

CPWF Project Report

Water rights in informal economies in the Limpopo and Volta basins

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Program Preface:

The Challenge Program on Water and Food (CPWF) contributes to efforts of the international community to ensure global diversions of water to agriculture are maintained at the level of the year 2000. It is a multi-institutional research initiative that aims to increase the resilience of social and ecological systems through better water management for food production. Through its broad partnerships, it conducts research that leads to impact on the poor and to policy change.

The CPWF conducts action-oriented research in nine river basins in Africa, Asia and Latin America, focusing on crop water productivity, fisheries and aquatic ecosystems, community arrangements for sharing water, integrated river basin management, and institutions and policies for successful implementation of developments in the water-food-environment nexus.

Project Preface:

Most African countries underwent water legislation reform since the 1990s, through which existing plural legal systems were changed into nation-wide permit systems, in which the state acts as custodian of the nation's water resources. Although globally heralded as the best way to manage water resources within the broader context of Integrated Water Resource Management, this project examines the problematic implications of the new laws for the majority of the rural and peri-urban poor. Since time immemorial, their water access has been largely governed by self-supply and informal arrangements that have allowed them to survive in often harsh ecological conditions. Water law reform basically dispossesses them from their current and future claims to water, unless they adopt an administrative water rights system that also historically has favored administration-proficient foreign investments. As the new laws have hardly been implemented as yet for various reasons that are further explored in this research, this research provides a timely analysis of the processes at stake and identifies alternative legal tools that recognizes informal water arrangements thereby protecting and encouraging small-scale water users to expand their water use. The generic findings from Burkina Faso, Ghana, Mozambique, and South Africa have generic validity throughout Sub-Saharan Africa.

CPWF Project Report series:

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RESEARCH HIGHLIGHTS

Legal solutions for both equitable water distribution and effective regulation in rural areas

The project 'Water rights in informal economies in the Limpopo and Volta basins' worked together with the national policy makers and lawyers in charge of implementing the newly promulgated water laws. This collaboration raised awareness in high-level policy and legal circles about the double risks of the widely promoted change of plural legal systems into the one single water law regime system. The single system is based on Roman-law whereby the state owns all water resources and authorizes water use either through permits or through exemptions. Such a change comes with potential risks. One risk is that such legal change supersedes and erodes the claims to water that millions of informal small-scale water users have vested through legitimate indigenous and informal arrangements. A second risk concerns the widespread assumption that permit systems are the most appropriate tool for regulation and that governments need to change the water entitlement system before they can effectively regulate. The project found that introduction and enforcement of permit systems brings major administrative burdens for the state and for small-scale users, whose administrative obligations are disproportionate to the volume of water used. Regulatory measures, such as taxation or registration, can also be implemented without changing entitlements to water. The recommended solutions are, first, to rethink regulation, and, second, if permit systems are still adhered to, to adopt the solution emerging in the Water Allocation Reform of South Africa, which is to issue priority General Authorizations. These solutions can be replicated throughout Sub-Saharan Africa (and other continents).

Quantified distribution of water use for equity and effective regulation

In order to substantiate the above research highlight, the project quantitatively assessed of the distribution of water use and examine implementation of the new laws. Research revealed that the few, often corporate formal urban and rural users use by far the largest bulk of the water resources, while the many small-scale farmers only use a tiny fraction of the nation's water resources. Unlike the discourse, in reality, governments only regulate this minority, typically for taxation. In South Africa and Mozambique, taxation was administratively separated from permit allocation. In Ghana, payment is through the new permit system, which charges a minority of 150 large-scale users. (In Burkina Faso, implementation of the new law is still on its way). In the face of these numbers, it is likely that the newly promulgated laws either remain as dormant as the colonial laws upon they were based, or become an arbitrary ad-hoc instrument for either the state or administration-proficient users to promote their interests, with the masses of small-scale users losing out. Priority General Authorizations would avoid such state.

Mapped 'hydraulic property rights creation' and informal water economies

In order to increase the visibility of the indigenous and informal water arrangements that risk being ignored in water law reform, the project studied selected cases for further analysis and to mapping. The concept of 'hydraulic property rights creation' appeared particularly appropriate to understand and analyze the processes through which people obtain claims to water in the right quantities, qualities, at the right site and right moment in reality. This is achieved essentially through investments in water infrastructure. The project found a range of infrastructure investments by small-scale rural users in both basins, often stronger and leading to more livelihood benefits than public investments in infrastructure. In addition, the dual agrarian structure of the Limpopo basin, the project found that hydraulic property rights creation in joint ventures of small- and large-scale farmers can offer win-win arrangements, but only if the rights of small-scale users are well protected.

EXECUTIVE SUMMARY

The aim of the project 'Water rights in informal economies in the Limpopo and Volta basins' was to contribute to gender-equitable rural poverty alleviation by establishing stronger and more sustainable water rights of poor rural women and men to better develop water resources for multiple uses. The project, led by IWMI and with Unesco-IHE, was implemented in the Limpopo and Volta basins, by working together with the national policy makers and lawyers in charge of implementing the newly promulgated water laws, and research institutions. These include: Burkina Faso (Direction Générale des Ressources en Eau), Ghana (Water Resources Commission, and Water Research Institute), Mozambique (ARA-Sul and University of Eduardo Mondlane) and South Africa (Water Research Commission, Institute for Poverty, Land and Agrarian Studies of the University of Western Cape), and free lance consultants and Ph.D. students. A global historical literature review on water law, which examined the roots of permits since Roman times, complemented these experiences.

At national level, the project analyzed documents and early implementation of newly promulgated permit systems. It is found that the new laws continue the colonial legacy of water legislation aimed at dispossession of water resources under informal local arrangements in favor of vesting ownership of water resources with the minority rulers. At independence, when ownership shifted to the national states, this nature of water law was not exposed. The Integrated Water Resources Management (IWRM) discourse revived the same colonial argument. By denying existing plural legal systems, small-scale users especially suffer. Permit systems are logistically impossible to implement among tens of thousands of small-scale users, while the administrative burdens for small-scale users, certainly women, are disproportionate and discriminatory. Exemptions to the obligation of permit applications imply that the claims to water are second-class. Therefore, the project recommends that permit systems in Sub-Saharan Africa should remove any entitlements linked to the permit, and, instead develop permit systems as well-targeted tool for regulating the few large users who use most water resources. Small-scale users should obtain a legal priority status. An alternative way to achieve the same within a framework of permit systems is to issue priority General Authorizations, for water uses thresholds that make manageable legalistic requirements for the remaining water users.

With respect to developing regulatory tools, permits may not be the most appropriate regulatory tools, given their similar administrative and legislative burdens upon governments. Moreover, registration, taxation, pollution prevention, and the regulation of new water uses are very different endeavors, each requiring their own data bases.

These conclusions on the analysis of formal water law, one component of the research project in each country, are underscored by two additional components in each country. The second was a national- or basin-level quantification of the distribution of water use and users. Research showed major inequities that widen with the increasing level of formalization of the water economy. Third, the project undertook a range of case studies of local water arrangements that showed the nature of people's own initiative to invest in water infrastructure, often in spite of government. In the Limpopo basin, joint ventures were studied as well. It is recommended to build on the strengths of informal arrangements, while overcoming their weaknesses, in public investments in infrastructure, to ensure the poor get improved access to water.

1 INTRODUCTION

1.1 Background: Political drivers of water law reform

“Front runner” governments of Mozambique (1992), Ghana (1996), Zimbabwe (1998) and South Africa (1998) in the Volta and Limpopo basins have been implementing new water legislation and related institutional innovation for more than a decade. Burkina Faso followed in 2001. Driven by the new global discourse in the 1990s on Integrated Water Resources Management (IWRM) in general and market-driven water allocation in particular, these laws strengthened the legal device of ‘permits’ (or licenses, administrative water rights, concessions; for each country we follow particular names used). Permit systems reflected new perspectives at that time, in particular water as an economic good, ‘the user pays’ principle, the ‘polluter pays’ principle and the enforcement of environmental flows (GWP 2006). The new water laws further stipulated the establishment of new basin management institutions and lower-level water users associations, which were to be phased in at shorter or longer terms. Devolvement of the authority to issue permits to (lower tiers of) these new water management institutions according to the subsidiarity principle was often foreseen. The new laws were part of a broader shift away from the developmental role of government towards a regulatory role, which was justified by the expectation that the commercial private sector would take up water development (World Bank 1993; Bauer 1997; GWP 2006).

During the early implementation of the laws, many issues have emerged that led the Department of Water Affairs and Forestry of South Africa and Regional Water Authority ARA-Sul of Mozambique (Limpopo basin) and the Water Resources Commission in Ghana (Volta basin), and the Direction Générale des Ressources en Eau, Burkina Faso, to express their interest to IWMI and UNESCO-IHE in reviewing and comparing academic knowledge and policy and implementation experiences in other riparian countries. A better understanding of indigenous and local water and land laws emerged as particularly relevant. These informal arrangements, which are pivotal for the fragile water-dependent agriculture-based livelihoods of the majority of the nation’s citizens living in informal agrarian economies, received little attention in the new laws.

