous and economically important irrigation ventures lies in their invisible and officially unrecognised nature.

The paper concludes with an overarching analysis and recommendations to strengthen the position of smallholders with regard to their land and water rights within the context of intensified corporate land and water grabbing.

FORMAL LAND AND WATER RIGHTS IN MOZAMBIQUE

Before discussing the specific water regulations in Mozambique we first analyse the Land Law (1997) and its implications for the use of land and its associated resources, among which is water.

Land rights and regulations

Both the Land Policy (1995) and Land Law (1997) were developed in an inclusionary democratic process, which tried to resolve the question of how to "safeguard the diverse rights of the Mozambican people over the land and other natural resources, while promoting new investment and the sustainable and equitable use of these resources" (Tanner, 2002: 21).

The law recognises three ways through which land use rights can be obtained (Tanner, 2002: 25): (1) through "occupation, according to customary norms and practices", (2) through "good faith" occupation of land previously used by others, and (3) through a formal request to the State by investors

and other externals. To stress the equal footing of these three mechanisms they were included in one and the same article (Tanner, 2002). This recognition gave local communities "the full legal equivalence to the State DUAT"¹ (De Wit et al., 2009: 38), even when formalisation and documentation are lacking (Cotula, 2009: 70).

The 'local community' is a central concept in the Land Law, which defines it as follows:

A grouping of families and individuals, living in a circumscribed territorial area at the level of a locality [the lowest official unit of local government in Mozambique] or below, which has as its objective the safeguarding of common interests through the protection of areas of habitation, agricultural areas, whether cultivated or in fallow, forests, sites of socio-cultural importance, grazing lands, water sources and areas for expansion (Law 19/97, Article 1/1; in Tanner, 2002: 27).

This implies that through the Land Law, local communities, be it through customary occupation or through good faith occupation, are not only granted long-term land use rights, but also use rights to the resources connected to the land, including water. Anybody who now wants to gain access to local resources needs to negotiate with the community. Though the community has a veto to reject proposals by private investors, in practice power differentials have led to very different outcomes in various cases (Hanlon, 2004). Although communities' land rights are legally protected in the Land Law, in practice it becomes a hard-fought right to preserve.

Even with all the regulations and instruments for implementation in place, formalisation of land rights has been a slow and tedious process. Communities have to go through 'community delimitation' or 'land demarcation' exercises.² Only a limited number of community land rights have been formalised, amongst others due to time-consuming participatory methodologies, various bureaucratic delays and time required to resolve inter-community boundary conflicts (cf. Norfolk and Liversage, 2002). As a result, smallholder land rights have largely remained 'invisible' and large areas of Mozambique still appear to be 'empty' when official maps are consulted by investors (Tanner, 2009).

As early as in 2003 Lahif (2003: 3) observed that the government had "largely focussed on the potential of the Land Law to promote private ('external') investment, rather than on the development of the small-holder (peasant) sector". Since then the push for private and bilateral foreign investments and large land deals has increased tremendously (Schut et al., 2010; Kaarhus, 2011), with serious implications for water demands as well (Skinner and Cotula, 2011; Woodhouse and Ganho, 2011; Mehta et al., 2012). This recently re-ignited the Land Debate in Mozambique, which has resulted in some tangible legal changes in the Land Law, making it easier for local communities to defend their hold on the land. At the same time, a Land Forum was established in which civil society organisations have been co-opted (see CIP, 2011). Fairbairn (2011) has discussed the important intermediary role of domestic (party affiliated) elites, highlighting both their own appetite for land acquisition and associated land speculation and their role as gatekeepers for foreign investors. Meanwhile disadvantaged communities do not have access to any recognised channel for recourse. *De facto* domestic elites thus play a key role in the allocation and protection of land rights.

Water rights and regulations

The Water Act of 1991 distinguishes between common and private water use. Domestic water needs, including small-scale use for agriculture (up to 1 ha and without the use of siphoning or mechanical implements), is considered common use. Common use does not require a licence or concession and its

¹ Acronym for 'Direito de Uso e Aproveitamento de Terra', the right to use, and benefit of, the land.

² Delimitation is the "identification of the limits of areas occupied by communities [...] including entering this information in the national land registry" (Diploma Ministerial No. 29-A/2000, article 2, 'Definitions'; in Hanlon, 2004: 610). The land demarcation process which, among other things, requires accurate surveying and the construction of cement landmarks, is more complex and expensive (Cotula, 2009).

use does not need to be paid for. Furthermore, common use is prioritised over private use, which requires a licence. The compulsory licensing of private use is already referred to in the 1991 Water Act, but the actual process was regulated only in 2007 through an additional decree (Decreto No 43/2007) (Manjate, 2010). Smallholders are generally considered common users of water and their use is officially protected by law.

The water rights, like the land law, are primarily based on the individual use of a resource. It states that every farmer or company irrigating more than 1 ha should indicate the amount of water used and its source. The government water boards (ARA's – Administração Regional de Águas) should then research whether this water is available at catchment level and issue the licence for use, which also obliges the user to pay fees. There is a procedure for both the recognition of existing water rights and the acquisition of new water rights. New water uses cannot be licensed if they are found to be conflicting with common use interests or to be environmentally harmful. Requests for new water rights are dealt with on the principle of 'first come first served'. Water allocations should not surpass availability, but it is not always easy to determine the availability. This process requires an intricate knowledge at catchment level on water availability and quality, up-to-date knowledge on current users and staff that has the means and capacity to monitor the water use, a situation that is not met in reality in Mozambique.

Common use is especially difficult to monitor because of the large (and dispersed) number of users. Manjate (2010) reports that the Basin Management Units (UGBs) include common use in an entry labelled 'losses', rather than considering it a separate user category in their control and planning procedure. Also methodologically, it remains difficult to assess the amount of water that needs to be secured for common use at river basin level (Vilanculos and Macuacua, 2010; van der Zaag et al., 2010b). The exemption from licensing of common use often leaves these uses and users administratively invisible. This happened for instance in the Limpopo Basin where, in 2008-2009, too many licences were granted if one considers a realistic estimate of available river flows and water consumption through common use (van der Zaag et al., 2010b). Although common use is prioritised above commercial use it remains invisible for planning procedures when considered as non-quantified losses.

Another possible backlash of the water law on small users is that as soon as they start to use technologies to divert water (even if these are manually operated pumps or temporary diversion weirs), this is no longer considered to be common use and formally they would have to request for a licence. In practice, smallholder farmers do not do this; nor do the ARAs enforce this rule, but formally these smallholders operate outside the law, which eventually may become a problem for them.

