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Institutional Continuity and Change

A century of smallholders’ water rights in Meru, Tanzania

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***Abstract***

*In the late 19th century Meru smallholders established the first irrigation furrows on Mount Meru, Tanzania with the intent to prolong farming seasons and improve harvests. Soon neighbouring estate holders followed suit. Since then there has been a continuous construction of furrows by both smallholders and estates in the area. Smallholders’ furrows were from the onset managed as de facto communal property with private user right, while estate furrows were privately owned. Over the whole period, and especially during the last half century, population increase has caused land scarcity, which has encouraged a general intensification of farming methods. The continuous push to keep up production on decreasing plots has made irrigation more important today than ever before. Land scarcity has been accompanied by water scarcity translating into economic constraints that in turn have caused legal conflicts between the two parallel property right systems. Despite institutional and technological change as well as changes in relative prices of factors of production, property rights governing smallholder furrows have been characterised by continuity. The aim of the paper is to map and explain driving forces behind this institutional continuity.*

INTRODUCTION

This paper takes on the challenge to analyze more than a century of institutional continuity and change in property rights governing water resources. The specific case is allocation and management of irrigation water within a local smallholder production system in Meru area, located on the southern and eastern slopes of Mount Meru five kilometres east of Arusha town, northern Tanzania. With fertile soils of volcanic origin, a tropical climate moderated by altitude and a bi-modal rainfall pattern with an average precipitation of more than 1,300 millimetres per annum (Assmo 1999: 78-79; Larsson 2001: 112) Meru has favourable pre-conditions for agricultural activities, especially on the higher mountain slopes. Due to geographic limitations strategies for improving land productivity through intensification of farming methods were developed early on, including the construction of gravity irrigation furrows leading off water from rivers (Carlsson 2003; Larsson 2001: 102-103; Spear 1994: 3). The first irrigation furrows were constructed at the end of the 19th century. They were at the onset intended foremost for domestic purposes, to save on labour efforts in existing farming methods, such as washing crops, and to offer security in times of drought thereby making smallholders less dependent on seasonal rains. Due to local population increase resulting in growing land scarcity and technological change with the introduction of new crops, the demand for irrigation water has since steadily increased and it has escalated during the last two decades, especially on the lower slopes where rainfall is more erratic and scarce (Carlsson 2003; Larsson 2001; Puritt 1977: 93).

In spite of over a century of institutional change in both the local system of production and society at large, of changes in relative price between production factors and of technological change in farming methods, property rights governing smallholder’s irrigation furrows have been characterised by *de facto* continuity. The aim of the paper is to map and explain driving forces behind this institutional continuity. Qualitative methods are used to analyze secondary sources including archive documents as well as primary data consisting of interviews with government officials, key informants and water users collected during four periods of field work in 1998-2009. With its long-term perspective it aspires to bridge one of the great divides in research on African systems of production, that between the colonial and post-colonial eras.

The paper will start with building a framework for analysing communal property rights systems governing open water resources within customary institutional structures. Then it goes on with a historiegraphic presentation of the establishment of smallholder irrigation furrows in pre-colonial Meru, colonial influence and the Independence era. This descriptive section is followed by an analysis of long term continuity and change in *de jure* and *de facto* property rights institutions during the whole period. Concluding remarks include comments on the role of institutional continuity within a larger process or economic change.

The irrigation system among the Meru of Tanzania shares great similarities in physical features as well as social organisation with a number of contemporary irrigation systems in East Africa. Such similarities are, for example, the system of gravity irrigation, low levels of technology, hand-dug furrows with high evaporation, and communal property rights to the resource combined with private user rights to the water (see e.g. Adams 1990; Adams et al. 1997; Davies 2009; Lerise 1996; Spear 1997; Sutton 1990, 2004). Due to the area’s universal characteristics it can be expected that an analysis of long term continuity and change in property rights systems governing irrigation water in Meru is of relevance for numerous settings in sub-Saharan Africa.

ANALYTICAL FRAMEWORK

Property rights, like all institutions, are embedded in the socio-economic context and they cannot be analysed unless there is recognition that they are fundamentally made up of social processes and interactions. The success of any property rights regime depends on a social recognition of the regulations guiding claims, monitoring, enforcement and exclusion. Regimes differ from one society to another due to varying socio-economic contexts and they change over time as the context change (Alchain and Demsetz 1973; Berry 2009; Hodgson 1988).