Reform of informal indigenous and local water law by the governments of South Africa, Mozambique, and Ghana (and other riparian countries in the Limpopo and Volta basins and elsewhere in sub-Saharan Africa) are based on (1) a perceived role change of government, (2) increased participation of stakeholders in water access and use decision processes and (3) permit systems for regulation, in particular for taxation.

1.2 Revival of government’s developmental role

First, the pendulum swung back from a strong emphasis on government’s regulatory role to a developmental role. The global wave of strengthening (tradable) permit systems was based on the assumption that physical water resources were becoming so scarce that strong regulation was needed and that new water users, like growing cities or the environment, could only obtain water if existing water users were willing to give up their uses, in particular by selling their permits (Van Koppen 2003). However, certainly in most parts of sub-Saharan Africa, where only 4 percent of water resources have been developed, water resources appeared still available (Bahri et al 2010). Major public sector stakeholders like African Development Bank, World Bank, NEPAD, IFAD, and FAO have ‘re-engaged’ in investing in rural water infrastructure to strengthen physical access to more securely available water resources for multiple uses and boost agricultural and rural development and poverty alleviation. For example, the Ghanaian government, supported by IWMI, formulated an irrigation policy in 2004, which critically analyzed the issues facing the irrigation sub-sector and with special attention to recognizing and addressing the concerns of small-scale informal users, poor men and women, and

securing the water rights for them (Namara, personal communication). Elsewhere, novel approaches to overcome the flaws of public investments of the 1970s and 1980s have also been initiated. For example, wider range of technologies were promoted, including rooftop water harvesting, dug wells for multiple uses, treadle pumps, or small reservoirs. Gender issues have become more articulate. 'Multiple-use water services' approaches, which take poor men's and especially poor women's multiple water needs as a starting point, are now being piloted and upscaled (Van Koppen et al 2006). Bottom-up participatory approaches are also being developed for irrigation management transfer and new infrastructure. In addition, planning and implementation processes are receiving more attention by local government as the mandated water services providers for domestic and productive water supplies.

1.3 Local participation in water decisions

Yet, problems tend to persist of sub-optimal use and lack of maintenance of new water facilities, insecure land tenure, and exclusion of women and the poorest. In this light, indigenous and local water law and related land tenure may entail important strengths to build upon while weaknesses can be overcome. Participatory procedures enhance ownership and sustainable use of investments by allowing rural women and men to define their (differential) priority water needs from multiple sources and by incorporating strengths of indigenous and local laws in allocating 'project rights' to the newly available water and land resources. In sub-Saharan Africa, academic knowledge on indigenous and local water law has also grown in the past decade, but this knowledge has largely remained academic. Implications from an operational perspective that can inform governments, NGOs, private sector, and the international donor community in sub-Saharan Africa on more successful infrastructure development have hardly been identified as yet.

A better insight in informal indigenous and local water and land law is expected to generate new options for public sector developmental agencies to assess indigenous and local water law and identify and build upon their strengths, while overcoming their weaknesses. Moreover, it raises the visibility and legitimacy of these arrangements in the debates around the second concern: the challenging of permit systems both as water entitlement system and regulatory system to support the developmental agenda of government.

1.4 Water entitlements of small-scale users

Basically, permit systems are a formal water entitlement system and a regulatory system at the same time. Interestingly, the Latin American debates emphasize its nature as entitlement system, while water law reform in Sub-Saharan Africa was almost entirely presented as an improvement in regulatory systems. As an entitlement system, networks in Latin America, such as the Water Law and Indigenous Rights Program (WALIR) and Concertación, a network of advocates for water justice in Latin America, have widely challenged permit systems as single national legal system that supersede indigenous and local law. Title holders under the latter regimes are dispossessed even from their prior claims to water used. The Water War in Cochabamba in 2001 evolved around the same issue (Vos et al 2006). Although there is no reason to assume that this is any different in Sub-Saharan Africa, with an even much larger rural population whose natural resource management is governed under indigenous rules, this issue received hardly any attention, with the exception of one author in Ghana (Sarpong n.d.).

In the laws of all these countries, exemptions on the obligation to register and obtain a permit are made for micro-scale or 'de minimis' water uses, such as domestic uses or homestead gardening for (typically undefined) 'subsistence' uses or water abstraction by manual devices. The question is whether this arrangement covers all indigenous water uses and provides the legal entitlement status that poor, small-scale water users need to

protect and expand their water uses. This potential threat for poor rural people's livelihoods warrants closer examination of both the legal texts and any impact on the ground, if already visible.

1.5 Permit systems for regulation

As mentioned, in Sub-Saharan Africa, permit systems were mainly introduced or reinforced as being a supposedly better regulatory system. State ownership of water resources and permits were assumed to be effective vehicles for government to impose obligations, in particular registration, fee payment for national and basin level water resources management functions ('the user pays'), and waste discharge charges ('the polluter pays'). Thus, it was assumed that one needs to change and enforce the entire nation-wide legal system, in order to better regulate those who need to be regulated. Typically, there was no effort to make these assumptions explicit and analyze their implications in any quantitative manner. Similarly, there was no effort to distinguish the different regulatory objectives in their own right, and to identify a range of options that would achieve each of such regulatory aims in a cost-effective manner, for a well-informed choice.

If water allocation in closing basins, that is basins where all water resources already have been committed for use, had become a pressing issue, it would have justified regulation through water entitlements (Van Koppen 2002). However, Ghana, most of Burkina Faso, and Mozambique have abundant water resources that are underdeveloped. Rather than focusing on how to share a limited pie, the governments in these countries seek to increase the pie of water available for all through investments in infrastructure.

South Africa, including the country's part of the Limpopo basin, is an exception. In contrast to the IWRM discourse of the 1990s to reallocate water as an economic good according to market principles, the overarching aim of South Africa's National Water Act (1998) was to redress wealth, racial and gender inequities from the past and alleviate poverty, also if this requires distributive water reform, similar to distributive land reform, in which water was re-allocated from the 'haves' to the 'have-nots'. The Water Allocation Reform (W.A.R.) since 2004 sought to implement this policy to legally protect and expand poor people's water uses, while effectively regulating non-poor water users, also under growing water stress. As basin closure is bound to become more widespread at longer term, a study of these experiences can generate important lessons can timely be learnt on the suitability of permit systems to allocate and re-allocate water equitably.

1.6 Comparative analysis

In order to shed more light on the above-mentioned concerns for governments to recognize, protect and expand small-scale water users' claims to water and align their developmental and regulatory roles, this project conducted an in-depth study of legal texts and implementation experiences. The Volta and Limpopo basins represent a range of important conditions, as summarized in table 1.

These national contexts were then placed in a wider global and historical context of Roman water law and the history of permit systems. Such comparison of findings renders them more relevant to other riparian countries of the Limpopo and Volta basins, and elsewhere in sub-Saharan Africa and even Latin America, certainly for countries that are still redrafting their water laws.

Table 1. Characteristics of recent water law adoption

Country	Colonial legacy	Water resources availability	New water law year of adoption	Phase of implementation
South Africa	British-Dutch: plural common law/riparian rights, forestry permits, indigenous law, Government Water Control Area, irrigation districts	Most basins declared as being 'stressed', with highly inequitable use	1998	Gradual implementation of most elements, including unfinished pilot projects of compulsory licensing
Mozambique	Portuguese province and in 1947 permit systems, ignoring indigenous law	Mostly abundant underdeveloped water resources	1991	Starting only
Ghana	British: common law, riparian rights, recognizing indigenous resource rights	Mostly abundant underdeveloped water resources	1996	Taxation among 150 large-scale users implemented
Burkina Faso	French province, and 2002 permit systems, ignoring indigenous rights	Available underdeveloped water resources, except Sahel	2002	Design phase

2 PROJECT OBJECTIVES AND METHODOLOGIES

2.1 *Project objective*

The project objective is: to contribute to gender-equitable rural poverty alleviation by establishing stronger and more sustainable water rights of poor rural women and men to better developed water resources for multiple uses.

This objective has three main sub-objectives:

At local level: to map informal indigenous and local water rights regimes, and identify recommendations to public investors in infrastructure on how they can build on the strengths of these arrangements, while overcoming their weaknesses, to enhance ownership and sustainability of infrastructure investments

At national level: to analyze the texts and early implementation of newly promulgated permit systems and identify options for the design and implementation of permit systems and other regulatory tools that can adequately enforce these regulations, and that recognize, protect and expand investments in infrastructure among the rural poor.