Land, water and rural development paradigms

Hanlon's (2004) analysis that "the land debate is actually a proxy for a debate about rural development" and "the question of who will develop Mozambique" to some extent also applies to the water debate. Hanlon concludes that out of four possible groups, "foreign investors, the urban élite, 'advanced' peasants and family farmers", the Government of Mozambique has mainly been banking on foreign investors. This can also be observed in the field of water regulation. In the context of very limited capacities to implement the water policies (van der Zaag et al., 2010a) a primary focus on licensing of new and large volumes of water use has emerged, which in practice results in the regulating and facilitating of foreign investments.

As a result of the legal setup, both land and water use by communities tends to remain invisible and hence not considered when assessing and issuing new land and water applications. The absence of recognised avenues for legal recourse in case of deprivation of land or water rights is compounded by the fact that most such customary rights are not backed-up with legally recognised, written documentation, marginalising the strong official position in the law of communities.

Within the context of increased foreign investments in intensive agro-industrial production involving large amounts of land and water, and the adoption by the Mozambican government of an agricultural policy that favours agricultural development through foreign corporate investments, possibly linking up to smallholders through outgrowers' systems, the question of securing land and water rights for smallholder communities becomes paramount.

CASE 1: NANTE AND THE MUNDA MUNDA IRRIGATION SYSTEM³

The first case is situated in Nante, Zambézia Province where smallholder farmers have been involved for years in a struggle over land and water rights in the area of the Munda Munda irrigation system. The case is an example of how organised smallholders farmers, supported by civil society, effectively managed to defend their land and water rights. Colonial history, formal land and water law as well as immigration of smallholders and their subsequent successful productive use of the area, exploiting commercialisation alternatives, all play a role in this highly contested case.

Introduction

The Munda Munda irrigation system of Nante is a large-scale smallholder rice production venture in the lower floodplain of the Licungo River, in the Zambézia Province. The irrigation system, first built by a Portuguese company and later operated as a State farm, is now being engaged in a rural development effort fostering irrigated rice production. Since the end of the civil war (1992)⁴ the area has been subjected to almost constant pressure on the irrigated land, entailing a protracted conflict over access to the available irrigation infrastructure.

The struggle started after the civil war when, in 1996, a family member of the previous Portuguese owners returned to Mozambique to claim the area and the irrigation system that smallholder farmers in Nante had started to use. The local communities received support from ORAM,⁵ an NGO divulging the land law, against the claim by the Portuguese. The law introduced in 1997 made it possible for the communities of Nante to start a delimitation process which was used as a first line of defence. But once the land delimitation was initiated, it imposed an obligation on the community to make economic use of the area. The communities continued to receive support from ORAM and, later, APAC⁶ in community development efforts, as will be described below. This first claim was special in the sense that it was a conflict about who had historical ownership of the land and the infrastructure it harboured. But after conclusion of the delimitation, three more claims were made by outside investors aiming to develop the irrigation area. Due to the nature of these latter claims, the performance of the farmers was measured against the potential performance of the investors.

Advocates of external investments (in particular within the local government) argue that these investors would be able to mechanise production, commercialise their products efficiently and invest in improvements on infrastructure (Beekman and Veldwisch, 2012). In Nante these claims were countered by demonstrating alternative pathways where smallholder farmers perform these tasks. Firstly, farmer-managed tractors were introduced to promote modern agriculture (Beekman and Vellema, 2011). Secondly, a farmers' cooperative was established to market their products (Vellema et al., 2011). And finally investment programmes were written, culminating in the proposed extension of the current

³ The case of Munda Munda has been documented in more detail in Beekman and Veldwisch (2012), where they analyse it within the context of the water grabbing debate.

⁴ Since the late 1970s Mozambique had been entangled in an intensifying civil war between the Rhodesian/South African-supported RENAMO resistance movement and the ruling Marxist FRELIMO regime. The conflict was peacefully resolved in 1992.

⁵ Organização Rural para Ajuda Mútua, Rural Organisation for Mutual Assistance.

⁶ Associação pela Promoção de Agricultura Comercial (Association for the Promotion of Commercial Agriculture).

system to a 3000 ha rice irrigation system for smallholder production. These consecutive developments from 1996 onwards, created a local dynamic that enhanced the capacities and ownership of the development processes by smallholder farmers, who defended their land rights by demonstrating viable alternatives to foreign investments.

Access to water, access to land

The struggles in Nante were focused on the existing irrigation area and affiliated infrastructure. Apart from the 3000 ha of Munda Munda floodplain, Nante harbours other fertile floodplains near the river comprising about 5000 ha. However, these other areas have not been a focus of land contestation and one can only assume that this is because they lack infrastructure. This demonstrates that the struggle is not exclusively about land but about access to water management infrastructure. In the first conflict, described above, the ownership was questioned based on who made the investments and who had the right to use. The Portuguese party had made the historical investment but the independence war and the consecutive civil war resulted in a political climate where conflict was settled in favour of the local communities to use the irrigation area.

In this first conflict, only a part of the new land law was used, and the delimitation of land represented the first step in a process towards the official acquisition of the land rights. Although the delimitation of the irrigation areas for the community resulted in the discontinuation of the claim by the Portuguese, the settlement of the claim was inconclusive. At first, farmers were afraid to start farming in the irrigation area. The land had always had an owner, first the Portuguese and later the State farm, and consequently, farmers were reluctant to move in and use the land, fearing that the land would be taken away from them. In subsequent conflicts, as neither the farmers nor the more recent investors had made the initial investment in the infrastructure, the focus of the land struggles shifted to other aspects stipulated in the land law that demand continued economic use of land in accordance with a development plan submitted as part of the DUAT application process.

The first tentative rehabilitation of the irrigation area was executed in 2003/2004 in collaboration with the local community and ORAM. This made irrigation possible for the first time since the end of the war and was an important step in the farmer emancipation process as it demonstrated the value of ensuring crop production through access to water. This created awareness amongst the farmers of the value of the irrigation system, as was evident from a vociferous farmer protest in 2007 against repossession of the system in the hands of a private investor. The collective investment was an important step to stimulate the active defence of the land and irrigation system by the farmers thus creating ownership.