Property rights and their need to change are constantly being evaluated by society and thereby continuity and change are part of the same process. As long as the pre-conditions for the rational of a certain property rights regime stay the same, there will be continuity. If pre-conditions change, there is, however, opportunity for institutional change. According to North (1990) the two main causes of institutional change are changes in relative price between factors of production (land, labour and capital) and changes in preference and taste (customs, ideology, ethics, etc.). Bromley (1989) presents a similar argument claiming that that the quest for increased efficiency together with attempts to carry out individual, group and social interests are the two over-riding motives for change in society. Change initiated by efficiency or interest may go hand in hand, but they may also be conflicting as power struggle between what can be considered to be economically rational and what is rational according to other types of incentives are on-going in all societies (North 2005). Additionally, there are radical events, such as war and natural disasters, and although they are considered exceptions by North they should not be underestimated when investigating colonial history (North 1990).

North’s (1990) explanation for the development and persistence of irrelevant institutions is ‘path dependency’. Out of chance circumstances institutional solutions may appear that, once they prevail, lead to a particular path. Once a society has started its institutional development in line with a certain path, the costs may be high to instigate change. Gains of changing the path must be higher than the costs to make it worth while, otherwise there will be continuity. North (1990, 2005) further emphasises that informal institutions may precede, prolong, or even hinder change in formal institutions. Informal institutions affect changes in formal institutions because they are the consensus of beliefs and behaviour shared in society and a change in one eventually causes a change in the other. Every society should strive to achieve a fit between the two that is as close as possible because this will induce voluntary compliance to the formal system and simplify monitoring and enforcement.

The natural characteristics of water further complicates the analysis of what drives the development of property rights as they have direct implications for the possibility of setting up exclusive property rights and pricing water use. As one in an exclusive group of life-supporting natural resources water has a strong public good characteristics and it can be inconceivable to refuse other individuals, as well as animals, their basic needs. In poor agrarian societies it may also be difficult to deny fellow smallholders irrigation water if this act will lead to the destruction of crops. Further, just as water cannot be denied to people who are too poor to pay its actual production price, it cannot in times of scarcity be amassed in the hands the few (Carlsson 2003). Meanwhile, water is also an economic asset and it is becoming increasingly valuable in economic terms as it is being overused and misused. Up to a certain point, water consumption can therefore be regulated by pricing incentives (see e.g. Kay et al 1997). In the present case study we are dealing with irrigation for agricultural use which means that water is considered primarily as an economic good and, still, principles of non-exclusion are strong.

Irrigation furrows are examples of what Elinor Ostrom (1990) termed common-pool resources, CPRs. They are characterized firstly, by the fact that as one individual extracts from the resource there is less available for other users. Irrigation is a consumptive use as water that is removed from the source is not returned (Chanje and Johnson 1996: 75). Secondly, there are difficulties to monitor and sanction the use of the CPR leading to complexities in excluding individuals from benefitting from the resource. Due to the second characteristic CPRs are generally managed as communal property and the communal ownership is often combined with private user rights. These communal property rights are as a rule conditioned, rights are limited and the scarcer the resource the stricter it is being governed by national and local, formal and informal institutions (see e.g. Adams 1997; Andelson 1991; Bromley 1992; Carlsson 2003; Dahlman 1980; Ostrom 1990; Peters 1994). The irrigation furrows in Meru correspond to the typical traits of CPRs and property including having *de facto* communal ownership and temporary private user rights.

Data availability on seasonal flows in CPRs such as rivers and irrigation furrows and the potential evaporation from open water sources is often poor in developing countries. A situation of insufficient data may lead to conflicts regarding distribution and excessive exploitation of the resource. There is, as a rule, excellent local knowledge about seasonal flows and other limitations to water availability; information gathered over centuries through practical experiences, and used by the indigenous water authorities when distributing and surveying rights (see e.g. Chenje and Johnson 1996). There is also the complex problem with the head-tail power balance to take into account. Consequently, in many societies where furrow irrigation is used there are very elaborate property rights structures resting on old traditions.

