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Hydropatriarchies and landesque capital: a local gender contract analysis of two smallholder irrigation systems in East Africa

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Abstract

Water is a natural resource whose control for productive purposes is often in the hands of men. Societies grounded on such unequal gender relations have been defined
‘hydropatriarchies’. Against this background, this paper presents a gender analysis of landscape investments, conceptualized as landesque capital in smallholder irrigation farming in East Africa. Based on the analysis of how local gender contracts are negotiated, I argue that as processes of landesque capital formation are often explicitly gendered, attentiveness to gender dynamics is required to fully understand such practices. Moreover, as investments in landesque capital, for example, irrigation, terracing and drainage systems, have primarily been conceptualized as the result of men’s systematic work, this study highlights women’s contributions to the creation of landesque capital, taking smallholder irrigation as an example. Findings show that a distinction between ‘incremental’ and ‘systematic’ change (Doolittle 1984) is central to understanding the gender dynamics of landesque capital investment, but it is not sufficient. As women’s work processes are typically not systematic, possibly promoting incremental change, they contribute to the
production of landesque capital by supporting and facilitating men’s work. However, the work of women is, as a rule, homogenized and stereotypically rendered as reproductive and secondary, due to the underlying cultural norms that limit, control or exploit women. This conceptualization, or rather lack of, I argue, risks leading to a gender-blind analysis of land use intensification processes. Building on the gendered and symbolic nature of landesque capital, I propose a local gender contract analysis that integrates the cultural, symbolic and physical dimensions of the local gender division of labor into agricultural work and landscape change processes.

**Keywords:** Kenya, Tanzania, landesque capital, local gender contract, smallholder irrigation farming
Introduction

Women are typically described as the backbone of smallholder agriculture in Africa, with about 50% of the agricultural workforce being women involved in crop production, animal rearing and small income-generating activities (FAO 2011). While women are in many cases considered as the ‘owners’ of the crops, men are associated with control of the land (Goheen 1996). Consequently, physical investments in agricultural landscapes or ‘landesque capital’, such as the building of irrigation canals, will in many cases be a predominantly male task. Hence, even if women’s roles as food producers and holders of agricultural knowledge and skills are widely recognized (Agarwal 2011; FAO 2011), their contributions to investment in land productivity have received less attention (Bayliss-Smith 2014; Zwartveen 2008; Chancellor 2005; Sheridan 2002).

Landesque capital, defined by Blaikie and Brookfield (1987, 9) as ‘any investment in land with an anticipated life well beyond that of the present
crop, or crop cycle’, is formed through inputs of labor and is thus the
result of labor organization through local social structures. As argued in a
recent book, analysis of landesque capital formation deepens
understandings of the societal dimensions of agricultural landscape
dynamics (Håkansson and Widgren 2014). As opposed to the current
neoliberal focus of economics and ecology assessing the value of natural
capital (see Bayliss Smith 2014), in the study of landesque capital emphasis has been put on how labor is mobilized by individuals and
through social organization and economic relations (Håkansson and
Only a few studies have focused on the impact of gendered labor tasks
on the formation of landesque capital (Östberg 2014; Bayliss-Smith
2009; Watson 2009; Sheridan 2002; Adams 1997). While previous
accounts of landesque capital formation are not entirely gender blind,
there is an obvious risk that the comparably scarce accounts of gender
dimensions of landesque capital formation make women and women’s
work less visible and thus peripheral to analysis of landesque capital
dynamics, as landscape investments are typically associated with men’s work. Such partial analysis is due to the fact that women’s agricultural labor – that is, skills that allow them to produce outputs – has often been conceptualized as unpaid reproductive labor (Peterman et al. 2010; Whatmore 1991). Accordingly, as women’s tasks are not (to the same extent as men’s work) commercialized (i.e. monetarily rewarded) or associated with the generation of surplus value, they have often been considered unproductive (Kandiyoti 1990). Yet ‘rural women’s workday, not only spans, but integrates agricultural fieldwork, transformation work [i.e. pounding millet, threshing rice, etc.] and childcare in logistically complex arrangements’ (Bryceson 1995, 210–11). Moreover, emblematic manifestations of landesque capital, such as irrigation systems, are indeed often associated with masculinity. Water management and masculinities often go together, regardless of whether they are articulated as farming skills or engineering projects (Zwarteveen 2008; Chancellor 2005; Joshi 2005). In fact, formal and informal institutions governing water are almost solely controlled by men (Asaba
et al. 2014; Casarotto and Kappel 2014; Zwarteveen and Boelens 2006; Watson et al. 1998). Departing from this stark reality and highlighting the need for attentiveness to local social contexts, the term ‘hydropatriarchy’ has been coined by Zwarteveen (2008, 127) as ‘social systems that create a certain gender structure which brings about a particular configuration of water control [where] water power and politics are often connoted as masculine’.