At the interface: to analyze how the state's developmental and regulatory role match or not, and identify options for better alignment of the state's regulatory and development roles to improve the use of water for rural poverty alleviation and gender equity.

2.2 *Conceptualization and methodology*

2.2.1 *The formal – informal dichotomy*

This study focuses on the formal – informal dichotomy in water law in Sub-Saharan Africa. Water law refers to the institutional, socio-economic and cultural arrangements that shape societies' development, use, management, allocation, quality control and productivity of water and related land resources. There are plural, coexisting and partially overlapping water laws. One distinction is between formal and informal water law. Informal, indigenous and local are used interchangeably. The term 'indigenous' refers to rural African arrangements of natural resource management, mostly oral, in which traditional authority structures play some role. Their importance can vary, and the term 'local' conveys this range of influence. Moreover, water arrangements are extremely dynamic and are influenced by external trends and actors, like government, markets and new technologies. 'Local' conveys this dynamism. Formal is the opposite of informal water law. Formal or statutory water law is formulated and implemented by the state. They are defined top-down at central national level, but they also can be formalizations of essentially indigenous laws. Thus, there are more formal water laws, such as permit systems, riparian water law, or Hindu or Islamic water law. Although the IWRM discourse portrayed permit systems as virtually the single one possible water law (GWP 2006), it is only one system out of many.

2.2.2 *Concept of hydraulic property rights creation*

For the analysis of the creation of claims to water at local level, the concept of 'hydraulic property rights creation' was used. Water resources, and the claims to water resources, are particular and different from other natural resources, in the sense that naturally availability of water resources often only get a use value in the right quantity (and not too much either) of the right quality for the envisaged use, at the right site at the right moment. This is achieved through infrastructure (Coward 1986; Boelens and Dávila 1998; for gender dimensions see Van Koppen (1998)).

Hydraulic property rights creation, therefore, is defined as the process of establishing recognized claims to water of certain quantity and quality on a particular site at certain timings. Making investments in the physical infrastructure to abstract, store, and/or convey water and, thus, create such use value of water in terms of quantity, quality, site and timing, is the single most important ground for vesting claims to water conveyed (Coward 1986). Others who have not contributed to the investments can be excluded, although this is lesser the case for everybody needing drinking water and for household and community members. Investments may be individual (like investments in small pumps or homestead wells), or communal (like village reservoirs). Processes of hydraulic property rights creation may be entirely 'endogenous' (or 'local' or 'informal'), with claims recognized at local level by communities, or they may depend upon government, formal NGOs, or other outsiders (publicly supported or 'exogenous'). In the case of public investments, governments who build the systems can exert claims, but the public constructors mostly expect users (or others) to take up at least part of the investments in operation and maintenance, as condition for their formal entitlement to the water conveyed. Lack of clarity on such hand-over and lack of other needed support may lead to a process of 'hydraulic property rights de-creation': water could physically be made available, but nobody exerts claims.

Hydraulic property rights creation is related to land tenure. Access to land situated above groundwater or near surface water is an important practical and sometimes also legal condition for vesting water rights. Servitudes may be obligatory, though. The weaker land claims of tenants and most women affect their incentives to invest in land-bound infrastructure, unless arrangements with those holding the stronger land rights assure sufficient sharing of benefits. Water uses are for multiple purposes. In exogenous water infrastructure development, which typically follows the rigid fragmentation of the water sector bureaucracies according to single uses, either domestic or irrigation or livestock, or fisheries, the factual uses of these single-use designed schemes are also invariably multiple.

The concept of 'hydraulic property rights creation' was adopted, first because it allowed better analyzing the dynamics of creating claims to 'wet' water through infrastructure development, and, second, because it underscored that formal statutory water law in text books is only one of many plural ways to understand 'water law', and, without enforcement, expectedly of little significance in reality.

2.2.3 Methodology

The overarching hypothesis of the project was that there is a mismatch between governments' new water laws on the one hand, and both the rural realities of informal water users and the dominant developmental policy agendas of the same governments on the other hand. To test this hypothesis, both primary data collection and secondary data analysis were conducted. Primary, empirical studies were initiated in Burkina Faso and Ghana (Volta basin) and in Mozambique and South Africa (Limpopo basin). Secondary data were reviewed for a global and historical comparative literature review of permit systems, focusing on Europe, its colonies in the North Americas and Australia, Sub-Saharan Africa and Latin America.

The empirical primary data collection had the same three components in each of the four countries:

a) Formal water law:

This component traced the history of water legislation and recent reform, and current texts, and further assesses early implementation experiences to the extent that the laws have already been implemented.

b) Quantitative mapping of informal water economies by quantifying formal and informal water users according to the categories stipulated in the laws.

This component aimed to address the lack of quantified analysis of possible implications from draft water bills before their promulgation. By assessing numbers of water users (permit holders or exempted users) and their relative volume of water use (both as entitlement and as volume of water use to be regulated), implications of the expected implementation of nation-wide measures become clear.

c) Qualitative mapping of informal water economies

In order to highlight the plural nature of water laws and the livelihood importance of claims to water under informally legitimized arrangements, this component analyzed and documented 'hydraulic property rights creation' in endogenous (or local, customary; either individual or communal) and exogenous (publicly supported communal) cases of infrastructure development processes. They included groundwater development (manual and mechanized irrigation, domestic supplies, livestock, other enterprises) and surface water development (reservoirs of various sizes, recession agriculture, irrigation schemes, fisheries, other enterprises). In the Limpopo basin, with its dual agrarian structure, collaboration between small-scale farmers and agro-business enterprises in joint ventures were also included.

In order to expand the geographic and temporary scope of the studies and to better place the findings of the individual countries in a wider context, a literature review was conducted on the global history of permit systems, since their invention by the Romans, their limited degree of uptake in Europe, exportation to Europe's colonies, especially in Latin America and Sub-Saharan Africa, and their recent revival under the Integrated Water Resource Management discourse. With this broader picture, findings from the four countries can be better compared and consolidated to further corroborate the ultimate conclusions and recommendations.

3 RESULTS, DISCUSSION, CONCLUSIONS

3.1 National water laws

3.1.1 Dispossession of informal water rights through state water resource ownership and permit systems

The global historical literature review revealed a colonial legacy of permit systems that both served as basis for the revival of permit systems in the 1990s and casts doubt on its potential to protect the water rights of the majority of Africa's population today. Permit systems were introduced by the Romans 500 BC. The dual nature of permits as both a regulatory system and a legal entitlement system stems from those origins. Roman water law classifies water resources are classified into either public waters, to be governed in a communal interest, e.g. to allow navigation, or private waters, at the disposition of the private owners. Gradually, the representatives of the communal interests transformed into the Roman Emperor alone as custodian of all water resources. Permits needed to be obtained to use water legally. By declaring most, if not all water resources of conquered tribes as 'public', prior claims to those water resources were cancelled, in favor of the recognition of the emperor as the legitimate ruler and owner of the resource, and his issuance of permits for lawful water use.

This way of declaring ownership by the rulers and dispossessing local groups of their water resources revived especially in Europe's colonization. Civil-law countries like Portugal and France declared most, if not all water resources in their colonies as public, with ownership vested in the European rulers. Common-law country England introduced riparian rights and also localized and issue-based regulations to protect and regulate water use in their colonial economy.

As also confirmed in the country studies of the national legislations, at independence (or in Mozambique, during the formulation of national legislation in 1991), ownership of water resources shifted to the new state but the laws remained the same otherwise, and have been largely dormant. The revived global interest in permit systems of the 1990s basically refocused attention on permit systems in civil-law **Burkina Faso and Mozambique**. The new water bills refurbished permits, and added new conditions to these permits, in particularly payment for the use of water resources, irrespective of who financed the infrastructure taking water from those sources. So the dormant permit systems were perfectioned and are now supposed to be enforced more rigorously. In Mozambique the adoption of a draft component 'Regulamento de Licenças e Concessões' is still underway. Burkina Faso is also still elaborating the regulations to implement its new water act of 2002. The implication for informal rural water laws is that they are declared illegal, unless they are regularized into permits, and that the implementation of this law is now further enforced. The difference between the colonial times and today is that it is not the colonial ruler but the own government who declares existing informal water law illegal.