The construction of elaborate irrigation systems demands a large labour input, and when they are built by smallholders this often results in the source becoming communally owned. In return for the labour that each farmer has put into the construction he/she is rewarded with rights to use the water in the furrow (see Adams e.g. 1990). Incentives, opportunities and discrimination embedded in communal property rights systems governing agricultural resources in rural areas in sub-Saharan Africa have been intensively debated. The origin of contemporary institutional structures has been sought in the colonial heritage with the colonial creation of ‘traditional’ African society, including the establishment of customary legislation and tenure (see e.g. Berry 1993, 2002; Mamdani 1996; Peters 1994, 2004). Particularly, the British’ creation of African tradition and Customary Law gave African leaders great power over allocation of agricultural resources, which opened opportunities for rent seeking behavior and changed the institutional structure (Berry 2002: 641-645).

Individuals’ ability to negotiate and secure access to resources is clearly affected by their social, political, and economic status. The power invested in African local leaders under Indirect Rule and the informal nature of Customary Law opened up for flexibility and negotiability of customary tenure rights. Such negotiability has been presented as slowing down the process of exclusion thereby protecting and promoting the opportunities of those who have a low social and economic status (see e.g. Berry, 2002; Odgaard, 2003). Others claim that negotiability is part of a process of increased exclusion and polarisation since stakeholders are not equal in status, influence, and wealth negotiations are used by the socially, politically, and economically more powerful to enrich themselves (see e.g. Peters, 1994, 2004). It is certainly a general trend on the sub-continent that the present elite, both tribal and national, have continued to support and maintain the customary institutional system thereby contributing to institutional continuity. Meanwhile, there has been considerable and growing inequality, a polarisation process within the framework of prevailing customary property institutions (Carney and Farrington 1998; Platteau 1996, 2000; Ribot 2000). While identifying driving forces as well as effects of institutional continuity in Meru elite interests and regularity of exclusion are important factors to take into consideration.

ESTABLISHING TRADITIONAL FURROWS

The Meru moved to the Mount Meru from the Kilimanjaro area to the east sometime in the 17th century (Spear 1997: 18). They came to consider the mountain slopes to be their communally held land, where men by the rights invested in them as members of the community could gain and inherit user rights to local natural resources. Mount Meru and its surroundings were at this time virgin land with unlimited opportunities for expansion, but during the 19th and beginning of the 20th centuries the Meru became increasingly locked in. In the 1830s the Arusha people settled on the mountain slopes to the west. In 1896 the first German missionaries arrived and soon the colonial administration for German East Africa established itself in what was to become Arusha town. The colonial administration declared all land on Mount Meru above 1.600 metres to be a forest reserve. At the same time land to the south of the Meru community was allocated to European and South African settlers. The scope for geographic expansion was now limited and these boundaries were not changed significantly either by the take-over of the British colonial administration in 1919 or the Independence government from 1961 (Larsson 2001: 102-103; Spear 1994: 3).

Limited opportunities for geographic expansion combined with population increase caused the Meru early on to developed strategies for improving land productivity. One such strategy was the construction of irrigation furrows. The first furrows were established at the end of the 19th century just before the arrival of the German colonial administration. They were at the onset intended foremost to increase security, making smallholders less dependent on seasonal rains, and to save on labour efforts (Larsson 2001: 185; Puritt 1977). Initially furrows were constructed with the technical assistance of the Chaga from Kilimanjaro. The Meru were thereby incorporated in a long East African tradition of combining irrigation furrows with rain fed agriculture. Among both the Chaga and the Meru the establishment of irrigation furrow systems was the result, not of adverse conditions, but rather of striving towards intensifying cultivation practices and later on meeting the demands from a growing population (Puritt 1977; Sutton 1990: 37). Soon the technical know-how was adopted permanently into Meru society.

Whoever constructed furrows on Meru land was expected to approach the Paramount Chief, the *Mangi*, in order to obtain permission. While the tribal leadership thereby guarded their judicial control over local natural resources there were no centralised attempts to develop water resources. Instead initiatives came from individual clan leaders and other active members of society. With population increase and an intensification of farming methods the demand for irrigation grew and the supply side was developed as more furrows were constructed. While tribal authorities neither had projects, nor gave subsidies for the construction of furrows, all inputs, in the form of either money or labour, were provided by farmers and future water users. These efforts strengthened smallholders’ property rights claims to the water sources (interviews, four oral history key informants, Meru, September 2000).

Property rights were generally developed along two different paths. One scenario was that the construction was initiated by a leader figure in the village. He would either pay other villagers for their labour or get them involved in the construction in return for future water use. In cases where the construction had been initiated by the village strong man the furrow was generally considered to be the property of that individual, but there were restrictions to that ownership. Any farmer living along the stretch of that furrow who wanted access to water could approach the owner to ask permission, and it would be socially difficult to refuse such a request. In return for water allocations farmers would pay the initiator in the form of gifts (interviews, four oral history key informants, Meru, September 2000). The furrow was then *de jure* private property, but was managed as *de facto* communal property with a strongman who granted private allocations.

