

LABOUR AND LANDSCAPES: THE POLITICAL ECONOMY OF LANDESQUE CAPITAL IN NINETEENTH CENTURY TANGANYIKA

by

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ABSTRACT. In a long-term and global perspective irrigated and terraced landscapes, landesque capital, have often been assumed to be closely associated with hierarchical political systems. However, research is accumulating that shows how kinship-based societies (including small chiefdoms) have also been responsible for constructing landesque capital without population pressure. We examine the political economy of landesque capital through the intersections of decentralized politics and regional economies. A crucial question guiding our research is why some kinship-based societies chose to invest their labour in landesque capital while others did not. Our analysis is based on a detailed examination of four relatively densely populated communities in late pre-colonial and early colonial Tanzania. By analysing labour processes as contingent and separate from political types of generalized economic systems over time we can identify the causal factors that direct labour and thus landscape formation as a process. The general conclusion of our investigation is that landesque investments occurred in cases where agriculture was the main source of long-term wealth flow irrespective of whether or not hierarchical political systems were present. However, while this factor may be a necessary condition it is not a sufficient cause. In the cases we examined, the configurations of world-systems connections and local social and economic circumstances combined to either produce investments in landesque capital or to pursue short-term strategies of extraction.

Key words: political-ecology, Tanzania, pre-colonial, landesque capital, exchange

Introduction

Landscapes are the products of past human labour. Nowhere is this more evident than among the irrigated and/or terraced agricultural landscapes of the world. These capital-intensive human-made environments have a long history of human investments in land. To borrow the wordings of Fisher and Feinman (2005, p. 64), such landesque capital allows 'labor to be environmentally banked through stone walls, terraces, drainage and irrigation systems, raised fields, or other landscape infrastructure'.¹ In this paper we explore the relations between labour and such capital-intensive landscapes. Specifically, we examine the social and economic conditions

that govern whether or not labour is invested in the land.²

Within a long-term and global framework, irrigated and terraced landscapes have often been assumed to be closely associated with hierarchical political systems (see e.g. Wittfogel 1957; Earle 1997; Kirch and Green 2001, p. 131). However, accumulating historical and archaeological research is demonstrating that kinship-based societies (including small chiefdoms) have also been responsible for constructing landesque capital without population pressure.³ For example, labour-intensive and highly productive systems of agriculture existed in the Amazon (Hornborg 2001), New Guinea (Blanton and Taylor 1995), Africa (Håkansson 1995; Widgren 2004), and North America (Doolittle 1992, 2000). While chiefdoms and states may well need investments in land for their accumulative strategies, the opposite chain of explanation cannot be sustained. Evidence is emerging which demonstrates that landesque capital does not need stratification to be developed (Widgren 2007). Hence, rather than focusing on political or economic hierarchies, we examine the political economy of landesque capital through the intersections of decentralized politics and regional economies.

Landscapes have a 'nested political ecology' (Batterbury 2001, p. 440; Robbins 2004, pp. 72–74) in that it is the different forms of political and economic circumstances at particular junctures of history and at different spatial scales that provide the incentive structures for how labour is used on the land. This perspective employs a chain of explanation that begins at local level and proceeds to the conjunctures of causation at progressively wider levels of interaction rather than assuming invariant relationships between political forms and land use. While a significant amount of research in political ecology has been concerned with unravelling the chains of causation behind land degradation⁴ (Robbins 2004, p. 131), much less work has been

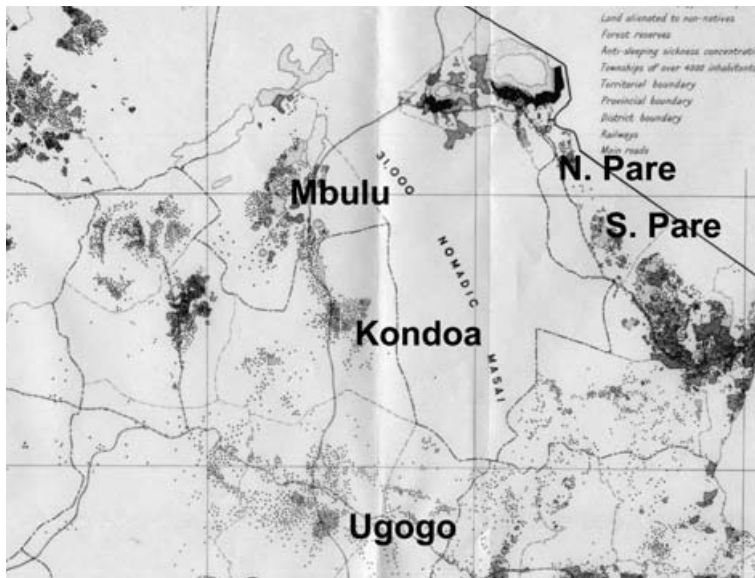


Fig. 1. Investigated areas in North-eastern Tanzania. Background: population map of Tanzania 1934. Source: Gillman 1936.

done on the factors that contribute to the building and maintenance of a highly productive landscape. Thus, instead of focusing on marginalization and degradation, we ask the question why some societies choose to invest their labour in landesque capital.

In East Africa, the contrasting physical landscapes of green and humid highlands surrounded by dry steppes and savannas appear to have set inevitable economic destinies for the communities that inhabited these diverse environments. However, in both dry and wet habitats the degree to which landesque capital and sustainable land use was maintained was strongly influenced by political-economic factors (Håkansson 1989, 1995, 2003; Widgren 2004). Pre-colonial and early colonial East Africa showed a plethora of different farming systems with varying intensity of labour input, from the banana-based agriculture in the well-watered highlands to extensive grain cultivation on the savannah.⁵ But there were also many intermediate forms of agrarian communities practising more permanent forms of agriculture. This is clearly illustrated in the 1934 population map of Tanganyika, where areas of intensive farming appear as islands of dense populations, separated by more sparsely inhabited savannah environments (Fig. 1; see also Widgren 2004). Although these population concentrations were, or are, similar in that they practised a rather intensive form of permanent agriculture, they differ in the degree to which they

have invested in the land in the form of terraces, irrigation, and other soil-and-water-conservation measures.