In common-law countries Ghana and South Africa, the change towards permit systems implied superseding the patchwork of plural legal systems and vesting one single other system, that of state ownership and permits. Another major issues in these countries is the legal status of all water claims vested under earlier regimes. In **Ghana**, the new possibility to charge fees to finance newly created water management institution of the Water Resource Commission was an important driver. The new law is very optimistic about the conversion of all earlier claims into permits, called 'regularization'. The period to regularize existing water uses under the preceding water laws was set at two years. In this country with a colonial history of common law and riparian rights, the customary legal status of indigenous land and water rights is relatively strong. These powers were fundamentally challenged with the new state ownership of water resources and nation-wide definition of 'public waters':

By a stroke of the legislative pen and policy intervention, proprietary and managerial rights which had been held from time immemorial by families, stools¹, and communities have been taken away from a people some of who probably had no prior knowledge of the matter. [...] This is an issue that deserves to be examined having regard to the massive nature of the assault of the legislation on customary proprietary water rights. [...] If the law on appropriation of land by the state is to be used as a guide on the matter, then it may be surmised that the Water Resources Commission, in spite of its far sweeping powers with regard to water appropriation, would have to yield to the constitutional requirement of providing prompt, adequate, and effective compensation in accordance with Article 20 of the Constitution for the compulsory acquisition of customary water rights as obtains in the case of compulsory land acquisition by the state' (Sarpong undated).

In **South Africa**, the National Water Act of 1998 stipulated that the state became the owner of water resources but licenses were only made obligatory for any new water uses and when water was purchased from existing lawful users (licenses are tradable, but such trade needs to be approved by government). Existing lawful water uses under preceding laws were also declared as lawful under the new National Water Act, and even seen as property rights – a condition negotiated by the, by then exclusively white, vested large-scale water users. The spin-off of this negotiated status of all existing water uses by 1998 was that existing water uses in former homelands also became lawful. However, as water rights regimes in the former homelands had hardly been defined, its formal lawful status under the new law remained an equally vague category. With the strong legal status of earlier rights, the National Water Act is prudent about the conversion of existing lawful water uses into licenses: the Act envisages this through

¹ 'Stool' is tribal authority.

localized highly controlled projects of 'Compulsory Licensing', that can be initiated as water users or government see fit. Since 2005, Compulsory Licensing has been piloted in three basins, including the Olifants sub-basin of the Limpopo, but these pilots basically halted after 2008.

3.1.2 *Are exemptions entitlements?*

The water laws in all countries, and indeed elsewhere in Sub-Saharan Africa (but not in Latin America), exempt micro water uses or '*de minimis*' water uses (Hodgson 2004) from registration or permit application obligations. Definitions vary and refer to farm size (e.g. below 3 ha of irrigable land as in Burkina; or below 1 ha in Ghana); to lifting method (e.g. manual lifting in Ghana); to purpose (with 'subsistence' production exempted from registration obligations as in South Africa). While this includes a large number of informal rural users, there is still a considerable grey area of large numbers of informal users that, according to the law, should register or obtain a permit. During the law formulation, no quantitative assessments of these numbers were made.

The South African Water Act, moreover, stipulates 'General Authorizations', as a legal instrument to exempt certain new water users, or users of a certain water source, from the obligation to apply for a licenses – and, thus, the obligation for the Department of Water Affairs to process such applications. The single goal of this measure is to alleviate the administrative burdens of government, wherever the water uses remain relatively insignificant and, hence, do not warrant individual license applications, although blanket conditions may still be attached, e.g. registration.

Water lawyers have criticized that such exemptions leave these users with a 'curious type of residual right', if it can be called a right at all (Hodgson 2004). Indeed, it is entirely unclear how *de minimis* 'entitlements' can be protected if they are encroached upon either by others, either other '*de minimis*' users or those with formal permits.

The real water allocation issue in most laws regards priorities, but this is often extremely rudimentary listing of single – uses, while it is well known that people need water for multiple uses simultaneously in highly localized ways. Moreover, these priorities never refer to the scale of use, so discard any equity issues.

3.1.3 *Lessons from early implementation of permit systems in Burkina Faso, Ghana and Mozambique*

Even though the new laws have only recently started to be implemented or are partially still being specified, certain trends can be identified, both with regard to permits as regulatory tools and as entitlement systems. Remarkably, in only one case of the studies on informal water law (a large-scale user in Mozambique) and in the South African study that explicitly targeted license applicants, were respondents engaged in obtaining permits. Few were even aware. Yet, the studies gave some pointers on the possible impact of permits on small-scale users once permits will be implemented at this level.

Burkina Faso is still in the process of detailing its policies, especially with regard to the tariffs to charge. The government counts on the districts to assist in implementing the new law.

In **Ghana**, the government stipulated tariff policies linked to the permits. Tariffs are volume-based, with either a formal or *de facto* exemption of small rural users. Up till 2009, 150 users have been registered into one data base in the past decade. Using this data base for invoicing of fees, the Water Resources Commission is able to raise enough funds to enable its own functioning. While the districts are supposed to assist in the registration of many more water users, hardly any data have been delivered as yet.

Objectives CPWF Project Report

Without explicit resources to fulfill this task, registration of water uses does not seem to be a priority.

In its project report, the Water Resources Commission expressed the need to better recognize the importance of informal water arrangements.

In **Mozambique**, registration of large-scale users was already taking place in a separate department of the National Water Directorate. This registration focused on important areas, like the Chókwe irrigated areas in the Limpopo basin. Again in a parallel separate department, taxation of large users had already been organized, without any link to permits. Permit applications are organized through another, new separate new department of law. At the moment, each department keeps its own data base, although improved linking is envisaged for the future.

The department of law expects water allocation in stressed basins, such as the Inkomati, to be a goal that can best be achieved through permits (Manjata personal communication). Permits are supposed to better allow enforcement of capping of water use of large users. At the same time, the case study of the Procana sugarcane estate shows that it was easy for this investor to obtain the preparatory state authorization for a permit, as this was backed by Mozambique's foreign investment strategy, which tends to favor foreign investments as effectuated through high-level policy makers. The preparatory documents for the permit went even far beyond the initial water needs and did not stipulate any conditions for, e.g., the sharing of benefits through outgrower arrangements for those dispossessed of their land. The investor started investing in a large sugarcane plantation under drip irrigation in the Limpopo basin, but discontinued its activities later. This raises the question whether large-scale users, who can easily obtain formal permits, will easily accept that the already-allocated entitlements will again be contested at any later moment by the same government who recognized the rights in the first place.

As one of the few cases in which the implications of the issuance of permits among small-scale users could be assessed, the case study of the Revue catchment showed that permits, like land title deeds, were most likely to become yet another asset in the hands of the powerful to reinforce patronage relationships. It also emerged from this and other case studies, that there was no way in which permit systems could ever capture the dynamism of informal water rights arrangements (Bolding 2010).

3.1.4 Lessons from early implementation of permit systems in South Africa

As implementation of the National Water Act of 1998 in **South Africa** was intensive, it reveals important dynamics around each of the different aspects of licenses, and the linkages between those aspects, both for new water uses that are to be licensed and for conversion of the existing water rights into licenses. First, as in Ghana, there is a strong perception that licenses are essentially tools for taxation to finance water resource management. The National Water Act has two charges: the already existing water development charge for factually delivered water services from state-owned infrastructure, and the newly introduced water resource management charges to pay for the water resource management tasks implemented by the government or by the future envisaged catchment management agencies. For revenue collectors in the Department of Water Affairs, the entitlement dimensions of licenses are primarily a way to leverage payment. For most users, licenses are merely an obligation to pay government; they see little potential for licenses to strengthen their rights vis-à-vis neighboring competing water users, if there were competition for water at all.

At the same time, the South African experience shows that imposing obligations, in particular registration and taxation is very well possible under any water rights regime. The large majority of existing water users by 1998, whose claims were vested under the former riparian rights regime or pocket-wise permits in Government Water Control Areas, also pays water development and water resource management charges to the

Department of Water Affairs. One of the first implementation activities after promulgation of the new act was to oblige water users to register in a newly established data base: the Water Authorization and Registration Management System (WARMS). (Parallel to WARMS, the water resource planners develop their own data bases about water use, mainly based on remote sensing and modeling. Outcomes of both systems diverge). This system provides information, especially of individual users, that is used by the revenue section to bill the users. For more direct billing of the corporate sector companies and users, there is a parallel administration, entirely devoted to revenue collection.

While the A in WARMS of 'Authorization' hints to a similar perceived overlap of use entitlement and obligation (in this case registration for information but also clearly for billing purposes), the Department soon started to emphasize that registration is an obligation that does NOT give any entitlement. The reason for this was that some registered users started exerting claims to government vis-à-vis water registered. Either seeing registration as the first step, or directly, some existing lawful users started to ask for conversion of their former entitlements into licenses. Without much documentation of riparian rights and many other earlier rights, state-approved, tradable licenses represent the stronger entitlement in the country. Even stronger opportunities for vested water users to use licenses to their advantage, contrary to governments' aims, emerged with regard to land with water rights attached to the land that was slated for re-allocation to land reform beneficiaries. In various cases, farmers hived off the water and sold this as a new license to the water buyer, before handing the land over to government for redistribution. Initially, the Department of Water Affairs rejected these requests for unsolicited conversion as an unnecessary burden. Also, efforts were undertaken to prevent water sale from land under claim for redistribution.