The alternative was furrows with an uncontested communal set up, where construction and maintenance of the furrows were carried out together by farmers in the village who could be reached by it. In return for labour put into construction and maintenance work, farmers received a share of the water according to established schedules (Spear 1996: 221; interviews, two oral history key informants). These furrows were *de jure* and *de facto* communally owned and had elected water committees made up of water users who allocated private user rights to the committee members. Both scenarios show that from the onset there was a great willingness to share water resources with other community members regardless of whether the furrow was a private or a communal initiative. This interpretation coincides with other studies of East African irrigation systems arguing that the presence of irrigation did not automatically result in an uneven accumulation of natural resources (Davies 2009). Notwithstanding, the willingness to share water resources does not translate into a claim that these societies were egalitarian in their socio-economic structures.

COLONIAL INFLUENCE

Shortly after the introduction of irrigation furrows among the Meru smallholder, estate owners who had been given land by the colonial administration to the south of Meru started constructing their own channels. They either solely used wage labour from their own farms, or dug the furrow systems in joint ventures with neighbouring Meru smallholders. Depending on the arrangements around the construction, they considered part or the whole of the furrow to belong to them as private property and they did not share water from the stretch that they controlled. To obtain permission to construct furrows estate owners turned to the colonial administration and from there they also receive their water rights (interviews, one oral history key informant). Consequently, from the start there were two parallel property rights regimes developing in the area. One was that of the Meru smallholders with the legal support of tribal authorities funded on *de jure* and/or *de facto* communal ownership offering to include potential water users and considering water fundamentally as a public good. The other was that of the estate owners supported by the colonial administration based on private ownership excluding all other water users and deeming water to be an economic good.

Possibly the most important example of formal institutional change caused by the radical event during colonialism in sub-Saharan Africa is the creation of statutory and customary laws. The period of German colonial rule in Tanganyika, 1884-1918, was primarily one of conquest and establishment with few administrative strategies. While estate furrows were established and awarded statutory property rights by the colonial administration, colonial rule had little impact on the institutional structure of Meru area itself. After World War I as Britain took over Tanganyika as a League of Nations Mandate the colonial administration was consolidated and the principles of Indirect Rule were introduced. The colonial territory was physically divided into separate areas, Crown Lands administrated by the British and Native Reserves administrated by African leaders with the military and political support of the colonial power (see e.g. Mamdani 1996: 77-78). The *Mangi* was put in charge of administering Meru including allocating rights to construct irrigation furrows and preventing conflicts between water users. Throughout the colonial era the smallholder furrows continued to rely primarily on customary water rights given to them by the *Mangi* in his capacity as the administrator of the Native Reserve and they were generally not registered with the colonial administration nor did they obtain statutory water rights (interviews, four oral history key informants; one water committee member, Meru, September 2000 and September 2007).

Continuously over the first half of the 20th century the demand for water increased both because of population increase and because of the introduction of new farming methods and new crops. Instead of being utilised primarily for domestic purposes and offering security in times of drought irrigation became imperative for prolonging growing seasons and introducing crops that could not be farmed with the natural availability of water. One such new crop was coffee that required a large quantity of water, both for irrigation and for washing and pulping the coffee beans after harvest. Originally, coffee was the basis for the growing estate sector and in 1902 Liepzig missionaries planted the first coffee trees in the native areas on Mount Meru. For the first couple of decades they dominated as coffee growers, but coffee production by Meru smallholders picked up in the late 1920s. It continued to increase despite opposition from the settler community, low world market prices, and even poorer local prices. Coffee had advantages for the Meru farmers as it was easily intercropped with their staple food, bananas, it increased the rate of return on land and labour, and provided a cash income (Spear 1997: 139, 142; interviews, three oral history key informants, Meru, September 2000). There was a general trend in colonial East Africa of superior efficiency of smallholders’ coffee production compared to estates (Austen 1987: 138-140, 171-172: Cooper 2002: 95-96) and Meru was no exception.

