International Scholars Journals

Global Journal of Sociology and Anthropology Vol. 8 (1), pp. 001-012, January, 2019. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Impact of land tenure change on subsistence agriculture: Implication on farm productivity of the farming system in Bukoba district, Tanzania

Amos Mwijage[1,2]*, Jens Andersson[1], Nico de Ridder[1], Frederick Baijukya[2], Cesare Pacini[3] and Ken Giller[1]

[1]Plant Production Systems, Wageningen University, P.O.Box 430, 6700 AK Wageningen, The Netherlands.
[2]Maruku Agricultural Research Institute, P.O.Box 127, Bukoba, Tanzania.
[3]University of Florence, Piazzale delle Cascine 18, 50144 Firenze, Italy.

Accepted 12 March, 2018

Discussions on land tenure change in Africa often lack an appreciation of farming systems and their structure. This disconnection is remarkable because tenure change is often seen as means to enhance the productivity of African agriculture. In this article, we examine the structure of the agro-ecological system and its productivity in relation to land tenure arrangements in the banana-based farming system in northwest Tanzania. We analysed the evolving land tenure arrangements and changes in agricultural productivity. We found that customary tenure and land use practices have been destabilized by tenure reforms including those programmes facilitating individual control of previously communal lands. Like elsewhere in Africa, tenure reforms have increased the competition for land, although low productivity land is being targeted in Bukoba. By ignoring the morphology of the dominant farming system, the reforms are not likely to result in an increase in agricultural productivity. This paper challenges the communal-private ownership opposition that continues to dominate the debate on land tenure reforms in Africa. It proposes a perspective on tenure reform that takes account of the farming system and the specific tenure arrangements for different land use practices that it comprises.

Key words: Tenure arrangement, land use change, system productivity, privatization.

INTRODUCTION

There is an increasing global concern about rapid population growth and socioeconomic developments that generate pressures on available natural resources particularly in developing countries. This is due to fast decline of tropical farmland resulting into increasing competition for farmland (Repetto and Holmes, 1983). In the ongoing debate on land rights and tenure reforms in Africa for example, the proposition that transferable property rights would improve (smallholder) farmers' productivity and investment on land often underpins land tenure reform policies, although empirical evidence shows mixed results or may be different (Besley, 1995; Deininger and Jin, 2006; Smith, 2004). A common feature of study on property rights and changes of land tenure systems is, however, their focus on tenure arrangements, that is, the set of socio-political arrangements by which access to land is regulated. Land tenure revolves around issues of governance, as the regulation of the access to land as well as its use defines a tenure system. Despite unprecedented thinking on transformation of customary land rights by non-customary tenure ideology and legislation provisions, customary tenure systems not only persists, but also is still by far the major form of land tenure in sub-Saharan Africa (SSA) (Wily, 2000). None of the strategies adopted to ignore it have been successful in most countries of SSA where in many cases, lands are vested in the states. Thus, land tenure debate often becomes focused on the failure of central government to enforce legislation or to recognize particular local tenure arrangements, or on the need for government to implement land tenure reform policies.

Alternatively, academic studies have focused on the

*Corresponding author. E-mail: amwijage@yahoo.com.

social, economic and/or legal pre-conditions for tenure change, thus understanding change in tenure rights as an evolutionary process (Platteau, 1996). Consequently, tenure arrangements tend to become seen as mutually exclusive and ordered along a linear development path often discussed without an appreciation of the land use practices to which these arrangements are related. In the context of evolutionary model of land tenure change and agricultural productivity, the World Bank argues that private property is a key incentive for farmers to invest in land and that because of diversity and changing tenure systems, agricultural modernization combined with population pressure makes privatization of land necessary (Toulmin, 2008). The critics of this neo-modernization model argue that the data on which these arguments are based are too weak to support such a claim (Atwood, 1990). On the other hand, Haugerud (1989) shows evidence from Kenya where privatization of land did not lead to significant investment in agriculture because credit funds were most often diverged to other off-farm investments including land speculation. Further evidence from Ghana and Rwanda indicates that privatization of communal land had little effect on productivity of the farming system (Migot-Adholla et al., 1991). This study seeks to contribute to the debate on African land tenure systems, by examining the impact of population pressure and socioeconomic developments on changes of land use systems and productivity.