Previous analyses of gender and landesque capital have employed an analysis of gender division of labor to distinguish between men’s and women’s contributions to land use intensification processes (Östberg 2014; Bayliss-Smith 2009; Sheridan 2002; Watson et al. 1998; Adams et al. 1997). The inclusion of women’s work, knowledge and skills in rural research has long been called for, yet without ‘understanding of why women were excluded from most studies in the first place’ (Feldman and Welsh 1995, 31), gender division of labor does not incorporate an analysis of agricultural production as a socially constructed process.
More commonly, analyses of gender division of labor imply a productive/reproductive divide between men and women and uniformly endow women with the unpaid role of caregivers and homemakers (Chafetz 1988). This analytical focus is, therefore, limited, as it does not explicitly engage with the process of how gender is reproduced and negotiated in the local context.

In this paper I investigate the role played by cultural norms in shaping gender division of labor and how this in turn is materialized into processes of landesque capital formation. Analytically, I use the concept of the gender contract, which refers to how production and reproduction are organized according to the existing gender regime (Hirdman 1990), which is manifested in three societal levels. Hirdman develops her analysis drawing on Habermas’ concept of ‘lifeworld’ (1984). Departing from a gender focus, Hirdman defines

1. the ‘cultural overlay’, which comprises all the metaphysical images that allow for the division of genders, for example, women’s impurity;
2. ‘social integration’, which is the concrete societal expression of the cultural overlay, such as the gender division of labor, for instance, that women cannot irrigate because they are impure;

3. ‘socialization’, which refers to how the previous two levels are manifested at the personal level (Hirdman 1990). For example, as women cannot irrigate because they are considered impure, they are not taught how to break a canal.

This article’s analysis employs a geographical conceptualization of gender contract that contributes to a spatially and culturally specific understanding of gender division of labor and its local material context, hence providing critical information on the local social context of hydropatriarchy. In fact, a gender contract is grounded in local everyday practices, which vary considerably from community to community or even within the same community, depending on their material and environmental preconditions (Forsberg 2010). The most crucial element of a gender contract is the process of negotiation, which implies change
in the relations between genders (Hirdman 1990). This aspect is relevant to this study because these negotiations are reflected in the utilization of space and finally in the physical landscape produced. Landscape, in fact, contains numerous physical indications about past, current and even future productivity investments and therefore encompasses ongoing societal changes (Mitchell 2008). Negotiations between genders are part of an incremental process of small modifications in local, specific agricultural practices whose transformative potential spreads itself from the household (i.e. socialization such as sharing of domestic chores between partners) to the community level (i.e. social integration such as gender division of labor) and may eventually materialize in a renegotiation of the local gender contract. Gender contract theory is indeed concerned with understanding the underlying conditions for the local processes of gender division of labor. As a consequence, it can illustrate the position of each gender in relation to those labor arrangements, whether egalitarian or subordinate (Hirdman 1990), and it
can illuminate the dynamics of change and negotiation of hydropatriarchies, which are not mere static masculine constructs.

Data were gathered in two villages, one in western Kenya (Marakwet/Sibou) and one in northern Tanzania (Engaruka).

These two gravitational irrigation schemes are based on very similar forms of landesque capital investments, while the local gender contracts that structure men’s and women’s agricultural work differ clearly between the two locations. By linking processes of landesque capital formation to an analysis of the local gender contracts of these two smallholder irrigation systems, this study highlights the importance of conceptualizing landesque capital as part of gendered work processes even in hydropatriarchies where women’s work may seem to be marginal to the processes of landesque capital formation.