Intensification of farming methods and the introduction of new water demanding crops, particularly coffee, combined with the existing plural judicial systems meant that water conflicts increased in both number and level of severity. The dual administrative system and the weak enforcement of existing rules caused many of those problems, and together they opened up for both smallholders and estate owners to ignore statutory legislation and national policy. In 1921 the Moshi District Political Officer, DPO, wrote to the Chief Secretary to the Government in Dar es Salaam complaining that he spent the majority of his time settling water conflicts between water users with irrigation furrows on Kilimanjaro. Meru resembled the Kilimanjaro area in that it also had a situation of an increasing consumption of irrigation water due to an expanding plantation sector paired with growing African population. There appear to have been several reasons for the escalating conflicts. One was that estate holders drew water from sources that were located several kilometres from their plantations, forcing them to dig excessively long furrows, which in turn made exclusion of other water users difficult and caused large losses of water through evaporation. Another conflict was the classic issue of head- and tail-end water users. African farmers were located higher up on the mountain slopes in relation to the estates, and hence they were closer to the original water sources and could extract water first. Preventing head end water users from taking advantage of their position and supervising the distribution of water to tail-end users demands either co-operation of the head-end users or great enforcement resources and both were lacking (TNA 3495 vol. I; interviews, one oral history key informant; one private irrigation furrow owner, meru, September 2000 and September 2007). These conflicts can all be identified as typical challenges for a CPR such as irrigation furrows that are regulated by a weak institutional framework.

A first step towards national regulation of water resources in Tanganyika was taken as the British administration declared that all water was reserved to the Crown. Then the administration initiated what in 1923 was to become the Natural Water Supply Regulation Ordinance No. 4, laying down the rules for the creation of Water Boards, WB, and defining their executive powers. However, English Customary Law was applied and no principles taking into account specifics of the Tanganyika conditions were formulated. On the WBs the District Commissioner, who was also the president of the board, was supposed to represent the interests of the African communities and he relied on information forwarded to him by the tribal authorities (Kanthack 1936; Mwita 1975; TNA 471/w.2/8 vol. I: 4-5).

Government officials in the Northern Province soon realised that the Natural Water Supply Regulation Ordinance was not satisfactory when it came to solving problems of legal rights to water in a situation of high demand and scarce supply. The need for more elaborated legal and administrative machinery dealing with monitoring water rights and preventing abuse became obvious, especially in areas such as Meru with a higher population density and where smallholders and settlers were to share water resources. As a way to bring order in existing water conflicts between Meru and estate holders and among estate holders themselves a detailed survey of rivers and furrows was conducted in 1941, but the aim of the administration’s policies was to favour the settlers at the expense of the Meru. During the 1940s the British administration worked on a new water act putting existing extractions and water use of Africans as well as non-Africans under the control of one single authority. However, when the new Water Ordinance of 1948 was finally brought into effect in 1954 it lacked any profound reform (Mwita 1975: 12-17; TNA 471/w.2/8 vol. I: 6-7).

Despite the fact that colonial government officials, again and again right up to the time of Independence, expressed concern regarding how to get all customary irrigation furrows registered with the colonial authorities, they never managed to reach this goal. Most traditional furrows in Meru continued to stay unknown to the administration throughout the colonial era, probably because it was ultimately seen as the responsibility of the water users to obtain water rights (TNA 471/w.2/8 vol. II). As long as the colonial water authorities had no obligation to seek out customary furrows, to spread the administration’s policy, or to visit the tribal areas, they could neither expect to have full information on these furrows nor hope that Meru smallholders would be interested in getting formal water rights. The registration of traditional furrows can be described as a request rather than a demand, since no means were provided to enforce registration and since most customary furrows were never brought to the attention of the courts.

The colonial authorities passed a final water ordinance in 1959 where the power of water apportionment was again handed to WB. The demand to register extraction was again emphasised, but enforcement appears to still have been weak (TNA 471/w/2/8 vol. II: 3-4). In practice the power to grant property rights to water and water ways, and the control over water works continued throughout the colonial era to be divided between the colonial administration and the African authorities (TNA 471/w/2/8 vol. I: 1; interviews, one oral history key informant, Meru, September 2000).