Rather than concentrating on tenure systems and/or their governing institutions, we argue that discussions on land tenure arrangements and especially, (the need for) tenure reform, generally fall short in their appreciation of the ways in which the farming systems are intertwined with agro-ecological processes, that is the productivity of the land. Thus, this paper argues for the understanding of the morphology and functionality of farming systems in relation to access rights to common land in Africa.

Specifically, the paper addresses the relationships of different land tenure systems that have prevailed in Bukoba district by comparing the level of realized productivity between different tenure systems that existed at different historical periods. Our general perception is that, some of the prevailing land tenure institutions may have frustrated economic opportunities, legitimized the existing inequalities among increasing population of farmers and inhibited them from making significant agricultural investments leading to poor productivity. Our rigorous emphasis is placed on common land (Rweya) sub-system that provides fundamental roles in the functioning of the home garden (Kibanja) sub-system. In particular, we identify the strengths and weaknesses in each of the tenure systems and suggest holistic policy remedies to provide incentives to farmers to invest in land management in order to improve agricultural productivity.

The discussion in this paper is structured in two main parts. In the first part, we describe the historical emergence of the Bukoba farming system and elaborate on how the tenure arrangements and land use change are intertwined. This historical description reveals how the Bukoba farming system evolved in response to population increase, the introduction of new crops and the area's incorporation into a wider political economy. On the other hand, we elaborate on how the banana-based farming system started to experience a productivity crisis as land shortage and population pressure are becoming common features in the district (Baijukya et al., 2005; Rugalema et al., 1994). However, such 'natural' causes, which intensify competition between different land users, are aggravated by land use change that favours local elites in controlling of formerly communal lands - the grasslands. The intrinsic socioeconomic changes disregarded the structure of the Bukoba farming system and, especially, the importance of what is considered as 'unoccupied' lands. The consequence of this is a fundamental ecological imbalance among key land use types of the dominant farming system which, not only undermines smallholder farmers' livelihood, but also the productivity of smallholder farms.

The paper concludes with a discussion based on the case of Tanzanian government national land policies and especially, the subsequent socioeconomic changes that has allowed for the privatization of common lands important in smallholder agriculture.

SOURCE OF INFORMATION AND METHODOLOGY

The data presented in this paper were obtained through household interviews, focus group discussions, individual interviews and transect walks in two villages of Butahyaibega (1°7'S and 31°48'E) and Butulage (1°29'S and 31°30'E) in Bukoba District, between June 2005 and April 2007. These villages are located in the high rainfall zone (HRZ) and low rainfall zone (LRZ), respectively of the farming system. Oral historical data on changing land tenureship were obtained through focus group discussions and key informants interviews at various stages. We started discussions with 20 elderly participants per village (in equal proportion of men and women) forming focus groups in order to solicit their perceptions as regard to access and control of available grasslands in their village. Selected farmers were those considered knowledgeable on use of grasslands by the villagers at the meetings after we had explained the objectives of the study. This was followed by household surveys in each village (Butahyaibega, n = 74) and (Butulage, n = 77). Farmers to be interviewed were randomly selected from the village register.

The generated information was collocated against time lines of locally significant events including famine and other significant political events. Review of published and archival information provided policy information, historical statistics, and dates against which to compare farms and community scale trends in land management and productivity (Rald and Rald, 1975; Reining, 1967).