Our analysis is based on a detailed examination of four relatively densely populated communities in late pre-colonial and early colonial Tanzania (Fig. 1). At one end of the spectrum of land use are Kondoia and Ugogo, where expansive agriculture and grazing caused soil erosion to such an extent that, in 1973 (Kondoia) and again in 1986 (Ugogo), the Tanzanian government deemed it necessary to enforce strict regulations on land use and evicted all cattle in order to allow regrowth of vegetation. At the other end of the spectrum are areas such as the Mbulu highlands and the Pare hills, where investments in land dating to at least the beginning of the nineteenth century formed part of a long-term strategy for development of agriculture.⁶ Similar variations may be found throughout East Africa as a whole (Widgren 2004, p. 7) and are included where appropriate.

A crucial point underlying our analysis is the degree to which investments in land 'pay off' in different natural environments (Blaikie and Brookfield 1987a, p. 3). It may appear self-evident that with a yearly precipitation of more than 1000mm, the Pare mountains and Mbulu would be more attractive for landesque capital investments than Ugogo and Kondoia, with their highly variable precipitation of 600 to 800mm per year. However, many problems involved in the measurement of the

costs and benefits of soil and water conservation preclude such simple assumptions. According to Scoones *et al.* (1996), much of the extant research refers to large-scale mechanical conservation works. While the evidence from small-scale and incremental conservation works is more anecdotal, it suggests that such investments may in fact yield higher returns in terms of yield and reduced risk in dry and/or previously degraded environments than in more well-watered areas. Scoones *et al.* refer to some case studies in their volume (Hassan 1996; Wedum *et al.* 1996). Simple investments in the land can significantly reduce the risk of harvest failure by improving moisture retention in dry areas and during dry years (Lutz *et al.* 1994). The cases of the northern Nigerian drylands (Mortimore and Adams 1999) and Machakos in Kenya (Tiffen *et al.* 1994) also provide lessons about the positive outcome of investments in drylands. Similar dynamic developments in harsh environments in the past are provided by the case of Baringo (Anderson 1988, 1989).

Political economy and landesque capital

In order to develop new ideas about the relationships between political economy and incentives for investing in landesque capital we have to 'deconstruct' those theoretical models that are based on demographic variables and political-economic hierarchies. The concept of heterarchy has been used by several archaeologists to break with preconceived notions of hierarchical causality in economic, social and political processes (Crumley 1987). Although this notion is vague and has been used in a variety of ways by different authors, it implies that complexity and differentiation may occur without the inclusion of elements into an overarching hierarchical structure of relationships (Brumfiel 1995). A heterarchical view allows us to re-examine the historical material in a new light and to build new theoretical models. While political economy is often equated with class societies by social scientists, we want to stress that societies without class stratification have political economies, although power relationships are not lodged in elaborate institutions and hierarchies, or result in visible monuments and durable concentrations of wealth.

One of the underlying assumptions is that, with the possible exception of some foraging groups, all societies must produce goods that are either exchanged for other items that take on the roles of valuables and prestige goods or else are directly used

in competitive distribution and social occasions. These items are transferred both in order to construct and maintain social relationships (e.g. marriage payments, ritual fees, feasting, ceremonial gifts and compensations for wrongs; and to build political power and advantage) (Sahlins 1972; Gregory 1980). In other words, as the historical and ethnographic record shows, people devote considerable time and energy to producing goods for social, rather than biological, survival and advancement (cf. Hayden 1995). Thus, the key to understanding the relationship between agriculture, land use and political economy lies in the connection between production of food and its use in competitive distribution and in exchange for valuables and prestige goods.

Despite the early insights of the French anthropologist Marcel Mauss ([1923–1924] 1990, pp. 32–33), who recognized that gift-based economies were capable of producing large surpluses that flowed through wide regional exchange networks, many Marxists and non-Marxists alike are locked into a view of production in non-state economies as the result of local subsistence requirements and use values. By default, this inability theoretically to conceive of an exchange-based economy supports a pre-colonial–colonial duality of use values versus commodities that still permeates many anthropological and historical analyses (Sluyter 2002). For example, the pre-colonial economy in Tanzania is regarded by several historians as primarily having been oriented towards subsistence production and use values, and regulated by culturally defined 'spheres of exchange' (Glassman 1995, p. 45; see also Sheriff 1987). We believe that such an opinion is untenable in view of the regional economic systems of East Africa in which large quantities of crops and livestock were produced for social payments, beer and feasting. Neither is it cross-culturally applicable to the many societies where the politics of gift-giving is highly spectacular with competition between leaders and large-scale feasting such as in New Guinea (Blanton and Taylor 1995), and among the Northwest Coast Indians in Canada.

In East African patrilineal societies, such as those under consideration in this article, cattle were (and to a great extent are) essential to social reproduction (Schneider 1979; Håkansson 1994). Without cattle the basic social institutions of families, households and kin-groups could not, and cannot, be formed. Every family had to obtain cattle in order to build new households and to establish vital

networks of kinship and affinity. Hence, cattle were constantly sought after and the objects of control and allocation by elders.⁷ All economic activities were ultimately connected through cattle as the primary prestige good and investment. Agricultural production and land use may therefore be traced to political and economic strategies directed towards access and control of cattle. In East Africa other goods such as goats, iron, glass beads and cloth also entered into exchanges. Productive specializations were not exclusive occupations but represented the ends of a continuum along which members of different communities could move back and forth between full-time farming, pastoralism and foraging (Waller 1985).

Before we proceed, it is necessary to clear up potential confusion that may arise from the anthropological use of concepts such as stratification and hierarchy. Although the societies under discussion did not have institutionalized class divisions and state structures, they were not egalitarian. Kinship-based societies may or may not have institutionalized leadership in the form of chiefs. Chiefdoms had political hierarchies but their political armatures were based on kinship relationships rather than being specialized institutions for governance and economic classes. The presence or absence of such leaders and formal political hierarchies may have had little to do with actual socio-economic stratification. That is, the elite in a chiefdom may have had less power to extract labour and goods from their subjects than would a powerful informal leader, such as a big-man or big-woman, in a segmentary society. Thus we use socio-economic stratification to refer to power inequalities as expressed through the degree to which one group can extract labour and goods from another without material reciprocation and the degree to which such individuals or groups can direct and constrain the behaviour of others.