Investments

The first conflict (with the heir of the former Portuguese owners) was contested through a legislative process of the new land law, while the consecutive conflicts took place in a more conceptual domain: contrasting the potential of commercial investments against development by smallholder farmers. The smallholder model was given shape through investment in the rehabilitation of infrastructure, farmer-initiated operation and maintenance practices (Beekman and Veldwisch, 2012), mechanisation through farmers' associations managing tractors (Beekman and Vellema, 2011), and collective commercialisation of rice products through farmer cooperatives (Vellam and Beekman, 2011). Whilst this process evolved, a variety of land claims and investment plans were proposed by various private investors, putting pressure on the smallholder farmers. Although aspects of the land law were used in the latter conflicts, the struggle was not fought in court, but through the active demonstration and attempted realisation of alternative development models. These comprised new investments that re-enforced farmers' ownership, not only through the demonstration of management capacity (tractors, irrigation and commercialisation) but also by successfully attracting funds for the development of the irrigation area.

In our view, the ongoing land and water conflict constitutes a conflict over different models for development. The government's preference for corporate foreign investments as development model puts pressure on the smallholder farmers to meet the same targets. The Nante case demonstrates the success of an alternative rural development model in defending the land rights by working towards mechanisation and modernisation of smallholder agriculture. But, at the same time, the case demonstrates that this is a slow process that will take time and investments in local organisational capacity enhancement.

In Nante such efforts have resulted in the formulation and endorsement of a joint Dutch-Mozambican-funded ORIO project in 2009 (Munda Munda flood control, drainage and irrigation project), aiming at the development of 3000 ha of smallholder rice irrigation. Through this the farmers have been able to counter the competing claims by demonstrating the capacity to invest and showing some success in development through mechanisation and commercialisation of their products (Vellema et al., 2011). This contrasts with the often assumed potential of external investors in Mozambique and the little they have to show to date (cf. Schut et al., 2010; White et al., 2012).

However, despite the aim of the ORIO project to increase the area of smallholder irrigation to 3000 ha, the rights over this area have formally not yet been assigned to the local communities. The recognition of these rights is still in process. The conclusion of this process will possibly give rise to a second round of questioning of the legal basis of their water right. Although owning the land with the existing infrastructure gives the users the opportunity to manage the water, it is not yet clear under which legal category they fall concerning their water rights. The users are all individually small scale, irrigating on average 0.5 ha per family. This could qualify their water use as common use, as it falls below the threshold of 1 ha per family. However, the future scale of the system, with an anticipated extraction of 8 m³/s, representing a considerable part of the river flow, and the technology used to divert the water, implies that it can no longer be considered common use. This probably means that smallholder farmers will be jointly held responsible and obliged to pay water fees, which might result in a further questioning of their capacity to do so.

CASE 2: CONTRACT FARMING AND LAND REFORMS IN CHÓKWÈ IRRIGATION SYSTEM⁷

The second case, Chókwè irrigation system, situated in Gaza Province, presents an example of how land and water rights of smallholder irrigators can be strongly influenced by a large-scale investment in marketing and other agricultural services, initiated by a commercial enterprise with support of the state. The commercial enterprise provided contract farming deals to entrepreneurs (not necessarily farmers) who would be able to crop an area of at least 8 ha. The government agency responsible for the management of the irrigation system together with elite-dominated Water Users Associations played an important role in facilitating these entrepreneurs in getting access to these relatively large areas by relocating smallholders to other places in the system. Land rights and, as a result, also water rights were dispossessed by reallocating them from a large number of small farmers to a small number of larger (entrepreneurial) farmers. Investments in agriculture and water management were organised in a centralised fashion leading to centralised control over production practices and a de-facto concentration of land and water rights.

Introduction

With an irrigation command area of 30,000 ha, the Chókwè irrigation system (CIS) is the largest irrigation system in Mozambique. It is located in Gaza Province, about 200 km north of Maputo. Originally, CIS was developed under colonial rule in the early 1950s as the *Colonato do Limpopo*. From the beginning, the scheme was intended for mono-culture rice production (Bowen, 1989: 362). Water is

⁷ The case of Chókwè Irrigation System has been documented in more detail in Veldwisch, 2010.

diverted by gravity from the Limpopo River. After independence, from 1975 to 1977, its management was slowly transformed into one single large (state socialist) enterprise: the *Complejo Agro-Industrial de Limpopo* (CAIL). In 1977, the scheme was officially designated 'the breadbasket of the nation' (Hermele, 1988: 36).

In 1983, CAIL was dismembered and the area was divided among 10 smaller state enterprises, each one exploring an area of approximately 1-2000 ha (Hermele, 1988: 52; West and Myers, 1996: 42). The management of irrigation infrastructure was placed in the hands of an organisation called SIREMO (Sistema de Regadio Eduardo Mondlane) (Bowen, 1989). From 1984 onwards many of the state enterprises were dissolved and land in CIS was privatised and distributed among four agricultural sectors – state, private, family, and cooperative – and by 1986, 14,000 peasant farmers had received between 0.5 and 1 ha each (Bowen, 1989).

HICEP⁸ is the state company that was established in 1997, as the successor to SIREMO. This institutional change, amongst others, involved the sale of old buildings, a drastic reduction in the number of staff, and the limitation of the agency's responsibility to the main system.⁹ HICEP is responsible for water distribution and maintenance of the primary infrastructure while, officially, from the secondary canal downwards, the farmers and their associations are responsible for the water management. Farmers/water user associations (WUAs) are organised according to hydraulic units, mostly at the level of the secondary canal (or *distribuidor*). The extreme floods of the year 2000 largely washed away the irrigation infrastructure. With the help of donors the rehabilitation of the intake and the main canal were completed in 2006 (HICEP, 2010). Also some of the secondary and tertiary canals have been rehabilitated, but only up to an area of about 7000 ha. An additional 7000 ha are in the process of being rehabilitated with funding from the Islamic Development Bank (ibid).

Officially, the scheme is occupied by thousands of smallholders, each having small areas of land registered in their name in the cadastre of water users (*cadastro*). In reality, however, each year only 2-3000 of them are registered as actively producing rice. Others only use small portions of their land, for instance for (irrigated) vegetable production or rain-fed maize. In the period 2001-2006, a maximum of about 3000 ha were in actual use for irrigated rice production (Veldwisch, 2010 on the basis of data provided by HICEP). The main reasons for low utilisation of the scheme are the poor state of the infrastructure, very limited access to (quality) seeds and fertilisers, lack of financial resources to invest in capital-intensive seasonal production, an unreliable output market (fluctuating prices, long distance, unreliable buyers) and the salinisation of considerable areas (Brito et al., 2009; Munguambe et al., 2009.; Pellizoli, 2010).