INDEPENDENCE

After Independence in 1961 water, together with all other natural resources, was nationalised and placed under the jurisdiction of the national government. Officially an end was put to the dual system of shared jurisdiction between tribal and colonial authorities. The new national jurisdiction did not, however, solve the issue of the dual property right systems because old customary rights that had been issued by tribal leaders continued to exist side by side with statutory rights issued by the colonial administration. Statutory water rights were easily registered with the new authorities, but while customary rights were recognised in principle there was a continued problem with registering them. During the 1960s the position of Paramount Chief was abolished throughout the country. Political power was transferred from tribal leaders to village authorities falling under the national government and ownership and management of all traditional furrows were handed over to the newly established village governments in Meru. However, still no decisive efforts were made to register existing traditional furrows or to convince water users that they should obtain government issued water rights (interviews, three oral history key informants, Meru, September 2000).

Although village governments were now *de jure* the property right holders to traditional furrows *de facto* rights were delegated to existing water committees, made up of water users and their elected chairman. It was the duty of the water committee to organise maintenance work, allocate hours for irrigation, and to formulate and uphold the by-laws of that particular furrow system. Water users who make up the water committee gained their private user rights by being accepted into the committee, obeying its by-laws and contributing in cash and in labour towards maintenance (interviews, two oral history key informants; four water committee members, Meru, September 2000 and September 2007).

The first post-independence water legislation, the Water Utilization Act No. 42, was created in 1974 and it was rather a continuation of the previous colonial legislation recognising both statutory and customary rights to water. Since then three amendments have been written. One was issued in 1981 mostly dealing with problems of pollution and suggesting the creation of Water Basin Offices, WBO. It came into effect in 1989 and the WBOs were supposed to administer Tanzania’s nine water basins and to take over the duty to issue statutory water rights. Instead of dividing water management along artificial regional boundaries the extension of the natural water basins would make up boundaries, which would be more suitable for sustainable management of water resources. Along the rivers water committees sharing the same river have also been advised to create Water Users Associations, WUA, with the commission to initiate negotiations and agreed on communal responsibilities. So far few WBOs have been created, one of them being the Pangani Water Basin Office, PWBO, that was set up in 1991 and to which the Meru area belongs. The following two amendments of 1989 and 1997 were concerned mainly with preventing pollution by increasing penalty fees and not with property rights (interviews, J. Kobalyenda, Principal Water Officer, Ministry of Water, Dar es Salaam, 15 October 1998; J. S. Nasari regional Hydrologist, Regional Water Office, Arusha, 21 April 1998). Little changed for the Meru smallholders with these new policies. *De facto* communal management of furrows continued as well as the drive from the national government to turn customary property right into statutory rights registered with government authorities.

Since the 1980s coffee has lost its position as the most important cash earner in the household budget and due to low world market prices, increased costs for inputs and consequent poor profitability smallholders have even started to stump and up-root their coffee trees. Since the 1990s, vegetables have taken over as the most important cash crops (Larsson 2001: 196-201, 210-211). This technological change has, increased pressure on water resources as vegetables are even more water demanding than coffee.

During the last two decades national authorities have become more and more involved in the management of national water systems though the inclusion of irrigation furrows, smaller rivers and larger river basins. This commitment has been demonstrated in the water policies of 1991 and 1998 where there was focus on community participation, sustainability, cost recovery, and a demand-responsive approach to water supply facilities (URoT 1999: 2-3). These are policies influenced and supported by the international donors, for example the World Bank (Easter et al. 1998: 11-16; Saleth & Dinar 1999). There was a gradual shift in focus during the 1990s in reports commissioned by the World Bank, actual World Bank policy recommendations and national water policies. This shift lead away from the development of the resource in quantitative terms to issues of allocation and quality, implying that technological concerns have given way to economic and social ones. The integration of water users in the development and management process was stressed, and there was an ambition to find long term solutions regarding economic viability and environmental sustainability.

Simultaneously, there was a strong belief in the privatisation of water resources as water was viewed as primarily an economic good and as an input in economic activities (Saleth and Dinar 1999: iii, 35). However, in the 2000s privatisation of existing property rights has ceased to be central to the bank’s policy recommendations. The realisation that there was no empirical proof that strict privatisation in itself automatically leads to increased private investments rubbed off on policy recommendations. Still, a property rights focus, implying that a change in property rights structures governing natural resources in sub-Saharan African countries in necessary in order to achieve growth in the agricultural sector, has remained (Friis-Hansen 2000: 15, 22).

CONTINUITY AND CHANGE

The analytical framework set up in section 2 identified three fundamental drivers of change in property rights: radical events, changes in preference and interest, and the search for continued efficiency in times with changes in relative prices for production factors. These drivers can be found separately or integrated into one another. Meanwhile, the natural characteristics of open water resources and the negotiability inherent in customary property rights in sub-Saharan Africa favours viewing water as a public good governed by communal ownership paired with private user rights. It is time to apply the model to analyse drivers of institutional continuity and change in the case study.