Incentives and disincentives to landesque investments

The literature on how and why communities and individuals invest labour in durable improvements in land is sparse and usually concerns state-level societies and complex chiefdoms. A selective review of the literature reveals a number of theoretical propositions and hypotheses that can aid our analysis. First, the role of socio-economic stratification and class divisions is central to several approaches but in opposite ways. Some authors stress the im-

portance of centralized decision-making for the coordination and mobilization of labour (Earle 1997, p. 71; Bates 2005, p. 146), while others emphasize the destructive influence of class divisions and exploitation (Blaikie and Brookfield 1987a, Franke 1987). For example, the deforestation of Iceland, in medieval times and later, may be attributed to political stratification and economic inequalities. The elite's extraction of surplus pushed tenants to destructive land use in order to meet demands from elites in Iceland and in Norway who were not directly dependent on the long-term productivity of the land (McGovern *et al.* 1996). Conversely, in a comparative study of land use in the Sahel, Franke (1987) concluded that sustainable land use emerged where the farming households were relatively independent of the demands from the ruling classes. In his view, class exploitation leads to extraction of goods and labour that prevents the farmers from engaging in proper soil conservation methods and sustainable food production.

However, practising sustainable cultivation may not necessarily entail such labour-intensive investments as terraces and irrigation. Many farming communities engage in shifting cultivation without marked transformations of the landscape or the soils. While relative freedom from exploitation and outside interference may be one important pre-condition for farmers' ability to invest in soil conservation there must be additional incentives to invest labour over and above subsistence requirements. Paradoxically, such reasons were present in a number of historical cases where political and economic stratification was involved in building and maintaining landesque capital for hundreds of years. For example, the Hawaiian chiefdoms are notable for their irrigated fields, which were sustained through family labour and public works commanded by the chiefs and nobility (Earle 1997, p. 75). Here the ruling groups' long-term political and economic interests were conterminous with sustainable and productive agriculture. Theoretically, nothing prevents the same principle from operating in kinship-based societies. Thus, the absence of alternative investments in wealth-generating production may lead to the building of landesque capital under certain circumstances.

For land managers to push production towards labour-intensive methods, significant outlets for, and returns to, surplus crops must exist. One such outlet, known from many ethnographic instances, is competitive feasting for power and prestige in and between neighbouring communities (Hayden

1995). However, there are presumably limits to local consumption, wherefore we must look into how foodstuffs are circulated in wider exchange systems that implicate larger populations. This leads to an examination of how agricultural production can be transformed through exchange into wealth and, in turn, into social relationships and power. A number of recent studies in East Africa (Håkansson 1994, 1995; Conte 2004, p. 25; Widgren and Sutton 2004) and New Guinea (Blanton and Taylor 1995; Hayden 1995) have suggested that regional exchange systems contribute to the development of *landesque* capital. In order to obtain prestige goods and valuables through exchange of agricultural products, households intensified cultivation through both increased labour input and the use of a variety of soil conservation methods. However, the long-term consequences of regional exchange and intensification may also lead to declining capability of the land, as has been the case in parts of highland New Guinea (Allen and Crittenden 1987). Formulated as a hypothesis, we suggest that the wider the exchange network and the larger the volume of valued goods that can be obtained through exchange of local agricultural products, the greater the transformation of the environment. The question then is: How does the environment become transformed by the increased extraction of crops? Widening and intensification of exchange may lead to the building of *landesque* capital for the long-term secure flow of foodstuffs or else to the long-term decline of productive capacity in exchange for short-term gains. We are not suggesting that the relationship between surplus production and *landesque* investments is direct, but rather should be regarded as an open question for empirical investigation. For example, in both contemporary and historical contexts rapid expansion in the market for crops has led to increased production without soil conservation (Blaikie and Brookfield 1987b, Bates 2005, p. 153). Such processes may be the result of short-term profit-seeking by wealthy farmers who rely on non-agricultural investments for their overall income security (cf. Batterbury 2001).

Finally, implicit in any hypothesis about *landesque* capital is labour mobilization. Farm managers must have access to labour in order to invest in such ventures. It is clear that many historically known cases of intensive cultivation with constructed agricultural landscapes have been built, and are being built, by local communities without centralized decision-making and political stratifi-

cation. Wide variation in forms of mobilization probably exists (cf. Watson 2004).

The purpose of this discussion has been to sort out the various factors that have been suggested as structural and situational determinants of how and why labour is directed towards investments in long-term agricultural productivity. We are now in the position to formulate four causal configurations derived from a literature mainly concerned with stratified and strongly centralized societies. However, despite this bias towards politically centralized and class-divided societies, we argue that many of these insights may be used to initiate the development of a general approach to *landesque* capital unencumbered by assumptions about the nature of the underlying political structure. Four aspects of causal contexts, or factors, emerge as important: (1) the character of surplus production and exchange (2) degrees of socio-economic stratification (3) alternative investment opportunities for surplus; and (4) institutions for labour mobilization.

Political and economic contexts of *landesque* capital in East Africa

The character of surplus production and exchange

We take as a departure point that non-state societies, like state societies, also have surplus production, however small, in order to reproduce social relationships and institutions. Thus, the character of land use is dependent on the connection between local production and its transformation into locally defined wealth. Hence, whether goods circulated mostly in regional networks or were also in long-distance trade may be relevant because the connection with a wider world system would have expanded the volume of goods exchanged. In our region of study and in East Africa in general, there were both vibrant regional systems of exchange and a long-standing connection through the ivory trade with the Indian Ocean world.

In the Pare mountains, and in northeastern Tanzania as whole, the influx of specialized pastoralism in the eighteenth century must have had a profound impact on the political economy of the region through an increase in the demand for food crops and the concomitant supply of cattle to cultivators. The specialized pastoralists had to exchange more livestock for crops than did agro-pastoralists who practised a mixed economy because a purely pastoral economy cannot produce enough food to feed the population⁸ (Galvin *et al.* 1994).