RESULTS AND DISCUSSION

General features of the farming system

The farming system is characterised by a mixed

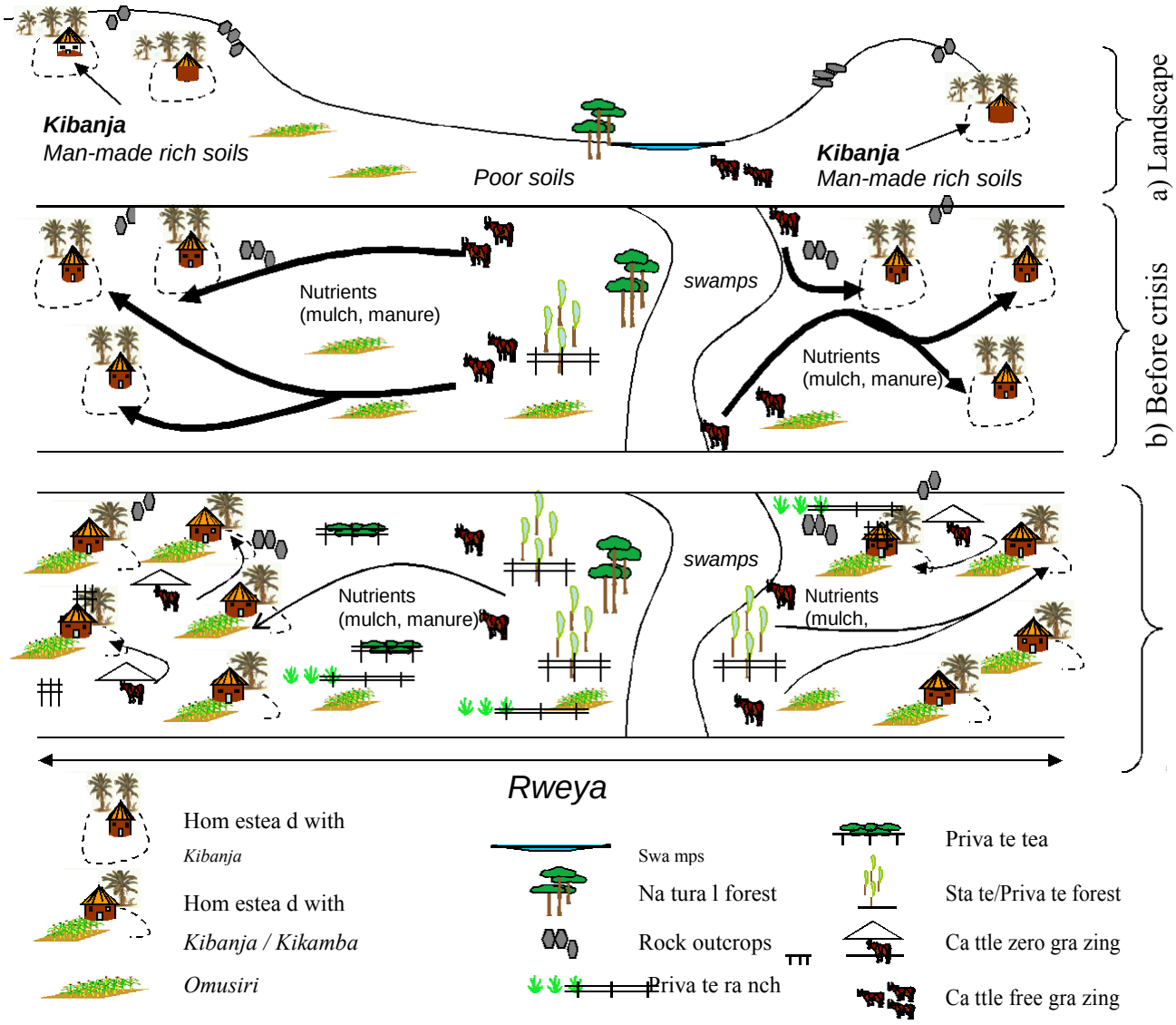

Figure 1. Simplified scheme of structural relations among basic land use types and intensity of nutrient flows before and after the productivity crisis in the banana-based farming system indicating (a) Cross section arrangement of the landscape; (b) Thick arrows signifying the intensity of nutrient transfer among land use types; and (c) The current state of nutrient flows in the system.

crop-livestock system. There are three different, but strongly interdependent land use types that encompass different rules of access and management: 1) Kibanja – individual family-owned home gardens clustered on deep soils (on top of ridges and sometimes on lower slopes), dominated by perennial crops notably banana and coffee; 2) Kikamba – a piece of land which is part of, or adjacent to the Kibanja where mainly annual crops such as maize (*Zea mays*), taro (*Colocasia esculenta*), sweet potato (*Ipomea batatas*), cassava (*Manihot esculenta*) and yams (*Dioscorea* sp.) are grown. However, the Kikamba is commonly regarded as a sub-type of the Kibanja, and shares the same tenure arrangements; and 3) Rweya – an extensive open grasslands on steep and rocky slopes, and on low-lying areas in the landscape. These lands surrounds the Kibanja and Kikamba, and are often managed communally and used for grazing, collection of mulch, and growing of annual crops such as Bambara nut (*Vigna subterranea* L.), sweet potato and cassava in shifting cultivation plots (referred to as Omusiri). Figure 1 illustrates the general features and functional morphology of the farming system before and after the envisaged productivity crisis.