The Department increasingly tried to use licensing to operationalize and enforce redress of inequities from the past in response to these incidental spontaneous requests for conversion, but even more so for the two substantial undertakings of licensing all new users applying for a license, and piloting the implementation of 'compulsory licensing',. From 2004 onwards, licenses were gradually increasingly seen as tools for government to negotiate this key element of the National Water Act, which is redressing inequities from the past. In the mid-2000s, Broad-based Black Economic Empowerment became a national instrument, originating from the corporate industrial sector, to accelerate black representation in the formerly white public and private sectors. This encompassed more equal participation as workers, as managers, in ownership, in procurement, and also in social responsibility and community development. The Department translated these measures into conditions attached to licensing, thus using water licensing as a tool to leverage such Broad-based Black Economic Empowerment. Although this remained contested by the vested large-scale water users such as Agri-SA, more fundamental problems emerged with the implementation of licensing: the huge administrative burden without adequate capacity on the ground to check applications and monitor their implementation.

For the first endeavor, licensing all new water users since 1998, those who applied met long waiting times before their application had been processed at regional level, then sent to national level, with various loops for further information. Backlogs grew, with some threats by the lawyers of the powerful users that they would go to the Tribunal, as the formal response time was less than a year. In 2006, it appeared that 98% of the new license applications were, again, submitted by white large-scale users. It is claimed by some officials, that the change in law and government created an enforcement void in which many more people could take up water use than would have been possible before the new act, or new government for that matter. More efforts were undertaken to address the backlog, but also more efforts to reach historically disadvantaged individuals – who generally saw this primarily as a taxation measure. Under both this administrative and political pressure and with limited implementation capacity, Broad-based Black

Economic Empowerment was hardly enforced through licensing. Interestingly, again separate data bases were used; in 2009 a 'track license applications' data base was initiated. The information feeds into WARMS. Yet, it is well-known that many new users never apply for a license. Once discovered, they hope to get away with the argument that they invested in the infrastructure and contributed to the GNP and employment.

For the second endeavor, Compulsory Licensing, three pilot projects were conducted from 2004 onwards: in the Inkomati, Mhlatuze, and Jan Dissel catchments (none is in the Limpopo basin). The first step, which was also started in the Olifants/Limpopo basin, was a Verification (measuring volumes) and Validation (assessing the lawfulness) of existing uses. Findings not necessarily met the data of the WARMS system, but, at longer term, reconciliation is foreseen. This appeared a very costly exercise, requiring expensive consultants. Even without any entitlement attached to it, water users generally welcomed to get registered – with the initiative and much of the costs borne by government. Many registered higher volumes than actually used – if anybody was able to measure. A small proportion of users under-registered their uses, trying to save on the water fee payments. The next step was the drawing up of potential allocation schedules. No pilot went further than that, although the real implementation of Compulsory Licensing would have warranted a re-application of all (non-exempted) users in the area and the drawing up, discussion, finalization and implementation of a real re-allocation plan. Allocation of the Ecological Reserve (a certain environmental flow stipulated in the law) and redress of inequities from the past through, among others, Broad-based Black Economic Empowerment would have been overarching principles for that re-allocation. However, even for those initial steps, costs were already astronomically high. Indeed, some felt that the step of Verification and Validation could be skipped, so that water users should get allocations for their water use that was seen as fair today, e.g. based on crop-water requirements, irrespective of the past.

During the pilot-testing of Compulsory Licensing, General Authorizations were one of the topics debated. While the reduction of administrative burdens for both government and smaller-scale users was the main consideration, it was also realized that this could be a solution as new *entitlements* of smaller-scale water users, also as a form to recognize informal arrangements in former homelands. However, the objection was that General Authorizations wouldn't give the same first-class, tradable status as licenses, even though they were to be registered.

3.1.5 Conclusions regarding national water laws

The colonial roots of water law, aiming at appropriation of water resources in the interest of the colonial rulers establishing an extractive formal minority economy, leave a deep, and unfortunate, footprint in contemporary thinking about water law in Africa. At independence, it was an obvious step to shift ownership of water resources from colonial rulers to independent national governments. As such, state ownership still leaves all possibilities open on how to use this authority. The revival under IWRM failed to re-think Roman water law in rural Africa as well, and, instead, just promoted the system with force, even in countries with common-law water law traditions, who are now faced with wider plurality of legal systems. Full-fledged conversion of one legal system into the other appears very complex and costly.

The key problem regards the use of permits as entitlements. Although the issuance of permits, or exemptions, is implicitly assumed to be the best and only way to vest formal water entitlements by citizens across a nation, both government itself and the majority of small-scale water users face a number of problems. For government, entitlement places enormous legalistic burdens on the shoulders of under-resourced and undercapacitated government departments, whose priorities are often elsewhere, including infrastructure and storage development to increase the pie of available water resources for all. Once permits are issued, governments have committed to back the

property claims they gave as well as they can, and pay compensation in case water is needed for other purposes. Lawyers of powerful users remind of this duty. Each entitlement given means less bargaining power to impose new obligations that may appear needed at a later stage.

Formal legal permits are highly inequitable by nature. Legal procedures require a level of legal sophistication, time and access to information legal literacy that only the wealthier have. Moreover, as procedures are equally intensive for larger or smaller quantities, they intrinsically discriminate against the smaller users. The very device of 'exemptions' shows the failure of the system itself to serve as entitlement system. Unless one accepts that citizens can be divided into those with first and those with second-class entitlements, the introduction of an entitlement divide should be entirely discarded. From today's reality, there can be permits to take up new water use (temporary). For competition among existing users and related water entitlement issues, government can elaborate and implement its often extremely rudimentary priority schedule. More important than sectors or single uses is to highlight scale of use, and prioritize small-scale users over larger-scale and normally wealthier users. This would be a way to operationalize a developmental and pro-poor agenda. Excessive uses can also be regulated by capping as needed. These prioritizations can be elaborated at more localized levels. Blanket moratoriums on any new use and localized monitoring can also be implemented immediately – provided there is the oversight to control. Without unnecessary interfering in entitlements, more attention can be paid to ways in which competing users have managed to solve problems among themselves. As mentioned, for protecting the poor, permits are the least suitable. Priority General Authorizations would solve this.

As a solution for South Africa and elsewhere, CP66 recommends a 'priority General Authorization', that is a General Authorization for which the minister, as custodian of the nation's water resources, can declare a priority. Further, it is recommended to implement this General Authorization across a country (so in South Africa, without any need to first implement Compulsory Licensing). Unlike current practice in South Africa of exempting stressed basins from General Authorizations, the implementation of this legal tool should purposively target stressed basins. Here, the over-use by the large 'haves' most risks jeopardizing new water uptake by the small-scale 'have-nots'. Thus, permits vest entitlements in those who need it most. At the same time, informal water law should be recognized, and protected against encroachment from large-scale users.

Moreover, by exempting small-scale uses from obligations, licenses and their enforcement can be better targeted and fine-tuned to the few who need to be regulated. Efforts for their regulation become more focused, while those small-scale water users that the developmental government wants to have improved access to water, are protected and encouraged to do so.

Stripping individual permits from any entitlement dimension other than just formally accepting current water use, permits can fully be shaped into the targeted regulatory measures that governments anyhow want them to be. In fact, they would not be called permits anymore, but simply an obligation to register, a taxation, a pollution prevention obligation – as the South African government did for its existing lawful uses, and how Ghana is operationalizing its new nation-wide permit system in reality. Registration is much less complicated when it does NOT entail new claims; taxation can be accomplished on any water use. Obviously, separating entitlements and payment is the only way to avoid a situation in which only those who can pay for water are entitled to water. Moreover, government can rationally look into the costs of revenue collection, compared to the revenue gained. Charging many smallholders is likely to cost much more than it generates.

3.2 Quantification

Remarkably, during the formulation and promulgation of the new water laws, no assessments were conducted of the implications in a quantitative manner. Therefore CP66 tried to estimate the number of users and their volume of water used in both the formal and informal spheres, at least in the countries where such data appeared available.

In **South Africa**, the WARMS system and the government’s own water use estimates for all citizens, provided the best basis. Calculations showed substantial inequities: a Gini coefficient for the distribution of the use of water of 99%. In terms of regulation, this implies that the 10 percent of the largest users use between 79 and 93 percent of the water resources, varying over the different provinces. Targeting these users for taxation and pollution prevention or even capping of water use, would likely be an efficient approach (Cullis and Van Koppen 2008). In terms of protecting current and future small-scale uses, it was also found that doubling the quantities of water used by the small-scale rural population would require the 0.5 percent large users to share just 6% of the water resources – a proportion that is hardly captured in the hydrological models (Cullis and Van Koppen 2007).