Previous literature has shown that gender division of labor allows for the exploitation of women to create landesque capital (Bayliss-Smith 2009) or for their exclusion from work aimed at landesque capital investments.
based on cultural/symbolic factors that restrict women from accessing
natural resources such as water (Östberg 2014; Sheridan 2002; Adams et al. 1997). In addition, literature on gender labor division in East African smallholder irrigation agriculture (e.g. Watson 2009; Bryceson 1995; Boserup et al. 1970) highlights women’s function in seasonal agricultural labor: sowing, hoeing with the short-handled hoe, weeding. These activities guarantee the maintenance of agricultural productivity, but are not directly associated with investments in landesque capital. Moreover, the distinction between two temporal dimensions of change – ‘systematic’ and ‘incremental’ – has been proposed, with important implications for landesque capital (Börjeson 2014; Doolittle 1984). A systematic change of a farming system is a work process that, like the construction of an irrigation canal, requires organized labor to be carried out before cultivation. Incremental change, on the other hand, refers to processes where seasonal cultivation practices and the formation of landesque capital are intertwined, such as in the gradual formation of a terraced field or improved soil quality.
The three elements of landesque capital – its symbolic, functional and
temporal aspects – frame the analysis of local gender contracts in
smallholder irrigation farming. To investigate the role played by cultural
norms in shaping gender division of labor and how this in turn is
materialized into processes of landesque capital formation, I (1) examine
whether and how existing cultural norms allow for the exploitation of
women’s work or limit women’s possibility of benefitting from
landesque capital, (2) consider the nature of women’s agricultural work,
and (3) investigate how women effectively contribute to the formation
and the maintenance of landesque capital.

Methods

The analysis is based on qualitative data gathered through observation,
11 gender- and age-segregated focus groups – each with 8 participants on
average – and 43 in-depth interviews during three fieldwork sessions for
a total of five months between May 2011 and February 2013. All
interviewees and participants, equally divided between men and women,
were active farmers between the ages of 20 and 60. Methodological
choices were guided by feminist epistemology, particularly in relation to the importance given to open interpersonal relationships between researcher, assistants/interpreters and participants (see Caretta forthcoming). Member checking (Cho & Trent 2006) was used in the form of a pamphlet with pictures and brief explanations in Swahili and the local language of Marakwet. In this way findings were taken back to participants, who were asked to check and comment upon the possible erroneous understanding of the researcher. Landscape was also incorporated into the methodology of this study: interviews were carried out in the ‘taskscape’ (Ingold 2000, 198) – the landscape of daily practices – by using the surrounding physical features as an ‘artifact’ to build a common understanding between researcher and researched and to check in a participatory fashion people’s accounts (Årlin et al. forthcoming).

Interviews were recorded and transcribed with the help of assistants. Data were coded and analyzed, intersecting the systematic and
incremental dimensions of landesque capital with the three building
blocks of gender contract analysis.

Case studies: Sibou and Engaruka

Sibou has a population of 2453 (KNBS 2009) and is located on the
escarpment of the Keryo Valley, Kenya, between 1000 and 1600 m.a.l.s.

Engaruka, on the other hand, located in Monduli district, Tanzania, east
of Ngorongoro crater at an altitude of 1000 m.a.s.l., has a total
population of 7291 (NBS 2002).

These two locations are part of the ‘complex of the East Africa hill
furrow’ (Tagseth 2008, 10) and have been defined as ‘islands of
intensive agriculture’ as smallholder irrigation has allowed for intensive
farming in drylands (Widgren and Sutton 2004).
The case studies share essentially the same type of landesque capital: a well-developed, functioning, old smallholder irrigation system. In Sibou, the system, whose existence British explorer Joseph Thomson (1887) first witnessed in 1883, runs mostly on the steep escarpment. Before the
advent of cement in the 1980s, water was retained and directed through canals made of wooden sticks. Subsequently, cement was used to construct canals and the intake, which is located on a vertical cliff. Canals in the plain are a combination of furrows that are maintained and dug again year after year and gullies that have developed thanks to the flow of water.

The present Engaruka developed during the 19th century and features a hill-furrow irrigation system located lower on the plain, as opposed to the terraces of the ancient fields (Westerberg et al. 2010). Canals depart from the Engaruka River in different points of the plain; dug into the sandy soil and strengthened on their banks by boulders, they are kept in position every year at the beginning of the rainy season.

In both systems the canals upstream are permanent, built of cement in Sibou and boulders in Engaruka; the further downstream the water is channeled, the more the canals turn into furrows that are used only during the rainy season (April–September) and need to be restored every
Irrigation is carried out by either breaking a hole in the canal or temporarily removing or shifting sluice gates made of rocks, grass and tree branches. The seasonal use of furrows implies a flexible exploitation of field systems that are extended whenever the rainy season allows their cultivation and then are abandoned during the dry season (November–February). In this sense, these smallholder autochthonous irrigation schemes permit permanent – upstream – and shifting – downstream – cultivation.