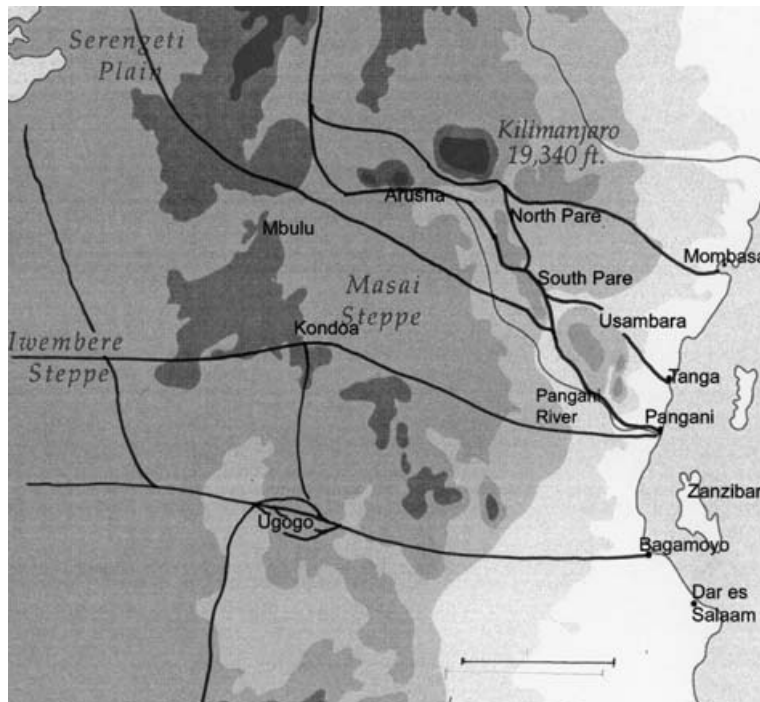


Fig. 2. Caravan routes mid-nineteenth century.
Sources: Wakefield 1882; Koponen 1988.

In the absence of extensive archaeological investigations, the origins of irrigation and terracing on Kilimanjaro, the Pare hills and Usambara cannot yet be determined. Despite this shortcoming in the source material, comparisons of recent case studies of several historical instances in the nineteenth century demonstrate that the maintenance and construction of sustainable intensive cultivation is clearly related to the exchange of foodstuffs for livestock and valuables (Conte 2004, pp. 25–26; Håkansson 1995, 1998; Sheridan 2002). Economic diversification was also encouraged by intensive cultivation. For example, already at the beginning of the first millennium, large-scale iron-smelting and tool-making were established. Semi-specialized smelters and blacksmiths in turn required food and livestock in exchange for their products. Pottery and salt were other commodities that circulated in the region as well, and ritual specialists, especially rain-makers, and irrigation engineers were in demand.

In the nineteenth century, people in both North and South Pare were involved in a regular barter trade of crops for cattle from the agro-pastoral and pastoralist communities on the plains and dry west-

ern slopes of the mountains (Håkansson 1998; Kimambo 1969, p. 177).⁹ Except in times of drought, irrigation was used to produce a third harvest for exchange purposes. As pastoralist populations on the plains grew, highland production was first expanded. Then, in the nineteenth century, the farmers of Kilimanjaro and North Pare established rain-fed fields at the base of the mountains for the cultivation of cereals to be used specifically in barter with pastoralists (Håkansson 2007; cf. Maddox 1986).¹⁰

Our second case of intensive farming, the Iraqw people in Mbulu, was part of a regional exchange network that included a variety of such goods as iron implements, salt and pots. They also engaged in the exchange of crops for livestock and pastoral products with neighbouring pastoral and agro-pastoral communities such as Datoga and Iramba in the nineteenth century (Thornton 1981, pp. 122, 126; Snyder 1996; Lawi 1999, p. 113; Börjeson 2004, p. 133). Although less information exists about the pre-colonial history available in this case, we may surmise that the regular production of agricultural surplus indicates that exchange was an important driving force in the development of intensive culti-



Fig. 3. Cultivation in Mvumi Division (Ugogo).
Source: Mats Widgren, November 2000.

vation in the area. However, other factors may also have been significant, at least in a short-term perspective, such as the attractiveness of the cultivated landscape and the acceptance of immigrants who contributed to the security and protection of the herds (Börjeson 2004). Decreasing availability of pasture, low levels of natural herd growth and frequent raiding by Maasai pastoralists in the 1890s created a chronic shortage of cattle (Lawi 1999, p. 114), which in turn necessitated sustained high levels of production to ensure future flow of livestock. As among the Pare, the size of cattle herds almost exclusively determined the economic and social status of the households (Lawi 1999, p. 76) and was necessary for full participation in Iraqw society through numerous community rituals and social payments. A major expenditure was bridewealth, which in the 1940s amounted to two to five head of cattle and some sheep and goats (Huntingford 1953, pp. 129–130).

Thus, in these two cases, sustainable intensive cultivation was part of the dynamics of regional exchange systems that encouraged surplus food production for the acquisition of wealth. But is it possible to claim that regional exchange is a sufficient

condition for the emergence and maintenance of landesque capital? We will return to this question after considering the effects of extra-regional trade.

In the mid-nineteenth century, the radically expanded caravan trade from the coast began to influence the economies in Tanzania (Fig 2). The caravans could number several thousand persons who needed provisions that were purchased from the highland farmers. This trade further stimulated surplus production and trade in the region, which is evidenced by the expansion of irrigated cultivation in new areas and the emergence of marketplaces and settlements along the trade routes. The sale of food to the caravans was an amplification of an earlier established pattern of exchange with the large pastoralist and agro-pastoralist communities in the region (Sissons 1984, pp. 146–150; Håkansson 1995, 1998; Conte 2004, p. 26). The most heavily travelled caravan route passed through some of the most inhospitable environments in Tanzania, Ugogo and Kondoa. Until the mid-nineteenth century most caravans in central Tanzania originated in the interior, notably from Unyamwezi, but later the majority was organized from the coast. Sissons (1984, p. 189) estimates that 80 000 persons trans-

versed Ugogo each year between the 1850s and the 1880s. The caravans obtained food in exchange for cloth, beads, iron hoes and other goods. In the second half of the nineteenth century around 1 090 909 kilos of grain were produced per year as surplus sold to caravans (Sissons 1984, p. 189). The population grew dramatically through the absorption of caravan porters and slaves purchased from the caravans. Hence, prior to the 1890s, Ugogo had a dense population, which in some areas approached the figures for the 1960s, but famines were infrequent (Sissons 1984, pp. 229–230).¹¹

As Christiansson has noted, the voluminous trade was accompanied by an expansion of cultivation on to marginal soils but without, however, any attempt to apply soil conservation methods. 'The present worn and eroded appearance of Ugogo dates back at least to the mid-nineteenth century. Continuous agriculture and pastoralism along the nineteenth century caravan routes has removed much of the natural vegetation and created a so-called cultivation steppe' (Christiansson 1981, p. 152) (See Fig. 3). By the end of the nineteenth century wooded vegetation was heavily cut around settlements and caravan routes leaving soils bare and exposed to erosion through wind and water; resulting in denuded flats (Christiansson 1981, pp. 149, 153).