The cropped area within CIS substantially increased as a result of the activities of Mozfoods Industrias Alimentares (MIA), who in 2005 rehabilitated the rice processing factory in Chókwè and upon finding too low volumes of rice being produced to feed their factory, initiated a contract farming scheme (Nhantumbo, 2009; Mozfoods, 2010; Munguambe et al., 2009). In the 2009-2010 season, this resulted in a total rice production area of about 7000 ha. In that season MIA engaged in joint production with 229 Associated Producers (APs) on a total area of about 3400 ha (cf. Veldwisch, 2010). A contract between MIA and individual APs specified that the producer committed himself or herself to cultivating a specified area for one production season with the obligation to:

- prepare the land with equipment approved or provided by MIA;
- exclusively use seed varieties approved by MIA and seeded at recommended densities;
- application of fertilisers and pesticides in quantities as recommended by MIA;

⁸ Hidráulica de Chókwè Empresa Pública (Hydraulics of Chokwe Public Company), the irrigation scheme management authority.

⁹ Interview with HICEP official on 04/11/2011.

- follow the good agronomic practices as recognised by MIA;
- obey the recommendations and instructions provided by MIA during the season;
- sell the expected amount of produced rice at the price determined by MIA for the season.

At the same time, MIA committed itself to buy all the rice produced under the agreement against an indicative price, adjustable post-season by MIA taking into account the international market conditions. In the course of 2011, MIA's contract farming programme was put to an end,¹⁰ but the way in which it was implemented, as described above, does reveal a lot about the land and water rights arrangements within the scheme, which is why we still use the case for this analysis.

Access to water, access to land

This sub-section describes how access to land and water is arranged within CIS. The long (colonial) history in combination with the large scale of the system has led to an enduring centralised state control over land and water resources, which is very different from the other two cases analysed in this article. The CIS as a whole has a water licence from ARA-Sul,¹¹ which is administered by HICEP, the organisation in control of the water abstraction from the river, allocation and distribution of water, as well as being responsible for collection of the water fees that should cover the annual payment for the licence.¹² Water fees are currently based on cropped areas within the scheme.¹³ Permission to cultivate is not required, and water users "are entitled to receive water in a quantity proportional to the size of their plot" (Pellizoli, 2010: 215), which means that having a land use right within the scheme includes a right to irrigation water. Formally, water users can be denied access to irrigation water if they do not pay the water fee (ibid), but in practice this has not been enforced.

According to various sources at HICEP, official farmers in the perimeter of CIS have individual titles, which have been registered in the cadastro. If people want to get land, in principle they will have to go through the WUAs to find people willing to rent out or sell their land. As only a very small part of the total area is in actual use (about 10% of the total area) it is relatively easy to find people willing to (temporarily) vacate their land. In this situation, MIA decided that they only wanted to work with farmers who could cultivate a minimum of eight hectares, as "small producers want to keep half the amount for home consumption and thus hardly sell to us".¹⁴ Most people who wanted to become APs did not have access to such big plots and more land had to be allocated to them. At first these arrangements were made by the WUAs, in which the board members and other capable farmers often assigned themselves large pieces of land. The reallocation was introduced as a temporary arrangement, but the leaders of the WUAs tried to make it permanent.

[WUA board member]: "We have re-divided the land so that the younger people who can work large pieces of land can also have a chance. The land was very fragmented and often in the names of old

¹⁰ On a field visit in November 2011 it was confirmed that the contract farming scheme was terminated after a dramatically low production in the 2010-2011 season, amongst other reasons as a result of untimely and enduring rains. MIA has, however, continued and expanded its programme for the Promotion and Commercialisation of Rice Production (*Fomento e Comercialização do Arroz*) that was started in 2010 and which, amongst others, provides 'quality seeds' to all farmers in CIS, communication of a guaranteed minimum price for the rice before the start of the season, agricultural inputs at relatively low prices, and free 'quality' extension services.

¹¹ Administração Regional de Águas do Sul (Regional Administration of Water in the South), an institution under the Ministry of Public Works and Housing of Mozambique.

¹² Interview with the president of the administrative board of HICEP on 03/11/2011.

¹³ At the end of October 2011 a wide variety of stakeholders discussed a proposal by HICEP to make the water fee a combination of the used area and a basic fee for holding the title to an area, irrespective of whether it is used or not. Interview with the president of the administrative board of HICEP on 03/11/2011.

¹⁴ Interview with head agronomist of MIA on 30/03/2010.

people that are not even capable of using it. We have made a provisional division now, but we aim to make this official in collaboration with HICEP".¹⁵

Both officials from HICEP and people working at MIA confirmed that 'potential APs', those approved by MIA, can go to HICEP to acquire the amount of land that MIA is willing to cultivate jointly with them.

[HICEP official]: "All the land within the perimeter of CIS is occupied, but when people do not use the land... eventually the land belongs to the state. There are many small producers. (...) We do not want to send them out of the scheme, but we put them at one place together".¹⁶

The authority of HICEP to also manage the land (allocation) within the perimeter of CIS is based on a presidential decree issued in 2009.¹⁷ This newly acquired authority on the part of the state-company HICEP made it possible for farmers to engage in this contract farming arrangement with MIA on considerable pieces of land, which were previously held by small producers. Land rights, and *de facto* also water rights, were being dispossessed by reallocating land and water previously held by a large number of small farmers to a small number of larger farmers, basically those farmers who, by MIA, were assessed to be able to produce rice in the way required by the processing company. In a way this is a continuation of a practice that goes way back. West and Myers (1996: 43) report for the period 1984-1995 that "rights to land were often revoked following each round [of new land allocations], and farmers were displaced while the government decided how to resolve the mounting claims for land. Many smallholders reported being moved in response to each round".

Investments

In the Chókwè case the primary investment was done by MIA and concerned an investment in processing capacities with the aim to get agricultural production going through an improved market access. Additionally, investments were made in other parts of the agrarian support system (seeds, fertilisers, extension services). In some exceptional cases, MIA also assisted in the rehabilitation of secondary and tertiary canals (Munguambe et al., 2009). The development model underlying these large-scale investments can be referred to as market-led development (Dorward et al., 2005), the impact investment approach (Bridging Ventures et al., 2009), foreign investor model (Hanlon, 2004) or development by company-rule, resonating with earlier attempts to develop the colony of Mozambique (Bolding, 2009).

In line with these ideas MIA preferred to work with large producers, while aiming at intensive, mechanised production of high and stable quality rice varieties. Through the selection process of APs, MIA decided which producers would get access to the inputs, services and markets provided through the contract farming arrangement, but indirectly also influenced which producers would get access to land and water resources.