**Landesque capital under different and changing gender contracts**

*Sibou: ‘furrow makers’ turned into cash crop cultivators*

In Sibou four patrilineal clans all belonging to the Marakwet, of the Kalenjin ethnic group, have equal access and rights over one irrigation canal each and a portion of the village. Each clan determines the allocation and the timing of irrigation through a water management group, whose members are all men. In fact, it is a cultural taboo for women to irrigate by themselves. This is certainly the most defining
characteristic of the local gender contract in Sibou. Interviewees reported that if a woman entered a canal to wash clothes or bathe or broke a canal to lead water to her field, the canal would dry out, and she would need to undergo a cleansing ceremony carried out by male elders to get rid of the spell that was cast on her (see also Östberg 2014). This taboo is particularly problematic for female heads of households. If there are no male relatives or sons who can assist them, they have to pay a man to break the canal. In order to afford this service, these women are forced to sell a goat or to pull resources from alternative livelihoods such as petty trading or local daily contract farming arrangements. Otherwise, male relatives or sons will make sure that women are allocated their time slots to irrigate. Men participate in the water management group meetings on behalf of these women and subsequently irrigate for them (see also Caretta and Börjeson. 2014; Östberg 2014).

In Sibou, gendered investments in landesque capital are inevitably defined by women being barred from autonomous irrigation.
Consequently, men are in charge of the construction, reparation and maintenance of the canals. They usually work together and conclude their task in a limited amount of time. Women, on the other hand, meet together seasonally to sow, weed and harvest. Additionally, when men break the canal or remove the sluice gates to irrigate, women are most often in charge of spreading the water around the plot while plowing the soil. Group work facilitates processes of local knowledge sharing: by working together, men learn how to halt soil erosion, while women have a vast knowledge of seeds, which they exchange together with recommendations on timing of planting (Caretta and Börjeson 2014).

The seasonal calendar in Sibou is punctuated by long (April–June) and short rains (October–November). Preparation for cultivation, consisting of clearing canals and fields and fencing, takes place between February and March and is mostly a men’s task. Nonetheless, women facilitate and complement the work of men. Reparation and construction of canals would not be possible if women did not carry cement on their backs. In
the past they walked up the escarpment bending under the weight of grass and sand – which they had the role of mixing – and wood. Cement nowadays, like grass and sand in the past, allows water not to infiltrate and be wasted, but rather to flow downslope to irrigate all plots. These findings show that even though women’s tasks are normally believed to be seasonal, they are actually crucial in facilitating the formation of landesque capital features. Moreover, by continuously carrying out work in the fields, women are often the first ones to notice the breakage of a canal. Therefore, they do have a role in the maintenance of the irrigation systems. Even though men identify with the role of ‘furrows makers’, this work would not be possible without the material help of women. Women literally bear the weight of canal maintenance and act also as guardians of the irrigation system’s operation.

Yet, the local gender division of labor is presented by interviewees as quite strict and defined: men do the hard systematic work and women take care of the plots. Men in fact are quite adamant that women cannot
carry out heavy tasks, judged to be naturally suited to men. Still, women readily perform strenuous tasks as hoeing millet, weeding and harvesting. Women sow and plant in March and April. Between May and August they weed with their short-handled hoes, while men irrigate. Harvest of short-term crops such as sorghum and millet is done in July by women, while all other staple crops, that is, cassava, maize and long-term millet, are harvested in August and September. Short-term crops like green gram and groundnut are planted to take advantage of the short December rains. Women carry out weeding and also harvesting of these crops, which are sold by their husbands. Between December and March women assist men in maintaining and repairing the irrigation system and in fencing and clearing new fields.

Finally, while men have been mostly involved with decision-making and activities related to the phase prior to cultivation – systematic change – women have been engaged mostly with crop management and the maintenance of land productivity – incremental change. However, major
changes in the local societal structure have taken place in the last decades that have triggered a process whereby some families have shifted from a local resource contract, based mainly on herding and subsistence agriculture, to a household income contract, which also includes cash cropping (Caretta and Börjeson 2014). The two factors that reshaped the local gender contract are the payment of school fees and the introduction of cash crops. Short-term cash crops such as green gram, cowpeas, tomatoes and watermelon that do not require a lot of rain are planted in October and harvested in December and January. While men and women collaborate in sowing and harvesting green gram and cowpeas and in the harvest of mangoes in February, tomatoes and watermelon are strictly a men’s venture. Until recent decades women were prohibited from climbing trees to pick mangoes, but the growing importance of this fruit for the local economy prompted men’s reshaping of the local working arrangements. In this way men could use the help of women to maximize the production and harvesting of cash crops. These crops, introduced from the mid-1980s onwards, are produced only for sale to retailers
coming from the closest town of Eldoret. Cash cropping has increased men’s involvement in cultivation, which has resulted in an engagement with seasonal practices. These new cash crops are labor intensive and have added an extra burden on women: before the mid-1980s they had to sow, weed and harvest food crops, but in the last three decades they have also begun performing those practices on cash crops that are sold by their husbands, who often use part of the profit for amusement purposes (cf. Bryceson 1995). These new work dynamics have modified the local gender contract of Sibou. While the current local gender contract might look more equal, because partners share more farming tasks, women actually are in a more subordinate position, as their work burden has increased under the lead of their husbands.