Similarly, since the inception of the colonial period, Kondoa has been described as heavily eroded and deficient in agricultural production (Mung'ong'o 1995, p. 67). This bleak picture is in stark contrast to the description by a missionary who visited Kondoa in 1884 (Last 1885, pp. 10–11):

All these people are great agriculturalists. Several Arabs and Kima have settled amongst them, and have imported a great number of slaves from distant places. The whole country is thickly populated, and corn in abundance is raised. All Sagala country is very fertile, and the Kondoa valley is the most fertile part.

This apparently verdant cultivation landscape may have emerged when the coastal caravan route reached Kondoa in the mid-nineteenth century, and provisioning stations were established where millet, ivory and iron hoes were sold. Much of the woody vegetation was cleared prior to the twentieth century to obtain fuel for the increased iron-smelting, and bark to construct grain containers. A small colony of resident Arab traders was founded early on. The trade also gave rise to local leaders, many

of coastal origin, who used the profits from the food trade to invest in cattle and to build large followings. As in Ugogo, the trade resulted in increased concentrations of cattle and territorial expansion of agriculture, which in turn contributed to erosion and population concentrations along the caravan stations (Mung'ong'o 1995, pp. 61–62).¹²

In both cases the intensity of trade and the role of agricultural production as a source of wealth combined to degrade natural resources rather than to maintain sustainable cultivation. However, the effects on land use of the caravan trade are less clear along the Pangani valley and the Pare mountains. Conte (2004, p. 37) notes that the growth of market trade in one Usambara community caused expansion of irrigation and other cultivation. Although he argues that this development could have brought on soil exhaustion and erosion, he does not present any evidence that this actually took place. There exist some indications of similar problems in the chiefdom of Usangi on North Pare. At the end of the nineteenth century, Usangi became a centre for caravan trade in slaves and attracted a dense population. European visitors reported that the hills were denuded of trees and cultivation was widespread. The steeper slopes that had previously been left unused were cleared and planted. However, the opening up of new cultivation seems to have been accompanied by the construction of landesque capital. For example, both a large stone-walled dam (for irrigation) and terraces were built high on the slopes of Kindoroko, the highest peak in Usangi.¹³ On the plain north of South Pare, the caravan trade led to the establishment of several irrigation-based communities that have since expanded in size and continue today. Outside Tanzania there are other examples where intensive caravan trade co-existed with the maintenance of sustainable, intensive cultivation such as the manured mounds in the floodplains of Barotseland in Zambia, and the Il Chamus irrigation system in the dry Baringo District of Kenya. The latter is an example of several multi-ethnic enclaves found along the Rift valley who had close trade connections to both the surrounding pastoralists and the mountain farmers. These settlements are at least 200 years old and comprised of a core resident population and refugees from economic difficulties and political conflicts in the nearby regions (Waller 1985). The Il Chamus irrigation system was expanded in the mid-nineteenth century in response to increasing demand for foodstuffs by caravans from the coast. In the 1880s observers reported a checkerboard of fields encompassing



Fig. 4. Irrigated rice field in Gonja on the eastern foothills of South Pare.
 Source: Thomas Håkansson 2006.

three to four square miles (Anderson 1988). The caravans paid with beads and cloth, and livestock for agricultural products. The former were exchanged for cattle with neighbouring pastoralists. During this time the community absorbed a steady flow of immigrants who provided labour to expand the irrigation system (Fig. 4). For our discussion it is important to note that the decline at the end of the nineteenth century was not due to expansion without soil conservation. Rather, it seems that it was too successful in that an increasing number of people could accumulate enough cattle to leave the community. The ensuing shortage of labour made it increasingly difficult to maintain the expanded system, which was finally abandoned in the early twentieth century (Anderson 1988).

Degrees of socio-economic stratification

In this section we will explore the role of political and economic stratification in the deployment of labour in agriculture. While in the Ugogo and Kon-

doa cases the availability of dependent labour was a factor that contributed to unsustainable land use, there are also cases where leaders and elites used such labour to build landesque capital. For example, in nineteenth-century Barotzeland in Zambia, the Lozi paramount chiefs used labour tribute and control of land and water resources to build mounds on a periodically flooded plain, and to construct and build canals (Gluckman 1941, pp. 25, 73). The political economy of this centralized chiefdom was similar to Hawaii in that food figured prominently in tribute as a support for the political hierarchy.

Hence, the presence of political stratification and economic inequalities cannot predict what kind of land use is prevailing in any area. Rather, it is the degree to which one segment of the population is forced to give up labour and produce for someone else and the extent to which elites can direct local production, which has consequences for farm management. Thus, it is not surprising that the relationship between the politics of the Pare chiefdoms and agriculture does not conform to either the

destructive class model or to that of the chiefs as builders of landesque capital.

In the early 1800s, Pare societies were constituted at the level of the family household and lineage, and encompassed by several chiefdoms of varying size and central power (Kimambo 1969; Maghimbi 1994; Håkansson 1998). Chiefs and their retainers had more and larger fields under irrigation and access to more labour than the majority of farmers. Although chiefs neither controlled nor were involved in the construction or management of irrigation other than their own, their demands for tribute and their powers of land allocation affected production. The extent to which chiefs and their retainers could have affected households' ability to control their own labour power and ability to maintain sustainable production is difficult to ascertain. In the south, the chiefs' claims to tribute were intermittent. Usually a modest part of the harvest and some beer, but no cattle, were given to the chiefs as a gift for their rain-making services (Håkansson 1998). The political economy in North Pare was more complex and relied on the support of large landowning chiefly clans. Here cattle were a part of tribute demands. It seems that the demands for crops and beer were not onerous but cattle tribute was considered a hardship and was often resisted (Kimambo 1969, pp. 50, 106, 141; Maghimbi 1994). Hence, exploitation probably did not extract large amounts of labour time from households, or skew their production in ways that undermined their ability to build and maintain landesque capital. However, chiefs did have access to more dependent labour and had larger fields under irrigation than commoners (Håkansson 1998).