The Government of Mozambique, through facilitating the investments in large-scale commercial agriculture and bestowing on HICEP the authority to also manage the land (allocation), enabled a process whereby land and water rights got concentrated in the hands of a very limited number of producers. Apparently, the government deemed that this was acceptable on the basis of a paradigm of market-led development at a macro level. The success and legitimacy of their choice was supported by starkly increasing areas under production and increasing yields. However, at the same time, large numbers of poor households were excluded from access to their land and water. As MIA only bought rice from its associated producers, smallholder farmers were not only excluded from access to inputs, credits and machinery, but also still lacked a market outlet for their rice. Due to the highly mechanised

¹⁵ Field notes of an interview on 29/03/2010.

¹⁶ Field notes of an interview on 31/03/2010.

¹⁷ Decreto No. 41/2009, 21 August 2009.

production process, the need for labour was low, thus limiting the ways in which poor households could benefit from these developments.

In a short period of time a particular form of production (capital-intensive, labour-extensive, meeting specific quality demands, involving large- to medium-scale producers) gained a dominant position within CIS. A single processing and marketing company, supported by the Mozambican state, strongly influenced the organisation of the rice production process and the distribution of both the economic benefits and the rights to land and water. In 2008, a similar process unfolded in the Baixo Limpopo irrigation scheme, downstream of Chókwè, demonstrating the wider relevance of the case.¹⁸

CASE 3: FURROW SYSTEMS IN THE MOUNTAINOUS AREAS OF MANICA

The third and final case is situated in Manica Province and presents a case in which numerous smallholder producers initiated furrow irrigation systems by diverting permanent mountain streams, virtually without any external assistance. These dynamic developments and farmers' investments have particular effects on land and water claims. Investments in productive means and the ability to produce play important roles in the acquisition and defence of land and water rights.

Introduction

In the higher mountainous areas in central Mozambique, bordering Zimbabwe, smallholder furrow irrigation can be found. This type of farmer-initiated earthen canal irrigation has a long history, some dating back to the beginning of the 20th century, and maybe even earlier (Bolding et al., 2010). Research in the upper catchment of the Revue River (Bolding, 2007; Schippers, 2008; Bolding et al., 2010), the upper catchment of the Pungwe River in Bárúè District (Bolding, forthcoming) and recently in the Messica area describes these systems and the regulations and bylaws used in water and land management.

Characteristically, several furrow irrigation systems take water from one stream, sometimes additionally capturing water from side streams, springs or neighbouring catchments. These systems are interlinked, whether indirectly through seepage and excess water losses reverting to the river to be used downstream or through direct interlinking of several furrow systems, and demonstrate a picture of a hydrologically interconnected water network (van der Zaag et al., 2001; Bolding et al., 2010), rather than a series of discrete irrigation systems.

In 2010, a PROIRRI mission identified 9500 ha of existing smallholder irrigation in central Mozambique spread over just 7 districts (Beekman, 2011: 22), to complement the last census of 2003 when only 986 ha of smallholder irrigation had been identified in the two central Mozambican provinces of Sofala and Manica (DNHA, 2003). Yet, even the identified irrigated command area of 2010 probably represented a gross underestimation. Detailed research in two communities in the Messica area, identified 1000 ha of smallholder irrigation, compared to the estimated 340 ha in 2010 (and 0 ha in 2003). In all likelihood, the extent of actual irrigation is also underreported for other areas. If in comparable agro-ecological zones the irrigation densities are similar to those found in Messica, and the extent of smallholder furrow systems could already be in excess of 100,000 ha. FAO Aquastat (2011, based on data from 2003) reported a national total of 118,000 ha of irrigation including large-scale systems like Chókwè, but excluding these furrow systems. This comparison clearly demonstrates the (little known) importance of smallholder irrigation.

Periods of droughts or of above average rainfall, often occurring in cycles of several years (Schippers, 2008), lead to shrinkage and growth of irrigated area (Bolding et al., 2010). Apart from responses to climatic variations, farmers dynamically reconfigure furrow irrigation practices in response to changing

¹⁸ Interview with the Agricultural Extension Officer, Ponela irrigation project, Baixo Limpopo, on 11/09/2008.

demographic, political and market conditions, physically changing the canals in time and space (Bolding et al., 2010).

It is striking that most of the systems identified in 2010 had emerged without outside support, and that almost all systems aimed at market production during the dry season, often using chemical inputs to enhance the production (Beekman, 2011). These systems have stayed mostly unknown as they are embedded in an (apparently big) informal sector that stays beyond the purview of formal policy circles.

Access to water, access to land

The emergence of irrigation in these mountainous areas is not coincidental. These areas are historically known to be safe havens for farmers fleeing the bad labour conditions in Mozambique during colonial times or repressive laws in (then) Rhodesia. This is specifically the case for the Penha Longa area that, during the civil war, received an influx of refugee farmers (Bolding, 2007). After the war a slow spread continued to other areas like Messica that was strengthened with the influx of returning (Mozambican) farmers and farm labourers from neighbouring Zimbabwe after a severe economical and political crisis hit there (1999-2009, see Derman and Kaarhus, forthcoming). Notably, the immigrants strategically choose where to settle, based on an appreciation of the availability of land, but most importantly of water. This resulted from research in Penha Longa and southern Bárúè District (Bolding, 2007; Bolding, forthcoming) and more recently was re-confirmed through research in Messica.

In acquiring new lands, a fairness principle is applied as seen also in water distribution, where new migrants are given land for agriculture after consultation with local (traditional) leaders. In more densely populated areas like Penha Longa this leads to the use of upstream areas often entailing the construction of bench terraces and new irrigation systems (Bolding, 2007; Schippers, 2008). For areas like Messica that were depopulated during the war a similar process can be observed where, first the lower areas with deep soils were put to use, but where a slow upstream migration can be seen. It is noticeable that the repopulation is mainly undertaken by Mozambican outsiders, often through family connections, but that Zimbabwean nationals are excluded from settling down yet, being allowed as providers of cheap labour (Bolding et al., 2010).

The new settlement locations are consciously chosen for their water availability. The principle that everyone has right to water applies, even to newcomers. By the same principle, one cannot be deprived of the right once established (Schippers, 2008; Bolding 2010). Newcomers can construct new furrows on the condition that not all water is diverted from the stream, based on principles of 'giving others a chance'. This dynamic leads to a slow upstream expansion of irrigated areas as population density increases. The first constructor becomes the '*dono do canal*'; owner of the canal, often in charge of regulating maintenance and making the regulations of water distribution within the canal.

The construction of new systems, or improvement of old ones through outside interventions, often attracts new users. This results in a re-configuration of rules applied in both irrigation practices at furrow level as well as on catchment level (Bolding et al., 2010; Beekman, 2011).