Changes in formal institutions brought about by colonialism can be deemed as a result of radical events consisting of the colonial conquests and establishment as well as change in interest due to new actors such as the colonial administration and estate holders. Through the establishment of the forest reserve and the alienation for land to estate farms colonialism created geographical boundaries limiting the territorial expansion of the Meru area. Thereby it contributed to a growing need among smallholders to intensify farming methods, a process that included continuous construction of irrigation furrows. Further, the construction of estate furrows on land alienated by the colonial administration introduced private ownership recognised by statutory law that interfered with management of the *de facto* communally held Meru smallholder furrows. This in turn created conflicts over water resources between water users supported by dissimilar judicial systems. The second radical event that gave way to changes in interest affecting the larger institutional structure in Meru was Independence. The greater *de jure* change of that time was when all formal ownership of customary furrows was transferred to the village authorities and thereby became *de jure* state property. With the delegation of *de facto* ownership of furrows to water committees made up of water users there was, however, a continuation of communal ownership combined with private user rights.

There have been significant changes in relative price for factor endowments in Meru during the last century. As the Meru became geographically enclosed during the 19th century increased agricultural production had to come from an intensification of cultivation strategies. The construction of irrigation furrows was one such strategy. The issue of land scarcity was further aggravated by population increase on the mountain slopes, which raised the price of land while lowering the price of labour. Until the late 1920s population increase had been fairly slow, but between 1928 and 1948 the Meru population more than doubled from nearly 12,000 to 25,000. The Meru core area reached 62,500 inhabitants in 1988 and population growth has continued through out the 20th century (Larsson 2001: 106, table 4.1). Population increase meant that average population density on the mountain grew from 37 individuals per square kilometre in the 1930s, to 114 in the 1960s, continuing to 170-250 individuals in the 1970s and reaching as much as 2,000 individuals per square kilometre in some villages in 2000 (Larsson 2001: 35; Spear 1994: 6, 1997: 128-129). It can further be pointed out that population increase in the heartland has occurred despite an ongoing large out-migration to the lowland areas south of the estates since the mid 20th century.

Changes in relative price between factors of production through population increase and land scarcity has clearly lead to technological change with the continuous construction of irrigation furrows, introduction of new crops such as coffee and vegetables, use of fertilisers and pesticides, and so on. The number of water users has significantly increased as has the demand for and scarcity of water, but property rights regimes have stayed according to the original model of communal furrows and private user rights earned by contributions in money, kind, and labour (interviews, four oral history key informants, Meru, September 2000 and September 2007).

The only real example of population increase altering property rights institutions is in the case of private irrigation furrows owned by estate holders that are slowly being taken over by Meru smallholders and thereby becoming *de facto* communal property. Contrary to orthodox property rights theory, the increase in resource users and consequent augmented price of water have not led to a privatisation, but rather to a *de facto* de-privatisation of water sources (interviews, one private irrigation furrow owner; seven water committee members, Meru, September 2000, September 2007 and February 2009).

It is argued that the explanation for the continuous strong position, and even expansion, of communal property rights is to be found in the natural characteristics of water combined with the challenges of successfully managing a CPR such as irrigation furrows. The first of those characteristics to be mentioned is water as a life supporting resource resulting in the resource being considered to be a public, rather than an economic good. As Meru smallholders would put it – “Water is a gift from God and it belongs to all Meru.” Although there are geographic restraints on who can be reached by the furrow all farmer who applies for membership and are willing to abide by the committee’s constitution are welcome. Rain is still the most important source of water for agricultural, but for a progressive farmer investing in crops such as vegetables water committee membership is a must. It is extremely rare that members are excluded from the committee and the combination of easily obtainable and basically non-threatened membership makes the irrigation furrow a *de facto* non-exclusive, and thereby, secure resource.

However, it is far from the ‘unmanaged commons’ that Hardin (1991) analysed. There are a number of forceful actions, such as the payment of fines and the temporary loss of one’s water allocation that can be used against anyone violating the furrow by-laws. Meanwhile, tradition recognises all community members’ right to draw domestic water from accessible sources including irrigation furrows, but this extraction is negligible compared to the amount of water required for irrigation (interviews six water committee members, Meru, September 2000 and September 2007). It can also be added that there is a pragmatic aspect to the principles of non-exclusion as monitoring of and exclusion from a CPR is generally difficult. Even is water was considered as an exclusive economic good protecting oneself from water theft would be difficult, a lesson that estate holders have learned the hard way.