In **Mozambique**, the water sector is less developed. 1.3 million inhabitants, together with their 3,415,000 animals, use 48 Mm³ per annum; moreover, 8000 ha of wetlands for ‘machongas’, uses 120 Mm³. Assuming an average of 1 ha, the threshold for exemptions in the Mozambican water law, this would imply issuing of licenses to 8000 users, a formidable administrative and legalistic task. The envisaged Procana sugar plantation requires an estimated 555 Mm³. Yet, the permit obtained from government stipulated 750 Mm³. This almost three times the current water use for people and irrigation of 283 Mm³.

Estimated existing and planned water requirements in the Lower Limpopo

	ha	mm/a	106 m3/a
Existing uses			
Machongo agriculture	8,000	1,500	120
domestic+animals			48
Chokwe and elsewhere	5,400	2,150	116
Environmental flow			240
Total existing uses	13,400		524
Planned uses			
ProCana drip	26,500	1,200	318
ProCana outgrowers	11,000	2,150	237
CAM	10,000	2,150	215
Chokwe	16,500	2,150	355
Xai Xai (Ponela)	9,000	2,150	194
Total planned uses	73,000		1,319

Hydrological modeling showed that the water resources only allow for 60% of the proposed development with a four out of five years assurance of supply, also for the downstream users (Van der Zaag et al 2010). If Procana were to use its full permit, downstream users would suffer. This case illustrates the risk that issuing of permits may favor large-scale foreign companies over the own population and their future expansion of water uses.

These quantitative findings show the disproportionate water uses by a minority of large-scale users, vis-à-vis the majority of the rural population. Estimates, which can be

further developed by sampling for ground-truthing, require much less transaction costs than obliging all users to register such small uses, or even entering long legal procedures for license allocation. Such quantifications also allow for future planning that ensures not only protection but also expansion of water use by the majority of citizens, instead of a small minority of large users only.

3.3 Mapping informal water economies

The case studies on informal water economies in the four riparian countries of the Limpopo and Volta basins highlight recurrent characteristics:

- There is a wealth of informal initiatives taking place in investing in water infrastructure, or hydraulic property rights creation: dugouts, river diversions, tanks, reservoirs, rainwater harvesting, shallow wells for multiple uses, private boreholes, a range of lifting devices, from manual to motorized, other joint initiatives such as fencing. They all go largely unnoticed.
- The notion of hydraulic property rights creation, in the sense of being able to exclude outsiders, appeared valid for individual or joint investments in infrastructure where the investor(s) had direct control over the water conveyed (e.g. private dugouts, private pumps). In the case of long river diversions to, initially, one plot, the original investor could not prevent fellow farmers from using the same canal further upstream as open access resource, to feed into the new secondary canals that the newcomers dug upstream. The original investor becomes a tail-ender and can be so seriously affected by upstream use that he has to leave the spot with his earlier investments. So geographic upstream/downstream location influenced hydraulic property rights creation.
- Public investments in water supply systems for domestic and/or productive uses are more often than not lacking hydraulic property rights creation: users fail to sustainably operate and maintain most of the systems. Especially the poorer, who cannot afford to own their private technologies to access water, suffer most. Property rights are extinguished.
- A much more participatory approach, which takes people's own priorities and technology choice for equipment, siting and lay-out as starting point, is warranted for hydraulic property rights creation. Payment of services should be encouraged by those who can afford to pay. Also, by developing water for multiple uses, income from productive uses can cross-subsidize domestic water uses, also among the poorest.
- Other approaches, in which projects introduce technologies, and train people to take it forward on their own, as in Ghana's groundwater technology project, also worked.
- Registering, let alone permitting of this myriad of initiatives would greatly burden the government with administrative or legal procedures, and still leave a large number of exempted or forgotten users excluded. This creates new divides. Moreover, the essentially shared nature of water use, and complex, locally-specific arrangements that have evolved, cannot be captured in a system with individual entitlements that run parallel to each other.
- Instead, these informal arrangements should be fully recognized by policy makers and implementing agencies as the most pivotal way for the rural poor and small-scale users to use water for improved livelihoods, the strengths of these arrangements should be protected and built upon, and the weaknesses, in particular the exclusion of certain groups, overcome.
- For the specific case of joint ventures in South Africa and Mozambique, the social inequities warrant a much deeper look beyond the seemingly 'neat' and neutral contract. These hierarchies consist of different layers (household, community, interface lower-level bureaucrats and agro-business and higher-level politicians and program managers). Clearer conditions and facilitation of the establishment of such contracts are urgently needed to fully exploit the potential benefits for all parties.

4 OUTCOMES AND IMPACTS

4.1 Proforma

Summary Description of the Project's Main Impact Pathways

Actor or actors who have changed at least partly due to project activities	What is their change in practice? I.e., what are they now doing differently?	What are the changes in knowledge, attitude and skills that helped bring this change about?	What were the project strategies that contributed to the change? What research outputs were involved (if any)?	Please quantify the change(s) as far as possible
Water lawyers and high-level policy makers in Burkina Faso, Ghana, Mozambique and South Africa	<ul style="list-style-type: none"> Acknowledging and giving more legitimacy to informal water arrangements Recognizing the merits and obstacles of permit systems considering alternative solutions such as General Authorizations 	<ul style="list-style-type: none"> Reflecting more critically on the history of permit systems and the drivers behind the water law reform Systematically studying and debating the vibrancy of informal water arrangements, instead of declaring 'illegal'. Finding the space to express their own doubts and field experiences on the suitability of permit systems in rural Africa 	<ul style="list-style-type: none"> Being part of the research team and conducting research themselves on both legal texts and field studies on informal water economies Providing a open space for debating, learning and reflecting on the colonial legacy of water law and the findings of their own and other team members' studies 	<ul style="list-style-type: none"> All 4-6 key highest-level policy makers and water lawyers in each of the four countries Key water research institutes
<ul style="list-style-type: none"> Students, scholars and other professionals in conferences and reading international journals 	<ul style="list-style-type: none"> Stronger recognition of history of water law and informal water economies 	<ul style="list-style-type: none"> Reading and debating 	<ul style="list-style-type: none"> National workshops for the team and key invitees Presentations at conferences International publications 	<ul style="list-style-type: none"> Over 150 participants attending the four national workshops See outputs

Of the changes listed above, which have the greatest potential to be adopted and have impact? What might the potential be on the ultimate beneficiaries?

The recommendation to fully recognize, protect, and expand existing informal water arrangements among small-scale users, is likely to be adopted *de facto*, because it also serves the interests of governments in two ways. First, it aligns with their developmental roles, and, second, the alleviation of this legalistic burden allows government to better target their permits as regulatory measures to those who need and logistically can be regulated. Whether a formal measure will be taken, like priority General Authorizations, is less likely, even in South Africa. Such measures require ministerial attention, and that of highest-level policy makers.

By taking away administrative hurdles, such prioritization of small-scale water uses would encourage private investments in infrastructure by small-scale users. Also, in case of competition with large-scale and more powerful users, a priority General Authorization is unambiguously protecting water use for basic livelihood needs. While this is a strong legal tool on paper, awareness-raising about its existence and pro-active enforcement are equally needed.

What still needs to be done to achieve this potential? Are measures in place (e.g., a new project, on-going commitments) to achieve this potential? Please describe what will happen when the project ends.

Project findings need to be further disseminated internationally, and also in comparison with Latin America (and, recently) India, to create a larger critical mass. New evidence should be generated on the existence of informal water economies, and on the stronger inclusivity and sustainability if water service providers in a developmental state build on communities' multiple sources for multiple uses. Quantification needs be pursued on volumes and numbers. Policy dialogue also needs to continue.

Each row of the table above is an impact pathway describing how the project contributed to outcomes in a particular actor or actors.

Which of these impact pathways were unexpected (compared to expectations at the beginning of the project?). Why were they unexpected? How was the project able to take advantage of them?

All pathways developed as envisaged. It was fruitful to have the water policy makers and lawyers as team members, fully engaged in the debate, and getting the time themselves to study, reflect, and visit the field with 'new lenses'.

What would you do differently next time to better achieve outcomes (i.e. changes in stakeholder knowledge, attitudes, skills and practice)?

Within the budget and timeframe, this approach was effective.

5 INTERNATIONAL PUBLIC GOODS

See 8 below (international publications under outputs). Most outputs have generic value because of the generic nature of permit systems in Sub-Saharan Africa and Latin America and Europe/USA/Australia.

6 PARTNERSHIP ACHIEVEMENTS

Partnerships were strengthened between the partners in the four countries. Further, partnerships were strengthened with the Water Law and Indigenous Rights Program (WALIR) and Concertación network. There is the possibility that General Authorizations will also be discussed in the Bolivian debates about the water law, through CentroAgua of the university of Cochabamba. Findings are also presented at the WaterNet conference and in the International Association of the Study of the Commons in Hyderabad, January 2011.