Investments

In practice, clear ideas exist around 'fairness' and 'giving others a chance', often sharing water between neighbours or when allowing new users into the system or allowing new furrows to be constructed (Bolding et al., 2010; Schippers, 2008). Rights are established through initial investments, where new members often buy themselves in by a money transfer to the original owner and/or making a substantial contribution to the maintenance or upgrading of the canals. These rights are maintained by recurring investment in operation and maintenance, and non-compliance could lead to exclusion of farmers from water (Bolding, 2007; Schippers, 2008; Bolding et al., 2010).

Although these are basic rights modalities used by farmers and documented in many examples of hydraulic property creation (cf. Coward, 1986; Gerbrandy and Hoogendam, 2002; Bolding et al., 2010;

Komakech et al., 2011), the unregulated principles also lead to conflict and exclusion. Frequently, upstream users slowly default on their maintenance obligations or only participate in maintenance from the intake up to their field, leaving most other work to be done by tail enders. This is particular the case where the '*dono*' is a tail-end user and slowly loses control over regulations that apply (Schippers, 2008; Bolding et al., 2010). But also the slow upstream expansion of irrigation furrows results in a redistribution of water in the stream where the older investment in downstream areas often suffers from less water availability in time. This indicates that not only the investment and maintenance but also the 'hydraulic position/hierarchy' determines who has a right to decide on or default from tasks. This is often the main structuring mechanism that determines the hydraulic property rights (Bolding et al., 2010).

The different types of hierarchy found in practices that determine the rights attribution mechanisms are hydraulic position as described above, then investment claims based on seniority or 'founding claim' like those of the '*dono do canal*', which are dominant, and also the claims of new successful farmers for more rights through their productive performance demonstrating the capacity to innovate. New rights are often obtained through the sharing principle as described above and lastly, but it is only on rare occasions that disputes are brought to court (Schippers, 2008; Bolding et al., 2010).

In spite of the density of irrigation furrows, intensity of land use, and resultant competition over both land and water it is remarkable that only few examples exist where formal court cases are applied in land disputes and that no water conflicts have been recorded to date (Bolding et al., 2010).

It is clear that these un-documented systems are undervalued in terms of their economic importance and the pivotal role in providing food security. This is in sharp contrast to the combination of the large areas that are being developed by smallholder farmers and their implications with regard to the quantity of water use. This form of spontaneous smallholder irrigation development not only takes place in mountainous areas but also in flood plain areas like Nante, in intensive smallholder pumped irrigation systems and along large parts of the Mozambican coast, where inundation irrigation takes place during the wet season (*machongos*). The amount of water these smallholder systems require is unknown, which leads to disregarding their needs when assessing water availability in the context of (foreign) external investments in agricultural intensification.

CONCLUSION AND RECOMMENDATIONS

This article addresses the question of how water rights of smallholders function in practice and how these could best be protected in the context of increasing pressures exerted by instances of land and water grabbing. The meaning and practice of water rights were explored along the lines of (1) formalised water law, (2) the intimate relation with land rights, and (3) the ability to use water to produce economic value. The main findings are summarised below and followed by policy recommendations of how smallholder water rights could best be protected.

Land and water rights in action

Though water rights of common use are recognised in the water law and, legally, even have a strong position when confronted with increasing private use, the strength of this recognition in practice needs yet to be shown. Licences are not issued to smallholders; nor are they sought by them in defence of their rights – due to high investment needs, limited benefits, and a weak enforcement. The difficulty of monitoring and estimating the actual common use volumes means that smallholder water use practices are not well represented in regional water balances. Formalisation of water rights may be tabled with an argumentation to protect common use, but in practice it does not, and rather leaves them invisible and/or culpable (cf. van der Zaag et al., 2010a). The fact that the law requires any use of water by means of diversion technologies (however simple) to be formally registered incriminates smallholder irrigators, though in practice it has not affected their actual practices.

Water rights are, to some extent, also anchored in the land law, i.e. the natural resources that are associated with the land that is rightfully in use by a community are part of the land rights of that community and cannot be alienated from the community without their consent.

Productivity/efficiency argumentations are prominent and influential in determining water rights in action. Those people who are able to turn their use into the production of economic value manage best to secure their claims on both land and water. The prevalent neo-liberal discourse on rural development through improved markets, involvement of companies and a strong reliance on foreign investors casts a shadow on future protection of customary land and water use.

Recommendations and framework for action

There is a need to make the smallholder farmer visible in policy circles. The strongest defence for their water use is an acknowledgement of their importance for both food security and commercial production. Further insights need to be generated on the actual water needs of current smallholder farmer systems, especially looking at those that clearly invest in land and water management as observed in the furrow systems, and also in small individual pump and flood plain systems. This should then be added to the available quantitative data on river water flows to determine an adequate water balance that includes a more realistic idea of common water use.

A methodology needs to be developed together with the ARAs to better estimate existing water use by informal water users and predict the future water requirements of smallholder farmers, by assessing smallholder crop production systems and areas in the river catchment. If this methodology is linked to new methodologies to estimate river flows and changes in land use on the basis of GIS data sets to augment the limited hydrological data available (as is presently being developed by many (African) researchers, see the 2012 WaterNet conference), it would provide an important tool for the ARAs in issuing water licences and reserving a realistic amount of water for common use. This way, a policy implementation tool could be provided that will help secure river water for existing and future smallholder development.

The first development and piloting of such a methodology could be best targeted in a catchment with high land (and water) pressures because of existing large-scale land claims. Supporting the ARA in undertaking an independent hydrological study and simultaneous study of informal production systems would result in a concrete action in a catchment to determine the common water use to ensure that smallholder farmers are not excluded, while at the same time providing a new methodology that can be applied in other Mozambican catchments.

At the policy level two proposals could be forwarded for changes in the present land and water law. In the case of the land law, community consultation prior to receiving the land rights is obligatory. But the results of these consultations are neither public nor registered in legally valid minutes/agreements. By proposing to make the deals that are made in these consultations public and legally valid, civil society could better understand and react if unlawful actions are taken. In the case of the water law, we propose a change that does recognise smallholder farmers as common users if irrigating less than 1 ha, irrespective of the water abstraction technology used. This would make smallholder farmers inherently interested in becoming visible so that their water use is accounted for in official water allocation efforts, without taxing them when cultivating for subsistence.