The development of landed resources made cooperation between family households necessary, and the power to transmit and allocate such resources was, at least ideally, transferred to all men and women as they aged. This placed young men in a dependency relationship until their fathers and mothers died. Women who generally did not inherit land had to marry and become dependent on their husbands, although their ability to control resources increased by age and the development of their sons' families. Parallel to the building of landesque capital, the ritual primacy of elders, especially old men, as responsible for the generative powers of the land was strengthened as well. Thus, the economic calculus of labour expenditure was differentiated according to age, gender and kinship rather than socio-economic stratification.

Among the Iraqw the political economy was

segmentary and lacked powerful leaders, competition for resources, collective mobilization of lineages or other local factions (Snyder 2005, p. 52). Hereditary ritual experts existed but seem to have had little political power. Rather, a fairly equal distribution of resources in the form of land and livestock led to low levels of polygyny and little differentiation in the labour available to households (Thornton 1981, p. 6). Here, there was a complete lack of stratification and political pressure on production, which again suggests that a high degree of independence of local farm managers is conducive to the maintenance of sustainable intensive cultivation methods.

On the surface, this conclusion would seem to be contradicted by the examples of Ugogo and Kondo, which both lacked formal political centralization. In both cases the intensity of trade and the role of agricultural production as a source of wealth combined to degrade natural resources rather than to build landesque capital. Although political centralization was absent, economic inequality and significant labour exploitation existed. The key to agricultural expansion was the availability of dependent labour in the form of clients and slaves imported from other areas in East Africa. This labour was used to increase agricultural output without investment in soil conservation.

In Ugogo, the gains of trade were collectively controlled by neighbourhoods. The clan leaders received tolls and fees but had to redistribute the proceeds to the elders of the local extended family households. The collective nature of accumulation precluded political competition by individual leaders. Thus, stable political relationships developed with few changes in the roster of chiefs over several decades (Sissons 1984, p. 116). However, the seemingly egalitarian nature of this society is belied by the existence of a sizeable pool of dependent labour that enabled households to expand production over and above their family labour. This workforce of slaves and immigrants was used to expand cultivation and produce surplus for patrons (Sissons 1984, pp. 118, 201), a process which was partly responsible for the degradation of soils in Ugogo (Christiansson 1981; Sissons 1984, p. 231). The concentrated flow of valuables that the caravans represented created competition, not between bigmen or women, but between clans and communities to attract caravans by providing more food and facilities available from the neighbours.

Thus, the comparison of four societies with different political systems and means of labour con-

trol shows that the formal political institutions are not directly connected to the way labour is deployed in the forming of the landscape. Rather, it is the extra-local factors such as the character of world-systems connections, regional economic and political relationships, and population movements that differently affect how those with power over people can and will use their dependants' labour power.

Alternative investment opportunities for surplus

The difference in the use of dependent labour in Ugogo and Kondoa on the one hand and such cases as Hawaii and the Lozi chiefdoms on the other seems to lie in the detachment from the consequences of land degradation by those who made the management decisions. As several authors (Franke 1987; McGovern *et al.* 1996; Bates 2005) argue with respect to more stratified cases, elites may not have any vested interest in long-term productivity due to their alternative bases of economic investment. The reason why the Gogo and Kondoa households were not concerned with soil conservation must be sought in a combination of factors. As in Pare and Mbulu, the main goal of production was wealth accumulation and the creation of communities. However, in distinction from the former, the Gogo rapidly built their holdings of cattle wealth, which reduced their dependence on the long-term productivity of the land. Cattle enabled them to command labour from clients and to trade for food rather than producing it themselves.

In Kondoa, as in Ugogo, the trade resulted in increased concentrations of cattle and territorial expansion of agriculture, which in turn contributed to erosion and population concentrations along the caravan stations (Mung'ong'o 1995, pp. 61–62). Second, the traders and big-men/women of Kondoa, and the Gogo corporate groups were investing the proceeds of the food trade in assets other than landesque capital. Investment in cattle predominated, but trade and other business in Kondoa was also perceived to provide long-term security in the flow of subsistence and wealth. The same process took place at the same time among the Kamba in Kenya. The establishment of caravan routes in Machakos in combination with large numbers of famine refugees provided local big-men and women with labour to expand food production for sale to the caravans. The pressure to cultivate led to precarious agricultural activities such as planting on steep hills and along watercourses, which promoted erosion.

The reduced fallow period depleted soil fertility and the cutting of trees for fuel resulted in serious deforestation (Ambler 1988, pp. 118–119; Lindblom 1920, p. 26).¹⁴

In contrast, cattle accumulation in Mbulu and Pare was slow and there was a perpetual scarcity of cattle in relation to the social needs of households (Lawi 1999; Håkansson 2003). It was this slow process of wealth accumulation that made long-term returns on investment in landesque capital imperative. The reason why Mbulu and Pare farmers could not build cattle herds at the same rate as the successful accumulators in Ugogo and Kondoa was twofold. First, residence in stable and dense settlements affected livestock husbandry, especially cattle, by pushing grazing further away from human habitation. This created problems of supervision and led to a shortage of good grazing that resulted in a decline in herd productivity. At the same time cattle-wealthy farmers were favourite targets for raiders from neighbouring pastoralists. Second, control of labour was to a great extent lodged within families/households and there was limited access to economic dependants and slaves.¹⁵ In addition, the patriarchal family structure allowed old men and women to control the procurement and allocation of cattle to the exclusion of young men and women.