*Engaruka: irrigation farmers in an enduring pastoral gender contract*

In Engaruka water rights are allocated by the water management group according to plots and relative locations. The central figure in this system is the *mgawa maji* or ‘water divider’, who is in charge of avoiding
conflicts by ensuring that every water user respects his/her time slot and does not ‘steal’ water from the neighboring farmer. In principle, women in Engaruka can irrigate by themselves and are members of the water management group. Hence, formally, women and men are in an equal position where water rights are concerned: for example, the important post of *mgawa maji* was occupied by a woman in 2012, and I interviewed her during her work shift.

Women are formally allowed to irrigate, yet during repeated and prolonged field visits I never witnessed a woman irrigating or carrying a hoe, which is the tool needed to break the furrows and spread the water in the plots. Women’s access to resources – water or crops – is not formally hindered; nevertheless, decision-making power and actual productive power – ox ploughs – are in the hands of men. Men are indeed the ones working to repair and extend the irrigation system, the ones discussing when and where to take up new fields and the ones having the ox power to till the soil and increase yields. While the use of
oxen for plowing and herding are exclusively men’s tasks, women use the short-handle hoe and are therefore equally involved in the management – that is, the hoeing, weeding and harvesting – of the three main staple crops, maize, beans and bananas. On the other hand contour bunding, promoted by the government and agricultural NGOs, is only done by men. This practice allows for water and soil retention and has become the norm in Engaruka, where, if a farmer’s plot does not have contours, he is not allowed to irrigate. Thus, most of the landscape investments geared towards the improvement or maintenance of land productivity appear to be the manifestation of the local hegemonic masculinity.

While women formally are allowed to irrigate and are not impeded from participating in the work of repairing the furrows, such tasks are customarily carried out by men. When men are occupied with cleaning and digging the canals, women are cooking and bringing food and drinks to the men. Hence, women do not have a primary role in the actual
construction or repair of the irrigation system, but they facilitate these tasks through their reproductive tasks. A considerable amount of women’s time each day is indeed spent in long strenuous walks to fetch several 20 L jugs or hundreds of kilos of fuel wood which they carry on their backs and on their donkeys’ backs. Without these vital provisions, men could not accomplish their daily tasks, let alone clean or dig canals. Consequently, without women’s continual reproductive contributions in facilitating the work of men, such enduring landscape features would not materialize (see also Asaba et al. 2014; Zwartveen and Boelens 2006; Chancellor 2005; Joshi 2005).

In times of cultivation women sow maize and beans and bend with their hoes to weed. They dig the soil after harvesting, producing greenery, roots and stumps as mulch to mix them with the irrigated soil. In this way they aerate the ground and reintegrate the nutrients present in the organic matter and in water: these are all substantial inputs to the improvement of soil fertility. Moreover, their primary role in harvesting
and carrying crops home on their backs is the physical manifestation of their practical role as bearers of food security and their subordinate position in the local hydropatriarchal system.

Interviewees typically mentioned a past distinct gender division of labor whereby women carried out cultivation, while their husbands and sons were out and about with the cattle. The 1976 villagization program forced Maasai to settle in Engaruka, fostering more extensive cultivation (Sutton 2004). This shift resulted in the renegotiation of the gender contract, and especially in women assuming mostly a subordinate role to their husbands. It is common for male farmers to assert that they are the ones doing everything and, only when asked, mention that their wives are helping them.

Hence, while women are formally granted access to all natural resources, men control agricultural production by delegating women to their tasks, as male interviewees emphasize. Whereas these assertive statements might historically have been influenced by the patriarchal notions
introduced during colonial times (Hodgson 2004), women are not shaping the local gender contract. In fact, their life course, characterized by lack of schooling and child marriage, is solely decided by their fathers. These circumstances contribute to women’s lack of self-confidence and their fear of men, which hinders their capability of express themselves in mixed focus groups and which makes them doubt their own agricultural knowledge, when interviewed individually. These circumstances are clear expressions of the dominant gender contract, which is grounded on the patriarchal and polygamist notion that the husband is the main provider and the sole decision-maker (see also Roth and Ngugi 2005; Hodgson 2004).