Within the current discourse effective defence of smallholders' water rights is possible by empowering them to produce, i.e. show that effective rural development and substantial food production based on smallholder agriculture are possible. All three cases analysed offer evidence to this effect. In Nante smallholder communities, together with civil society organisations, are heavily investing in irrigation infrastructure development after having shown to be able to produce at scale and for the market. In Chókwe, currently a new development model is being elaborated in which smallholder farmers are the basic producers for MIAs factory, rather than a few privileged emergent farmers. In

Manica, smallholder farmers defy both the development by company rule and the development through NGO assistance. Activities in support of these developments in terms of investment in infrastructure, capacity-building and joint learning processes would be worthwhile.

ACKNOWLEDGEMENTS

The first version of this article was written as a strategy document as part of an assignment for the Royal Netherlands Embassy in Maputo, Mozambique. We thank Jan de Moor and Raphaëlle Ducrot for their valuable comments on an earlier version of this article.

REFERENCES

- Beccar, L.; Boelens, R. and Hoogendam, P. 2002. Water rights and collective action in community irrigation. In Boelens, R. and Hoogendam, P. (Eds), *Water rights and empowerment*, pp. 1-19. Assen: Van Gorcum.
- Beekman, P.W. 2011. Identification of the irrigation potential for smallholder horticulture in the uplands of Manica and Sofala provinces. PROIRRI Report, program for sustainable irrigation development. Maputo: DNA.
- Beekman, P.W. and Veldwisch, G.J.A. 2012. The evolution of the land struggle for smallholder irrigated rice production in Nante, Zambézia. *Physics and Chemistry of the Earth* 50-52: 179-184.
- Beekman, W. and Vellema, S. 2011. *Emancipation on the back of the tractor: Farmers managerial capacities and problem solving strategies in Mozambique*. VC4PD Research Paper No. 17. Wageningen: Wageningen International/DGIS.
- Bolding, A. 2007. The dynamics of smallholder irrigation furrows along the Mozambique-Zimbabwe border: A resilient force of agrarian modernization or last resort for marginal communities? Paper presented at the AEGIS conference in Leiden, The Netherlands, 11-14 July 2007.
- Bolding, A. 2009. The return of company rule in Mozambique: The case of irrigated biofuel and food production in the Elephants-Limpopo and Incomati rivers. Unpublished draft paper 28/10/2009.
- Bolding, A. Forthcoming. Reversing the flows of people, skills and goods: Rural livelihood changes along the Mozambican border, Bárue District. In Derman, B. and Kaarhus, R. (Eds), *In the shadow of a conflict: Crisis in Zimbabwe and its effects in Mozambique, South Africa and Zambia*, Chapter 5. Harare: Weaver Press.
- Bolding, A.; Post Uiterweer, N.C. and Schippers, J. 2010. The fluid nature of hydraulic property: A case study of Mukudu, Maira and Penha Longa irrigation furrows in the upper Revue River, Manica District, Mozambique. In van der Zaag, P. (Ed), *What role of law in promoting and protecting the productive uses of water by smallholder farmers in Mozambique?*, pp. 105-136. Challenge Program Project No. 66. Delft: UNESCO-IHE Institute for Water Education
- Bowen, M.L. 1989. Peasant agriculture in Mozambique: The case of Chókwe, Gaza Province. *Canadian Journal of African Studies* 23(3): 355-379.
- Bridging Ventures; Parthenon Group and Global Impact Investing Network. 2009. *Impacts for investment: Case studies across asset classes*. www.parthenon.com/ThoughtLeadership/InvestingforImpactCaseStudiesAcrossAssetClasses (accessed 2 February 2013)
- Brito, R.; Famba, S.; Munguambe, P.; Ibraimo, N. and Julaia, C. 2009. Profile of the Limpopo Basin in Mozambique: A contribution to the Challenge Program on Water and Food Project No. 17. Maputo: FAEF-UEM.
- CIP (Centro de Integridade Pública). 2011. Land moves up the political agenda. *Mozambique Political Process Bulletin* 48(1-3): 1-19.
- Cotula, L. 2009. *Legal empowerment for local resource control: Securing local resource rights within foreign investment projects in Africa*. Stevenage, UK: International Institute for Environment and Development.
- Coward, E.W. 1986. *State and locality in Asia irrigation development: The property factor*. In Nobe, K.C. and Sampath, R.K. (Eds), *Irrigation management in developing countries: Current issues and approaches*, pp. 491-508. Colorado: Westview Press.

- De Wit, P.; Tanner, C. and Norfolk, S. 2009. *Land policy development in an African context: Lessons learned from selected experiences*. Land Tenure Working Paper No. 14. Rome: Food and Agriculture Organisation.
- Derman, B. and Kaarhus, R. (Eds). Forthcoming. *In the shadow of a conflict: Crisis in Zimbabwe and its effects in Mozambique, South Africa and Zambia*. Harare: Weaver Press.
- DNHA (Direcção Nacional de Hidráulica Agrícola). 2003. *Levantamento dos regadios na zona centro do país (Zambézia, Sofala, Manica e Tete): Descrição dos regadios existentes no país, Volume II, Agosto 2003*. Maputo: DNHA.
- Dorward, J.; Kydd, J. and Poulton, C. 2005. Beyond liberalisation: 'Developmental coordination' policies for African smallholder agriculture. *IDS Bulletin* 36(2): 80-85. Brighton: Institute of Development Studies.
- Fairbairn, M. 2011. Indirect expropriation: The role of national institutions and domestic elites in the Mozambican farmland grab. Paper presented at the International Conference on Global Land Grabbing, 6-8 April 2011, organised by the Land Deals Politics Initiative in collaboration with the journal of Peasant Studies and hosted by the Future Agricultures Consortium at the Institute of Development Studies, University of Sussex, UK.
- FAO Aquastat. 2011. FAO's information system on water and agriculture. www.fao.org/nr/water/aquastat/main/index.stm (accessed 2 February 2013)
- Gerbrandy, G. and Hoogendam, P. 2002. Materialising rights: Hydraulic property in the extension and rehabilitation of two irrigation systems in Bolivia. In Boelens, R. and Hoogendam, P. (Eds), *Water rights and empowerment*, pp. 36-51. Assen: Van Gorcum.
- Hanlon, J. 2004. Renewed land debate and the 'cargo cult' in Mozambique. *Journal of Southern African Studies* 30(3): 603-626.
- Hermele, K. 1988. *Land struggles and social differentiation in southern Mozambique: A case study of Chókwè, Limpopo 1950-1987*. Research Report No. 82. Uppsala: Scandinavian Institute of African Studies.
- HICEP (Hidráulica de Chókwè Empresa Pública) 2010. Apresentação do regadio de Chókwè. Chókwè, 24 March 2010. Chókwè: HICEP.
- Kaarhus, R. 2011. Agricultural growth corridors equals land-grabbing? Models, roles and accountabilities in a Mozambican case. Paper presented at the International Conference on Global Land Grabbing, 6-8 April 2011, organised by the Land Deals Politics Initiative in collaboration with the journal of Peasant Studies and hosted by the Future Agricultures Consortium at the Institute of Development Studies, University of Sussex, UK.
- Komakech, H.; van Koppen, B.; Mahoo, H. and van der Zaag, P. 2011. Pangani River Basin over time and space: On the interface of local and basin level responses. *Agricultural Water Management* 98(11): 1740-1751.
- Lahif, E. 2003. *The politics of land reform in southern Africa*. SLSA Research Paper No. 19. www.ids.ac.uk/slsa (accessed 2 February 2013)
- Manjate, C. 2010. Analysis of water and related laws of Mozambique. In van der Zaag, P. (Ed), *What role of law in promoting and protecting the productive uses of water by smallholder farmers in Mozambique?*, pp. 9-30. Challenge Program Project No. 66. Delft: UNESCO-IHE Institute for Water Education.
- Mehta, L.; Veldwisch, G.J.A. and Franco, J. 2012. Introduction to the Special Issue: Water grabbing? Focus on the (re)appropriation of finite water resources. *Water Alternatives* 5(2): 193-207.
- Mozfoods. 2010. Homepage of Mozfoods S.A. www.mocfer.com (accessed 13 October 2010)
- Mungambe, P.; Chilundo, M. and Julaia, C. 2009. Water use and access in the Chókwè irrigation scheme, Mozambique: The case study of the Associação dos Regantes do Distribuidor 11. Project CP66: Water Rights in Informal Economies in the Limpopo and Volta basins. Final draft report.
- Nhantumbo, N.S. 2009. Perception about salinity and the existing strategies to cope with the Hazard in the Chókwè irrigated perimeter, Mozambique. MSc thesis. Wageningen University, Land Degradation and Development group.
- Norfolk, S. and Liversage, H. 2002. Land reform and poverty alleviation in Mozambique. Paper for the Southern African Regional Poverty Network, Human Sciences Research Council.
- Pellizzoli, R. 2010. 'Green revolution' for whom? Women's access to and use of land in the Mozambique Chókwè irrigation scheme. *Review of African Political Economy* 37(124): 213-220.