In such situations the building of large herds of cattle as an alternative source of wealth was limited. Hence, only careful management of landesque capital ensured the future flow of livestock. In Pare, the sources of wealth in the form of cattle and dependants were the permanent banana plantations and irrigated land owned by the polygynous extended families. Cattle were necessary for bridewealth and were controlled by the elders who decided about their allocation for sons' marriages. The exchange of grain for livestock with the Maasai was also controlled by the elders. Such exchanges did not take place at regular marketplaces but through arrangements between individual household heads and their Maasai counterparts. The elders' control over labour was made possible by the high costs of cattle relative to crops, and the absence of viable alternatives for cattle accumulation by young men. The irrigation systems in the Pare mountains began to deteriorate once these preconditions changed in the twentieth century.

The hypothesis that slow growth of livestock herds created incentives for long-term agricultural productivity and promoted the elders' control of wealth is further supported by the retraction from

intensive cultivation among a section of the Iraqw. In the 1920s the British had opened up large tracts of land, formerly belonging to the pastoral Maasai, to the Iraqw. In the 1930s these pastures became a convenient outlet for the rapidly increasing herds that the Iraqw had accumulated through trade in crops (Mbulu District Book). The subsequent large out-migration was driven by the opportunity to increase their herds and pursue an agro-pastoral economy on the new pastures (Thornton 1981, p. 240; Lawi 1999, p. 264; Snyder 2005, p. 31). Relying on growing cattle herds the migrants changed from intensive agriculture to shifting cultivation and pastoralism (Kjaerby 1979, pp. 13, 17). This indicates that, rather than human population pressure, scarcity of grazing for the production of wealth provided an important stimulus for intensive cultivation among the Iraqw.

Institutions for labour mobilization

Research on labour mobilization for landesque investments outside the theoretical realm of political centralization and stratification is sparse but shows a great deal of variation, possibly related to the nature of the resources as well as other socio-economic factors (Watson 2004). In South and North Pare labour was recruited and organized through a particular form of lineage-based political/religious hierarchy. The irrigation system itself was a collective asset of the water-using community that constituted the material and symbolic source of life and fertility (Håkansson 2003). The management and control over these assets were ultimately lodged with the senior male elders of the water-using community. Labour for construction and maintenance of furrows was mobilized and coordinated by the senior men who coordinated the work of young men in the water-using community. As among the Konso in southern Ethiopia (Watson 2004), wealthy families used their resources to attract labour from dependants and thus were able to further expand their production and political influence (Håkansson 1998). Hence, socio-economic stratification may enter into labour mobilization in kinship-based societies but the effects on overall maintenance of landesque capital must be empirically investigated in each case. For example, among the Iraqw, cooperative work in agriculture was less structured than in Pare and was based on neighbourhood work groups. The neighbourhood cooperated in work on physical structures, especially cultivation ridges, on the permanent fields under

the supervision of two elected elders. Another form of institutional cooperation at the section level was communal herding of cattle (Loiske, n.d.).

Obviously irrigation demanded community-wide cooperation because the furrow system was a collective resource. The Pare system of neighbourhood and lineage cooperation in furrow construction and maintenance is similar to arrangements found in contemporary irrigation communities such as Marakwet (Östberg 2004) and in Taita Hills (Fleuret 1985) in Kenya. In contradistinction the Mbulu fields were the work of individual families/households and did not require constant coordination except for very labour-intensive tasks and measures that affected several owners of fields (Loiske, n.d.).

Clearly the mobilization of labour, both family and neighbourhood, rested on the ability of community leaders and farm managers to compel people to work for a common interest. This ability derived from incentives set by local control over wealth by lineage and community elders. The importance of institutional control of cattle exchange by elders for the mobilization of labour is revealed by the impact of the caravan trade. The increase in sources of wealth not controlled by elders, in the form of cloth and beads, enabled young men to bypass the elders and accumulate cattle. This resulted in an increase in the number of married men and women who established themselves as pastoralists and agro-pastoralists on the plains (Kimambo 1969, p. 185).¹⁶

The interaction between social structure and exchange in shaping the control over labour is well illustrated by the rise and fall of Il Chamus irrigation in the nineteenth century. Lineages were not important in the control over land and cattle. Instead, furrows and land were community property allocated to families and the irrigation system was under collective control by a council of male elders. Most of the families were pastoralists with a family and household structure that allowed sons to establish themselves with independent households as soon as they could accumulate enough cattle to marry. Young unmarried men were responsible for the upkeep of the irrigation furrows. Hence, the prevailing early marriage age of men created problems for the effective mobilization of labour. In addition, the lack of a strong lineage hierarchy gave men independence from their parents' authority. A combination of ivory trade and immigration led to increased crop production and an increase in cattle holdings. The labour diverted to herding resulted in

an inability to keep the irrigation furrows in repair to the extent that they collapsed through neglect (Spencer 1998, p. 175). The history of the Baringo irrigation system shows how the particulars of social organization and economy intersect to provide incentives for the building of *landesque* capital. The expansion and maintenance of the Baringo irrigation systems was based on a boost in trade opportunities but there were no strong institutionalized dependencies and control over wealth by family heads.

Conclusion

In the title of this article we set out to emphasize the close connection between how land is used and formed by human effort and the social factors that affect how labour is deployed. The general conclusion of our investigation is that *landesque* investments occurred in cases where agriculture was the main source of long-term wealth flow irrespective of whether or not hierarchical political systems were present. However, while this factor may be a necessary condition it is not a sufficient cause. In the cases we examined the configurations of world-systems connections and local social and economic circumstances combined to either produce investments in *landesque* capital or to pursue short-term strategies of extraction. Thus, the productive landscape was not a direct reflection of the organization of societies.

It is clear both from our four cases and other examples in our analysis that farmers in nineteenth-century East Africa produced a regular surplus of crops for exchange. While markets and trade ensured access to products that were used for everyday household needs and subsistence, large quantities of crops were exchanged for wealth used in social payments and the building of status and power. Although we cannot trace the origins of *landesque* capital, we can show that in the cases we have examined such investments were maintained and extended in order to support exchange and the procurement of wealth in kinship-based societies. However, this simple observation is complicated by the opposite effects of trade and exchange that caused erosion and soil exhaustion.