7 RECOMMENDATIONS

The project recommendations are:

- 1) Informal water arrangements should be fully recognized and understood, in the same way in which informal indigenous land, pastoral, forestry or fisheries rights have been widely recognized. Their strengths need to be built upon and their weaknesses overcome for higher inclusivity and sustainability of public investments in infrastructure.
- 2) The promulgation of permit systems as the single formal blanket water rights regime should be challenged. The claims to water of tens of thousands small-scale water users are governed by informal and indigenous arrangements for various reasons. First, government is logistically unable to process tens of thousands of permit applications and risks getting entangled in legalistic affairs. Second, the procedural efforts for small users are disproportionate to the water volumes and benefits derived, and the ability of small users, especially women, to comply with complex applications is prohibitive. Third, while most small-scale users will be exempted, the legal status of those who are exempted from permit applications is secondary to those with permits, at least if the entitlement dimensions of permit systems are held up as the only legal entitlement.
- 3) In order to advance development and equity, governments should give a priority legal status to small-scale exempted uses to protect and encourage the expansion of small-scale water uses.
- 4) As exemption thresholds are currently very low, a higher level of a (priority) General Authorization can protect many more small-scale users, and free up time and capacity in government to render permit issuance to large-scale water users as regulatory measures more effective.
- 5) Entitlement dimensions of permit systems in Sub-Saharan Africa should be minimized or taken away, so that permit systems can be fully developed as regulatory tools for selected, targeted users.
- 6) Quantification of the distribution of water use and users is essential to assess the implications of potential regulatory measures.
- 7) In developing regulatory measures, alternatives to permit systems should be thoroughly reviewed with respect to economic, social and environmental implications. In particular, actual water use can be quantified more efficiently, e.g. by estimates and sampled groundtruthing and hydrological modeling, than asking every water user to register. Although administrative data bases for each regulatory measure (taxes, pollution control) typically differ, permits may be efficient in regulating the new uptake of water. Nevertheless, in order to promote a developmental and pro-poor strategy, governments may want to *encourage* uptake of new water by the poor, so there is no need to permit them.

8 PUBLICATIONS

Burkina Faso

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Ampomah, Ben, and Bernadette Adjei. 2009. Statutory and customary water rights governing the development and management of water infrastructure and technologies in the Volta basin. Accra, Ghana: Water Resources Commission and Challenge Program on Water and Food

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Emmanuel Obeng Bekoe, Eric Oforu and Ben Ampomah 2009. Synthesis of an assessment of hydraulic property rights creation at community level in the Volta basin: case study of Ghana. CSIR-Water Research Institute, KNUST, and Water Resources Commission

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Mozambique – monograph chapters

1. Introduction - Water rights in Informal Economies in Mozambique
Barbara van Koppen and Pieter van der Zaag
2. Analysis of water and related laws of Mozambique
Carlos Manjate
3. Quantitative Analysis of Water Demand and Supply in the Lower Limpopo
Agostinho Vilanculos and Eunicio Macuacua
4. Does the Limpopo river basin have sufficient water for massive irrigation development in the plains of Mozambique?
Pieter van der Zaag, Dinis Juizo, Agostinho Vilanculos, Alex Bolding and Nynke Post Uiterweer
5. Water rights in informal economies: the case of the Ndonga Community
Carlos Manjate, Emilio Magaia and H. Gueze
6. Water rights in informal economies: the case of ASAMA, the Associação dos Agricultores de Marreguele
Carlos Manjate, Enid de Oliveira and Óscar Sibia
7. Water entitlements and use in Chókwe Irrigation Scheme: the case of AREDONZE, the Associação dos Regantes do Distribuidor 11”
Paiva Munguambe, Mário Chilundo and Cláudio Julaia
8. The fluid nature of hydraulic property: a case study of Mukudu, Maira and Penha Longa irrigation furrows in the upper Revue river, Manica District
Alex Bolding, Nynke C. Post Uiterweer, Jilles Schippers
9. Synthesis – What role of law in promoting and protecting the productive uses of water by smallholder farmers?
Pieter van der Zaag, Alex Bolding, Nynke C. Post Uiterweer and Barbara van Koppen

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- Van Koppen, Barbara. Forthcoming 2011. Rights, customary law and water resource management: comparative perspectives. In: M Langford and A. Russell (eds). forthcoming 2011. The right to water: theory, practice and prospects. Cambridge: Cambridge University Press

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11 APPENDIX A: ABSTRACTS SELECTED PUBLICATIONS

Manzungu, Emmanuel, Pinimidzai Sithole, Barbara Tapela and Barbara van Koppen. Forthcoming 2010. Phases and interfaces: national and local water investments in Sekororo Communal lands, Limpopo basin, South Africa. Accepted for publication in Economics, Management and Financial Markets

In the 1990s, South Africa, like other southern African countries, embarked on an Integrated Water Resources Management (IWRM)-inspired water reform process that culminated in the promulgation of the National Water Act in 1998, four years after achieving democracy. The adoption of IWRM, which emphasizes second generation water issues (such as demand management, water quality, environmental flow requirements etc), and not the development of water infrastructure, begs the question whether this can make a meaningful contribution to the development agenda in a country where, during apartheid, the water rights of millions of the black majority population were systematically expunged due to unjust legislation and underinvestment in water infrastructure. This paper analyzes the suitability of post-apartheid water legislation and water investments *vis-a-vis* the water needs of the historically disadvantaged individuals, and how local people have tried to cope with the situation. While the post-apartheid water legislation contains some useful pro-poor provisions these have not been complemented by strategies to operationalize them, a situation not helped by state funding that is biased towards formal irrigation. We use the concept of 'hydraulic property rights creation' to investigate how local people, as individuals and as groups, assert rights over water, and how such claims are legitimized. Self initiative and poor performing public-owned/managed domestic and productive water schemes have become important catalysts for local investment. However, local efforts need to be strengthened by ensuring that the favorable legal provisions are operationalized, appropriate financial support mechanisms for individuals and groups for development of water infrastructure are in place, and institutional shortcomings are addressed.

Van der Zaag, P., D. Juizo, A. Vilanculos, A. Bolding and N. Post Uiterweer. 2009. Does the Limpopo river basin have sufficient water for massive irrigation development in the plains of Mozambique? Oral presentation at the WaterNet conference Entebbe October 2009.

This paper verifies whether the water resources of the transboundary Limpopo River Basin are sufficient for the planned massive irrigation developments in the Mozambique part of this basin, namely 73,000 ha, in addition to existing irrigation (estimated at 13,400 ha). This development includes the expansion of sugar cane production for the production of ethanol as a biofuel. Total additional water requirements may amount to 1.3×10^9 m³/a or more. A simple river basin simulation model was constructed in order to assess different irrigation development scenarios, and at two storage capacities of the existing Massingir dam.

Many uncertainties surround current and future water availability in the Lower Limpopo. Discharge measurements are incomplete and sometimes inconsistent, while upstream developments during the last 25 years have been dramatic and their future trend is unknown. As current water uses in Mozambique are poorly monitored, it is not precisely known how much water is currently consumed, especially by the many small-scale users of surface and shallow alluvial groundwater. Future impacts of climate change increase existing uncertainties. Given these uncertainties it was decided to model water availability conservatively.

Preliminary model runs indicate that the Limpopo does not carry sufficient water for all planned irrigation. A maximum of approx. 58,000 ha of irrigated agriculture in the Mozambican part of the basin seems feasible, whereby all users can still achieve a

reasonable assurance of supply. This figure assumes that Massingir will be operated at increased reservoir capacity, and implies that only about 44,000 ha of new irrigation can be developed, which is 60% of the envisaged developments. This finding requires that all envisaged development plans are revisited and reduced.

Any additional water use would certainly impact downstream users and thus create tensions with upstream water users. Also, the considered irrigation development could impact existing water uses that have not been formally registered. Moreover, once the mentioned large-scale developments have materialised, it will be more difficult for new irrigators (e.g. emergent farmers) to join. Competition over water will be exacerbated by upstream developments in South Africa and Zimbabwe.

Some time will elapse before 44,000 ha of new irrigated land will be implemented. This time should be used to improve monitoring networks and consolidate the disparate data sets on river discharge, in order to decrease the high uncertainty of current findings.

Meanwhile the four riparian Limpopo States are preparing a joint river basin study. In this study a methodology could be developed to estimate and safeguard water availability for those users who under the law do not need registration – but who do need water. In this context it is important to study the implications of future irrigation development in downstream Mozambique for the entire basin and all users.