- Schippers, J. 2008. Making the water (net)work: Towards an understanding of water management practices in farmer-managed irrigation in Manica district, Mozambique. MSc thesis. Wageningen University, the Netherlands.
- Schut, M.; Slingerland, M. and Locke, A. 2010. Biofuel developments in Mozambique. Update and analysis of policy, potential and reality. *Energy Policy* 38(9): 5151-5165.
- Skinner, J. and Cotula, L. 2011. Are land deals driving 'water grabs'? *IIED Briefing*, November 2011. <http://pubs.iied.org/17102IIED.html> (accessed 2 February 2013)
- Tanner, C. 2002. Law-making in an African context: The 1997 Mozambican Land Law. FAO Legal Papers Online No. 26. www.fao.org/fileadmin/user_upload/legal/docs/lpo26.pdf (accessed 2 February 2013)
- Tanner, C. 2009. Land rights and enclosures: Implementing the Mozambican land law in practice. In Anseeuw, W. and Alden, C. (Eds), *The struggle over land in Africa: Conflicts, politics and change*, pp. 105-130. Cape Town: HSRC Press.
- van der Zaag, P.; Bolding, A. and Manzungu, E. 2001. Water-networks and the actor: The case of the Save River Catchment, Zimbabwe. In Hebinck, P. and Verschoor, G. (Eds), *Resonances and dissonances in development. Actors, networks and cultural repertoires*, pp. 257-79. Assen: Royal Van Gorcum.
- van der Zaag, P.; Bolding, A.; Post Uiterweer, N. and van Koppen, B. 2010a. Synthesis – What role of law in promoting and protecting the productive uses of water by smallholder farmers? In van der Zaag, P. (Ed), *What role of law in promoting and protecting the productive uses of water by smallholder farmers in Mozambique?*, pp. 137-154. Challenge Program Project 66. Delft: UNESCO-IHE Institute for Water Education.
- van der Zaag, P.; Juizo, D.; Vilanculos, A.; Bolding, A. and Post Uiterweer, N. 2010b. Does the Limpopo River Basin have sufficient water for massive irrigation development in the plains of Mozambique? *Physics and Chemistry of the Earth* 35(13-14): 832-837.
- Veldwisch, G.J.A. 2010. Rice value chain development and changing control over land and water resources in Chókwè, Mozambique. Paper presented at the Justicia Hídrica Workshop 2010, Cusco, 9-13 November 2010.
- Vellema, S.; Beekman, W. and Doorneweert, B. 2011. *Buying, ploughing and coordinating. How to make the 2-tier cooperative business model work in the Zambezi rice value chain?* VC4PD Research Paper No. 9. Wageningen: Wageningen International/DGIS.
- Vilanculos, A. and Macuacua, E. 2010. Quantitative analysis of water demand and supply in the Lower Limpopo. In van der Zaag, P. (Ed), *What role of law in promoting and protecting the productive uses of water by smallholder farmers in Mozambique?*, pp. 31-40. Challenge Program Project 66. Delft: UNESCO-IHE Institute for Water Education.
- West, H.G. and Myers, G.W. 1996. A piece of land in a land of peace? State farm divestiture in Mozambique. *Journal of Modern African Studies* 34 (1): 27-51.
- White, B.; Borrás, Jr. S.; Hall, R.; Scoones, I. and Wolford, W. 2012. The new enclosures: Critical perspectives on corporate land deals. *Journal of Peasant Studies* 39(3-4): 619-47.
- Woodhouse, P. and Ganho, A.S. 2011. *Is water the hidden agenda of agricultural land acquisition in sub-Saharan Africa?* TransNational Institute and Land Deals Politics Initiative. www.tni.org/article/water-hidden-agenda-land-acquisition-africa (accessed 2 February 2013)

THIS ARTICLE IS DISTRIBUTED UNDER THE TERMS OF THE CREATIVE COMMONS *ATTRIBUTION-NONCOMMERCIAL-SHAREALIKE* LICENSE WHICH PERMITS ANY NON COMMERCIAL USE, DISTRIBUTION, AND REPRODUCTION IN ANY MEDIUM, PROVIDED THE ORIGINAL AUTHOR(S) AND SOURCE ARE CREDITED. SEE [HTTP://CREATIVECOMMONS.ORG/LICENSES/BY-NC-SA/3.0/LEGALCODE](http://creativecommons.org/licenses/by-nc-sa/3.0/legalcode)