Women cannot count on the same formal leverage as men, yet they do nevertheless pragmatically support their families: they farm, and also they sell their produce at the local market. Women in fact are the majority of petty traders during the popular Tuesday market in Engaruka. They sell kitchenwares, Maasai beads, blankets and agricultural
products, which they either produce themselves (milk, tomatoes, onions, bananas) or they buy (tea, tobacco, sugar and beans from the highlands) from nearby towns and markets and retail in small quantities. Additionally, they sell fuel wood, which they collect in groups in the surrounding highlands. The fact that the women of Engaruka operate autonomously in the local market is yet again not the outcome of their agency, but rather a manifestation of men’s homosociality. Men delegate the sale of agricultural produce to women, while they contemporarily trade goats, a much more valuable item in the local economy (cf. Chancellor 2005).

These findings show that women’s contribution to the formation of landesque capital in Engaruka, while potentially and formally equal to that of men, is even more invisible than that of women of Sibou. On one hand, women in Sibou are formally excluded from irrigating: the rules defining the local gender contract are apparent. Nevertheless, they do shape the local gender contract by being responsible for food crops and
participating in the formation of landesque capital. On the other hand, in
Engaruka, according to the formal irrigation rules, women can fully
partake in landscape investments and negotiate the local gender contract.
However, in reality such is not the case, as the local gender contract is
grounded in underlying, customary patriarchal norms that relegate
women in general to a secondary and dependent capacity that excludes
them from determining working arrangements in any way.
Discussion

Fig. 2 Summary of findings
As Figure 1 shows, findings are discussed according to three categories – symbolic, functional and temporal – based on the analysis of landesque capital suggested by previous literature. These three categories mirror the three levels of societal structure that shape local gender contracts (Hirdman 1990). At a symbolic level landesque capital is part of the cultural overlay; at a functional level the prevailing gender division of labor is an expression of the social integration; and finally, at the temporal level both incremental and systematic processes of landesque capital formation are the manifestations of the socialization of gender divisions in the local society.

Symbolic landesque capital

In the study of landesque capital, four studies have hinted at the symbolic dimensions that lie behind its formation.

Bayliss-Smith (2009), in his study of ditches in New Guinea, provided two hypotheses for the gender rationale behind their construction. In the first, he suggested that ditches were the product of coercive labor
relations, among which he referred to the subordinate position of women who were exploited by the local patriarchal regime. In the second, he suggested that ditches were the physical manifestation of symbolic capital. Land drainage endowed the male farmers with ownership rights over communal wetlands, with ditches constituting a form of symbolic capital that could be used to mobilize labor. As men were the ones spearheading these processes of land improvement, they controlled the land; women were bound to join men’s projects and exchange their work capacity in order to farm and have access to natural resources (Bayliss-Smith 2009).

Sheridan (2002), in a study of North Pare in Tanzania, reported that women could not irrigate because canals represented a symbol of men’s control over the landscape. Accordingly, men’s control over women’s bodies mirrored their control over irrigation, as men were solely in charge of releasing the water from the canal: a typical example of hydropatriarchy.
Watson (2009), in her study of Konso, Ethiopia, presented the figure of the *pogalla*, who embodied gender symbolisms and control over land. In fact, this ‘clan leader’ lent out land to farmers who constructed terraces and worked them for him. At the same time, he performed rites where maleness and femaleness were intertwined in the form of phallic symbols and the metaphor of breastfeeding to ensure the fertility of the land. Hence, his ritual power enabled him to combine powerful male and female symbols to ensure the continued productivity of the land.

Östberg (2014), drawing on his 1970s material on Marakwet, also discusses gender and symbolic dimensions of landesque capital. When Marakwet say “whoever has a canal has a wife” (Östberg 2014, 206) they use a metaphor which indicates that relationships involving irrigated fields and wives are “the same” in that they both create relationships. Nevertheless, he added that “by excluding women from managing the irrigation canals, men monopolize control over the production process” (Östberg 2014, 205) and argued that gender relations are far from equal.
Östberg’s findings are confirmed in this study: prohibiting women from breaking canals in Sibou jeopardizes their livelihood and causes their economic marginalization. In Engaruka women can irrigate by themselves and can participate in the water management group, but these are only formal concessions. In reality, women in Engaruka do not use the big hoes, and so they cannot clear and dig the canals. Moreover, by claiming that the work of repair is too strenuous for women and that irrigating during the night is dangerous, men concretely exclude them from decisional and practical routines concerning the irrigation system (cf. Zwartveen and Boelens 2006).