Van Koppen, B., P. van der Zaag, B. Tapela, E. Manzungu. 2010. Roman water law in rural Africa: can it work? Accepted for oral presentation at the WaterNet conference Livingstone, October 2010

The recent water law reforms in Africa, and indeed worldwide, strengthen permit systems. This water rights regime is rooted in Roman water law and was introduced by the colonial powers, completely ignoring existing uses of water. The result was that indigenous peoples were dispossessed from their prior claims to water, while the new formal water rights were reserved to allies. At independence, ownership of water resources shifted to the newly independent governments but the nature of the water laws, including the paper cancellation of informal or indigenous water rights regimes as one of the plural water rights regimes, remained uncontested. Based on research on these formal and informal water laws in South Africa, Mozambique, Zimbabwe, Tanzania, Ghana and Burkina Faso, this paper addresses resulting dilemmas: how to formally recognize and even encourage vibrant informal initiative for water development for livelihoods in rural areas, where millions of small-scale water users mainly access water for domestic and productive uses through informal self-supply and 'hydraulic property rights creation'? How to use permit systems to effectively regulate large-scale users and, where needed, re-allocate water from the haves to the have-nots, as South Africa's government aims? Answers to these questions are underpinned by a quantification of the distribution of volumes of water by numbers of users, as an indication of the administrative challenges of permit systems and the regulatory issues at stake.

Tapela B. N. 2010. Strategic Partnerships in Smallholder Irrigation Schemes in Limpopo Province: A Critique of Institutional Arrangements for the 'Recharge' Phase of the RESIS Programme. Paper to be published in a Special Edition of Law Democracy And Development entitled 'Working on the Margins: Addressing Structural Poverty and Economic Marginalization'

Since the late 1990s, the South African government has implemented a nation-wide programme to 'revitalize' state-owned smallholder irrigation schemes. Many of these are located in former homelands and fell into disuse following withdrawal of government subsidies after 1994. A smaller number are located in commercial farming areas and were formerly white farmer settlement schemes. Revitalization of smallholder irrigation schemes (RESIS) has entailed investments in infrastructure, shifts towards agricultural

commercialization through joint ventures and 'strategic partnerships' as means for promoting entry by black farmers into commercial enterprise.

Significant public funding has gone into the earlier 'RESIS' and subsequent 'RESIS-Recharge' phases. With progression from RESIS to RESIS-Recharge, focus of government interventions has shifted away from objectives of "re-building socially uplifting and profitable agribusiness through a comprehensive programme to structure, train and capacitate smallholder farmers to run their scheme profitably and sustainably" towards emphases on infrastructure development and strategic partnerships.

This paper examines partnerships increasingly favoured by Limpopo Provincial Department of Agriculture (LDA). Three key issues are raised. Firstly, that RESIS-Recharge is creating a small class of black 'arm-chair' farmers, who play little or no active roles and obtain few or no skills in commercial farming but draw incomes from strategic partnerships. Secondly, that 'viability' is narrowly seen in economic and technical terms. Thirdly, that weak monitoring has meant voices of marginalized poor and vulnerable people are not being heard. Question asked is: What is the rationale for strategic partnerships in the context of South Africa's Agricultural Sector Strategy objectives for support to black farmers?

Van Koppen, Barbara. Forthcoming 2011. Rights, customary law and water resource management: comparative perspectives. In: M Langford and A. Russell (eds). forthcoming 2011. The right to water: theory, practice and prospects. Cambridge: Cambridge University Press

Parallel to the global endeavour to realize the right to water and sanitation and to food as a human right, reforms in water rights have been initiated especially in Sub-Saharan Africa, focus of this chapter, but also in Latin America. In their current forms, these legal reforms risk further marginalizing poor and small-scale water users governed by customary law. This chapter discusses conceptual and empirical trends that point in that direction. Most new laws impose the legal system of permits. They not only oblige any new water user to apply for a permit but also prescribe the immediate conversion of all existing laws into permits. Especially in rural areas where colonial water laws had hardly encroached, this revived the colonial legacy in which permit systems were established to supersede customary claims. Conversion of customary systems, in which water is common property, into individual licenses is impossible. Moreover, the new administrative permit systems intrinsically discriminate against small-scale users in favour of the administration-proficient. Also from government's perspective of water regulator, e.g., for registration, taxation or pollution prevention, regulation was complicated by the condition that existing rights should first be converted into permits. Regulation appeared more effective where any existing water uses were regulated directly, and where the few large-scale users who use disproportionate large quantities were well targeted. Hence, taking plural legal systems, especially customary laws, as starting point for any reform is critical. Moreover, customary practices reveal opportunities to realize the rights to water and sanitation and to food and women's empowerment at the same time. The chapter concludes with one such option: the promotion of homestead-scale multiple use water services.

Van Koppen, Barbara, and Everisto Mapedza. Roman water law in rural Africa: Finishing the unfinished business of colonial dispossession? Accepted for oral presentation at the 13th IASC Biennial International Conference, 10-14 January 2011 "Sustaining Commons: Sustaining Our Future. Hyderabad, India

An important question in the light of Africa's recent refocus on irrigation development is how smallholder farmers' own arrangements to better develop and manage water can be fully understood, stimulated, and built upon. This taps water users' financial, social and institutional capital and promotes ownership and sustainability of public investments by national and international governments and development agencies. Ironically, though,

the recent wave of new water laws across the continent risk leading to the opposite, at least according to the texts. Based on literature and empirical research in West Africa, Southern Africa, and Latin America, this paper unravels this contradiction. It explains the water law reforms towards sophisticated nation-wide administrative permit systems as a colonial legacy. Imposing permit systems in plural legal contexts dispossesses local water rights regimes, a feature as old as its roots in Roman water law. Vesting ownership of water resources in the Roman emperor and, later, the European colonizers, has systematically served to dispossess indigenous prior users. There was hardly debate about the suitability of the laws when ownership of water resources shifted to the independent states. The recent global efforts towards Integrated Water Resource Management revived these often dormant laws. In Africa this was accelerated by a second driver of water law reform: the discourse that permit systems are the most effective way to regulate water allocation, registration, tax payment, and pollution prevention. This paper demystifies that assumption and recommends how, in theory, permit system or any other formal water rights system could effectively target and regulate the few large-scale users, while recognizing and even prioritizing water uses by the majority of small-scale users. In practice, the key challenge goes beyond a merely legal recognition of existing arrangements and is to ensure better investments in the development of Africa's abundant water resources.

Ofosu, Eric Antwi, Everisto Mapedza, Barbara Van Koppen, Pieter van Der Zaag, Regassa Namara. 2010. Gendered access to shallow wells and riverine dugouts in the Upper East Region of Ghana. Oral presentation at the Groundwater Conference San Francisco and submitted to Water Resources Research Special Issue

The limit of rain fed agriculture is one of the major causes for poor agricultural performance in Sub-Saharan Africa, especially with the current climate variability. If these challenges are further juxtaposed with the climate change projections, irrigation then becomes a key solution to such agricultural challenges of changing rainfall amounts and seasonal rainfall variability. Focusing on the Upper East region of Ghana, this study used a gendered approach to assess how poverty alleviation through the use of shallow wells and riverine dugouts differ for men and women. This research looked at how the underground water irrigation technologies are accessible to both men and women. Using the concept of 'agricultural water management and investments', this study looked at how both men and women appropriate groundwater for their irrigation benefits. This study concludes that underground water technologies adoption is grounded within gendered production systems and tenure arrangements which largely determine whether one benefits from water extraction technologies or not. In rural Africa where women in both male- and female-headed households play important roles on agricultural production, findings of this research allow identifying more general policy recommendations for empowering women to benefit more from ground water based irrigation.

Van Koppen, Barbara. Forthcoming 2011. Administrative water rights from a poverty and gender perspective: discrimination and dispossession by design? IWMI – CPWF Research Report. Accepted by external reviewers

This IWMI – CPWF research report analyzes administrative water rights (or permits, licenses, etc) systems, focusing on their implementation in informal rural economies of low- and middle-income countries and impacts on the rural poor. It identifies a hitherto ignored aspect of permits, rooted in Roman law, which is that permits 'lawfully' vest ownership of water resources in the Emperor dispossessing defeated tribes. A review of permit systems in Europe, Australia and Western USA shows that dispossession hardly played a role in these high-income countries. However, in Latin America and Sub-Saharan Africa, colonial water laws, inspired by Roman law, primarily allowed settlers to carve out individual property rights to a shared public resource, divesting indigenous

water users from their prior entitlements. Today's expanded permit systems in Chile, Mexico, Burkina Faso, Ghana, Mozambique, South Africa, and also Zimbabwe, Tanzania, and Uganda, which super-impose formal permits as first-class entitlements over existing water rights regimes, risk dispossessing the informal and less administration-savvy water users, in particular the poor and women. Moreover, although all governments, except Chile, expected that permits would strengthen the state's regulatory role, early implementation shows the opposite. Permit systems create unnecessary new burdens for the state. Registration for hydrological information gathering, taxation or other measures are more effective as distinct measures with own, lean and purpose-specific administrations. The report concludes with entitlement arrangements from the Andean Region, South Africa, and the Indians in Western USA that both provide effective 'hooks' to regulate the few formal large-scale users but also legal tools to recognize and protect the water rights of informal users.