Clearly there were other factors that interacted in a complex way. The long-term dependency on cultivation as a source of wealth, and the absence of alternative remunerative investments, was definitely an important factor both in the kinship-based societies and in politically and economically stratified

polities such as Hawaii and the Lozi. The degree of household control over its own labour and other resources as a factor contributing to the building of *landesque* capital was important only if the return from alternative investments was lower than returns to investments in land. This is exemplified by the return to shifting cultivation by those Iraqw who built large herds of cattle in new areas vacated for them by the British colonial administration.

In addition to the configuration of regional exchange and political factors, institutions for labour mobilization were crucial in shaping how people used land. The patriarchal and gerontocratic nature of Pare and Iraqw family households made it possible for community and lineage elders to control exchanges and the distribution of wealth that also made it possible for them to organize production. The importance of such social structural controls became evident when the growth of the caravan trade created an expanded field of exchange and demand for local products that presented opportunities for young men to access livestock outside the sphere of controlled exchange. This resulted in a drain of labour from the agricultural to the pastoral sector, a factor that was especially marked in the Baringo irrigation system. The importance of variation in the forms of labour mobilization for the maintenance of different forms of intensive agriculture is unclear. For example, one may speculate that the independence of Il Chamus households from community and lineage controls contributed to the ability to young men to accumulate cattle independently of their elders and withdraw from working in the irrigation system.

Finally, our analysis does not preclude the emergence of conditions that favour *landesque* investments in very different political and economic contexts. Thus, changes in local labour deployment brought about by political-economic processes such as colonialism and the incorporation of East African communities into the global world system should not be seen as unidirectional. We argue that only through a historical perspective may we hope to reveal the causal interconnections of the factors that affect how farmers use the land. In the same locality the character of land use and landscape transformations may vary greatly over time. For example, in Machakos District in Kenya, soil conservation methods have emerged in two very different political and economic contexts during the past 300 years. First, terracing, manuring and irrigation were practised in the eighteenth century (or possibly earlier) until the late nineteenth century (Jack-

son 1976). Then, after a nearly hundred-year hiatus the 1980s saw the development anew of intensive cultivation and soil conservation in response to growing market demand from Nairobi and in conjunction with unobtrusive government assistance (Tiffen *et al.* 1994). Hence, by identifying labour processes as contingent and separate from political types of generalized economic systems over time we can identify the causal factors that direct labour and thus landscape formation as a process.

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Notes

1. Landesque capital: 'any investment in land with an anticipated life well beyond that of the present crop, or crop cycle' (Blaikie and Brookfield 1987a, p. 9).
2. This study is based on documentary sources, and the published and unpublished results from Håkansson's research in the Pare mountains. It has furthermore benefited from Widgren's involvement as supervisor of doctoral theses on Ugogo (Liwenga 2003) and Mbulu (Börjeson 2004). Our research is part of a joint project entitled 'Northeast Tanzania 1850–2000: the political ecology of trade networks, food production and land-cover change' (also including Dr Lowe Börjeson) supported by the Swedish Research Council (Vetenskapsrådet) and SIDA/Sarec (Swedish Agency for Research Cooperation with Developing Countries). We would like to thank Emma Liwenga and Lowe Börjeson for their introduction in the field to the land use history of Ugogo and Mbulu, as well as the PLATINA (People, Land and Time in Africa) research group in Stockholm, two anonymous reviewers for their constructive suggestions, and Monica Urdvardy for her comments and language corrections.
3. We do not discuss further explanations based on population pressure here. An increasing number of studies show that intensive cultivation in pre-colonial East Africa was not caused by population densities per se (e.g. Håkansson 1994, 1995; Sheridan 2002; Börjeson 2004; Widgren and Sutton 2004).
4. Degradation is a relative and subjective term that needs to be contextually defined. For the purposes of this article we define degradation as a loss of productivity of the land due to a variety of processes such as erosion, loss of humus, and the spread of scrubs at the expense of grass. Thus, degradation in relationship to cattle-raising and agriculture means a decline in the amount and quality of grazing, a decline in the soil's ability to sustain crops as well as the physical disappearance of soil and land forms capable of producing crops. While such degradation takes place without human intervention we are here concerned with practices that entail concentration of livestock, exposure of the ground to rain and wind, and the exhaustion of nutrients from soils. The time required for restoration of productivity if exploitative practices cease will vary according to a number of factors that are outside the scope of this paper (cf. Blaikie and Brookfield 1987a).
5. This characterization of pre-colonial farming systems in East Africa is in line with Koponen's arguments (Koponen 1988, pp. 220–241) and in contrast with Kjekshus (1977, pp. 29–50). Cf. discussion in Widgren (2004).
6. Although specific dating of these systems does not exist at present, oral traditions, historical linguistics and nineteenth century travellers' reports indicate that irrigation was practised for centuries before.
7. Both male and female elders controlled livestock. However, as a category, men had more power than women. For more detail on gender roles in Pare, see Håkansson (2003).
8. Several studies of contemporary pastoralists suggest that vegetables constitutes around 25% of the yearly calorie intake (Galvin *et al.* 1994).
9. Informants in South Pare mention livestock crop exchange both in the mountains and on the plains. In the 1850s there were many pastoralist Parakuyu settlements on the western slopes of South Pare.
10. Field notes (TH), North Pare 1995.
11. Sissons (1984) claims that the population of Ugogo in 1860 was around 200 000 and closer to 360 000 in 1890 when it collapsed, and less than 190 000 in 1920.
12. A more detailed chronology of erosion events in the Kondoa area has shown that the phase of human-induced erosion started well before the caravan trade (Eriksson *et al.* 2000). This, however, does not contradict our conclusion that the political economy of the caravan trade exacerbated the erosion.
13. Field notes (TH), North Pare 1989.
14. Interestingly, after a century of deforestation and erosion farmers in Machakos are again rebuilding their landscape with terraces, irrigation and tree-planting. This is not a new pattern but actually a renewal of the agricultural methods prevalent prior to the late nineteenth century.
15. In North and South Pare there was a form of institutionalized dependency, pawnship, whereby destitute men could receive cattle loans in exchange for their subservience. The prevalence of this practice is difficult to ascertain but it seems to have been particularly common during times of cattle scarcity such as at the end of the nineteenth century (cf. Håkansson 1998).
16. Field notes (TH), South Pare 1995.

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