Engaruka and Sibou emerge as two hydropatriarchal systems, given the symbolic dimension of landesque capital. As in the case of New Guinea (Bayliss-Smith 2009), men organize and carry out land improvements, which grant them the authority to manage water rights and consequently – formally or informally – to disregard women’s shared participation (see also Zwartveen and Boelens 2006; Joshi 2005). This symbolic
dimension is evident in Sibou, where discourses of women’s impurity spoiling the water and of men’s ownership of the canals are predominant.

*Functional processes of landesque capital formation*

Informed by the concept of gender contract (Hirdman 1990) I argue that division of labor, and consequently processes of landesque capital formation, are not gender neutral, but rather are defined by unequal gender relations. Gender division of labor illuminates the work functions determining local hydropatriarchies: as women cannot irrigate or repair and build irrigation canals, they are consigned to what are considered supporting tasks. On the contrary, women have a fundamental function in carrying heavy materials up the slopes of Sibou and in cooking and bringing food to men in Engaruka. Women’s subordinated and facilitating role is considered irrelevant when reported by male interviewees – omissions that are the clear testimony to men’s homosociality. Men have women helping them because it does not undermine their status; quite the contrary, it makes their tasks less
strenuous and reinforces their position as decision-makers within the local community. Hence, women in Sibou are not excluded from the production process – of crops, for instance (see next section): their involvement in systematic landesque capital formation is only concealed by men. Therefore, canals are the physical expression of these two hydropatriachies because they employ women’s workforce to ease their tasks, yet they do not acknowledge women’s productive contributions.

The employment of the concept of local gender contract in this case allows for a deeper articulation at the cultural and symbolic level of the local gender division of labor. As the analytical focus of local gender contract is on daily practices, and how they are determined by cultural premise, women’s contributions to productive investments in agricultural landscapes emerge. In fact, the gender contract is about relationships between men and their status. Local contracts are negotiated in order to have women carrying out tasks that do not impinge on men’s status and their homosocial structure. By shaping dichotomized societal
arrangements whereby women and men have different roles, men are in a dominating position from which they can control gender structures and thus reify women’s subordinate condition (Hirdman 1990). Although these two hydropatriarchal systems are characterized by similar gravitational flow schemes and agricultural practices, they are built on different cultural premises that nevertheless feature women in a subordinate condition. In fact, the negotiation of the local gender contract in Sibou has led to an increased work burden for women, and women in Engaruka cannot negotiate the local gender contract due to men’s overbearing patriarchal position. Hence, in both cases women’s function in the production of landscape is deemed supportive, as their tasks are defined by men’s homosociality.

Temporal landesque capital formation processes

Previous studies of landesque capital formation in smallholder irrigation systems (e.g. Håkansson and Widgren 2007, 2014; Östberg 2004; Watson et al. 1998; Adams et al. 1997) have been explicitly concerned
with the tangible features of landesque capital, that is, the irrigation canals. In these studies, the process of landesque capital formation is manifested and reinforced through the visibility of the systematic and enduring landesque capital investments that are made by men: construction, repair and extension of the canal system.

Another type of landesque capital is anthropogenically and incrementally improved soil fertility, which has received less scholarly attention (see Börjeson 2014), because slow continuous processes that enhance soil fertility are much more difficult to grasp, measure and observe compared to, for example, the construction of a canal. In fact, this type of inconspicuous landesque capital could be conceptualized as the result of both biophysical processes and human labor processes (Borjeson 2014). Because of the inconspicuousness of these investments, which are often provided by women (Gladwin 2002), and their seasonality and the alleged reproductive nature of women’s labor, studies have tended to
focus on the systematic nature of landesque capital (e.g. Håkansson and Widgren 2007; Östberg 2004; Watson et al. 1998; Adams et al. 1997).

Findings, however, show that one should be cautious about making a simplistic distinction between women’s incremental seasonal work and men’s systematic work. While this distinction is important as a gendered process, there is a risk that women’s support and engagement in systematic work, for example, carrying cement or facilitating men’s labor through reproductive tasks, are overlooked. Women engage in these works of repair, construction and maintenance of canals and fences during the months when cultivation is not ongoing; hence, their work cannot be considered only seasonal, even if their main workload is linked to seasonal work. On the other hand, men’s labor is not only systematic. Both in Engaruka and in Sibou, for different reasons, they do increasingly engage in agriculture, and thus, in seasonal activities.