Problems with seasonality in water flows and head-tail conflicts are other characteristics of CPRs, both rivers and furrows. Seasonality and fluctuations in amounts of water available causes conflicts between water right holders as they discover that formal water rights offers “false” security. Co-operation and a willingness to negotiate along the water way is required to solve these conflicts and the establishment of Water Basin management and Water Users Associations can be steps in that direction. In the end perhaps the whole Pangani Basin will be managed as communal ownership with private user rights for irrigation furrows. Until then the possibility of getting water to the furrow continues to be a question of head-tail opportunities and not of amounts stated in formal water rights. The traditional furrows located higher up on the mountain slopes may lack legal documentation, but since they are located at the head-end of the rivers they can always fill their furrows with water at the expense of tail-end users, and there are no government officers in place to monitor their water use. Both estate owners and water committees further down-stream have to wait for their turn and although they have a water right this gives no guarantees (interviews, two private irrigation furrow owners; eight water committee members, Meru, September 2000 and September 2007).

The government is showing growing concern with unregistered traditional irrigation furrows in Meru and although there is no change in *de facto* communal property rights in the area there is a change in that a growing number of furrows are being registered with the Pangani Water Basin and are obtaining statutory water rights for their furrows. The official argument is that even if smallholder furrows are still not truly controlled by the government, at least they can be registered. Registration also opens up for the possibility of collecting water fees although this practice has not yet been enforced at all traditional furrows (interviews, M. Lokissa, District Irrigation Officer, District Water Office, Arusha, 20 October 1998; J. S. Nasari, Regional Hydrologist, Regional Water Office, Arusha, 21 October 1998; H. S. Kidungwe, District Water Engineer, Arumeru District, Arusha, 4 November 1998). The motivation for the smallholders is primarily to strengthen their position as water users. Tail-end users in the lowlands are in need of any kind of pressure that they can apply on head-end users to leave water in the stream. Therefore they have always been more inclined to get government issued water rights, to pay water fees, to push for the WUA and for co-operation along the river (interviews, three water committee members, Meru, September 2000 and September 2007). Over the years pressure is finally also being felt by the smallholders higher up on the mountain slopes and most of them have now applied for statutory rights.

The natural characteristics of water and the challenges of managing a CPR are clearly fundamental factors for explaining continuity in property rights institution governing irrigation furrows. This argument becomes even stronger when noting that there is no inherent unwillingness to privatise other natural resources in Meru and parallel to the prevalence of *de facto* communal ownership of water there has been a *de facto* privatisation of land (Larsson 2001). The fact that changes in property rights governing other natural resources do occur and that there is also change within property rights institutions governing water, for example continuous changes in by-laws, it is evidence that the explanation for continuity does not lie in an inability to change or path dependency. Continuity is the outcome of rational management of a scarce CPR in a specific socio-economic setting.

CONCLUDING REMARKS

The analysis has shown that more than a century of institutional continuity in communal property rights governing smallholder irrigation furrows can be explained by rational choices made within a changing socio-economic context. In the midst of radical events, of institutional change in Meru at large and in local systems of production, of changes in relative prices for factors of production and of technological change the natural characteristics of water as a life supporting resource and of irrigation furrows as typical CPRs have been driving forces behind institutional continuity. Meanwhile, Meru has experienced processes of significant economic growth and agricultural development with increasing standards of living at the household level (Larsson 2001).

Over the last decade there has been an ongoing debate among economic historians on whether economic change is driven primarily by institutional change (see e.g. Acemoglu et al. 2001; Greif 2006; North 1991, 2005) or changes in factor endowments (see e.g. Allen 2009; Austin 2008). While the present study takes its point of departure in a different research focus, that of analysing driving forces behind institutional continuity and change, its adds to our understanding of the causal relationships between institutional change, changes in factor endowments and economic change. Its contribution is to show, through the empirical case of communal furrows in Meru, that we need to recognise that the rational of institutional continuity and change can be varying depending on what resource or asst is being regulated. Just as institutional change can be a necessary factor, and perhaps even a driver of economic change, institutional continuity is not the equivalent of economic stagnation. Instead continuity can be part of a dynamic process of economic growth and development.

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