There is nevertheless a crucial difference in the mode of agricultural production. In Engaruka men use the ox plow, while women can only
avail themselves of their body strength to farm with the short-handled hoe. As for the Betis of southern Cameroon, ‘male labor is [still] symbolically vertical in movement . . . , [while] women’s work is [still] dominated by the symbolism of bending: over the short-handled hoe, the cooking fire, the grinding stone’ (cf. Guyer 1988, 249). In such vertical and bending agriculture a parallelism with Sibou can be drawn. There too the use of the short-handled hoe is nowadays solely a female prerogative, while pictures from the 1940s show men also holding that tool (Henning 1941). The local patriarchal gender contract gave men the upper hand in the adoption of the long-handled hoe, which is a labor-saving tool. Thus, men in both communities perform incremental tasks, but they do this on very different terms than women (cf. Watson 2009; Chancellor 2005). Men tend to work standing, either behind the ox plow or using the hoe to irrigate, while women work with the short-handled hoe for planting millet, and bend to weed and sow. This vertical vs. bending characterization of agricultural production is a bodily representation of men’s homosociality in the two hydropatriarchies that are analyzed here.
Moreover, because men use the long-handled hoe, they are the natural proprietors of systematic tasks. Digging and cleaning canals are done with the long-handled hoe and would be extremely time- and labor-demanding, if these jobs were to be carried out using women’s tools.

Accordingly, women are not only symbolically and culturally excluded from systematic work, but most importantly, materially. As in other irrigation systems around the world, men are in charge of construction work – which is in some cases monetarily rewarded – while ‘voluntary tasks’ are left to women (Zwarteveen and Boelens 2006; Joshi 2005).
Fig. 3 Sibou: A man irrigating with a long-handled hoe and a woman harvesting millet with the short-handled hoe. (Caretta 2011, 2013)

Conclusion

By employing the concept of gender contract and departing from previous literature (e.g. Bayliss-Smith 2009; Östberg 2014; Sheridan 2002; Doolittle 2004; Adams et al. 1997), I analyzed three dimensions of work processes in landesque capital formation – (1) symbolic significance, (2) functional character (supporting or principal) and (3) temporal character (systematic or incremental). First, I examined whether and how existing cultural norms allow for the exploitation of women’s work or limit their opportunity to benefit from landesque capital. Secondly, I considered the nature of women’s agricultural work, and finally, I investigated how women effectively contribute to the formation and the maintenance of landesque capital.

Findings show that cultural taboos and customs, which in Sibou connect women with impurity and in Engaruka deny women agency, prohibit and
concretely limit women’s engagement in practical and decision-making routines related to irrigation. Dictated by these taboos, women’s functions have erroneously been considered mostly reproductive and thus deemed to be of a supportive nature in relation to men’s work. Men exploit women’s labor by having them carry material, and cook and bring food to the construction site. Those tasks are concrete forms of support for men’s work; yet men consistently downplay women’s labor as mere reproductive work. Such work arrangements are the effect of men’s homosociality – men’s status is not impinged, but their work burden is effectively reduced – and the practical rendering of hydropatriarchy.

The recent uptake of cash cropping in Sibou has brought about a negotiation of the local gender contract, yielding a bigger workload for women, as they are now also in charge of the cultivation of green gram and cowpeas and regularly help their husbands with the harvest of mangoes. Likewise in Engaruka, women diversify their income and
support their families with limited sales of small amounts of agricultural produce. Their engagement in the local market has put on them an extra pressure to secure their families’ wellbeing, while their husbands trade goats, a much more valuable item in the enduring pastoralist local gender contract.

While previous studies of irrigation systems have focused on systematic landesque capital investments (e.g. Håkansson and Widgren 2007; Östberg 2004; Watson et al. 1998; Adams et al. 1997), this study points to the importance of including incremental landesque capital formation processes in the analysis. Findings show that a clear correlation between women/incremental vs. men/systematic work cannot be explicitly drawn. Men are primarily in charge of systematic tasks because they exercise control over resources, decision-making and tools, which inherently endows them with the function of digging and clearing canals. Yet, these tasks would not be practicable without the material help of women, who are not only concerned with crops and seasonal activities, but also with
systematic changes, even though their contributions are not acknowledged by men. At the same time, both men and women contribute to incremental and seasonal processes of change in the landscape, as crop and soil management have the potential to improve and maintain land productivity. Finally, the employment of local gender contract in our analysis brought forward the informal nature of irrigation management against the gender exclusionary discourse of the formal rules. Hence, studies focusing on processes of investments in land productivity should not omit gendered practices from their analysis, as they risk taking as the benchmark men’s daily practices and living conditions (Kleinmann 2007). In fact, the study of landscape as the expression of the local gender division of labor, through the analysis of the local gender contract, provides evidence for gender-inclusive agricultural policies, reversing the widespread notion that irrigation is a male activity, which risks excluding women as potential stakeholders in the effort of organizing water users.

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