The figure indicates main land use types and biophysical processes that are involved in production process. In fact, nutrient resources are transferred from the Rweya to Kibanja by means of cattle or mulch collected by farmers, thus enhancing nutrient cycling in

Table 1. Changes in means of land acquisition among the respondents (%) in the households of two sampled villages of Bukoba district, Tanzania, in 1965 and 2005.

Means of acquisition of land	Butahyaibega (HRZ)		Butulage (LRZ)	
	Kibanja		*Rweya*	
	1965 (n = 53)*	2005 (n = 74)	2005 (n = 74)	2005 (n = 77)
Inheritance	30	74	39	16
Purchase	13	12	24	30
Gift from relative	13	0	0	0
Tenant by acceptance from landholder	13	0	0	0
Tenant by inheritance	13	0	0	0
Contract tenant from landholder	8	0	0	0
Gift from the chief	6	0	0	0
Gift from landholder	2	0	0	0
Part inherited, part purchased	2	14	3	0
Allocation by village government	0	0	4	6
Renting	0	0	11	10
Do not have	0	0	19	38

*Data available only for *Kibanja* in the HRZ (Source: Reining, 1967).

the Kibanja soils.

Tenure systems and soil fertility management

Land acquisition and cropping system

Acquisition of land in Bukoba takes several forms. Although inheritance through paternal lineage was already the dominant means of acquisition to land in 1960s, there were also other means, such as purchase, gifts from the chief or relatives, and renting. However, a survey in 2005 found that 74 and 39% of the interviewed households in the high rainfall zone (n = 74) had acquired Kibanja and Rweya lands, respectively, through inheritance (Table 1). Other means of land acquisition including allocation by village government, leasing, renting, has now disappeared but purchase of Kibanja land is still important, as it was in the 1960s. A significant change is observed for Rweya land that gained significant market value in recent years such that about 24 and 30% of the respondents in the HRZ and LRZ, respectively had purchased the Rweya in 2005 (Table 1). About 69% of the farmers in Bukoba do not own Rweya land privately and 79% of the farmers who own the Rweya privately have plantation forest (Table 2). The distribution of Kibanja size differs among the high rainfall zone and the low rainfall zone areas. While it is only 12% of farmers in the HRZ have Kibanja exceeding 1.1 ha, it is about 40% of farmers in the LRZ having Kibanja greater than 1.1 ha.

The implication of *Kibanja* acreage is reflected in the manure and mulch requirements for respective farming family. However, for the *Rweya* owned privately, it is 4% and 3% for farmers having above 1 ha in the HRZ and LRZ, respectively (Table 2). This is due to the relatively high population in the HRZ.

Role of grassland on fertility management in relation to tenure system

Traditionally, the *Rweya* was reserved for grazing and cultivation of seasonal crops that do not demand high fertility of soils by shifting cultivation system. At present, the large portion of Rweya is mainly occupied by forest plantation. Some farmers are expanding cultivation of bananas into the Rweya due to land shortage. The Rweya also provides off-farm employment and income generating opportunities such as collecting and selling mulch grass and carpet grass. At the same time, cattle form an integrated part of the farming system and are important for concentrating nutrients from the Rweya to the Kibanja. In old days, grazing in grasslands was centrally regulated by appointed person by villagers known as ‘mkondo’, who was responsible to select grazing sites, supervise cattle herders, monitoring and isolation of diseased animals (Lorkeers et al., 1996). Such centralized control suggests that, despite its poor soil fertility, the Rweya land was valued for its capacity to sustain the productivity of the Kibanja through exporting nutrients in the form of mulch and manure. Another important use of Rweya of this farming system was Omusiri cultivation in shifting cultivation. To ensure long term productivity, in the past the land would be left fallow for 6 to 8 years to allow the soil to regenerate. Such shifting cultivation in the Rweya was controlled by the traditional chief through male or female overseers known

Table 2. Land use in Bukoba district and the area owned by farmers (ha).

Land use type	Land area (ha)	Number of households (%) with respective range of land area and forest plantation		
		HRZ (n = 74)	LRZ (n = 77)	Total (n = 151)
Kibanja	Nil	Nil	Nil	Nil
	0.1 - 0.5	47	33	40
	0.51 - 1.0	41	27	34
	1.1 - Above	12	40	26
Kikamba	Nil	27	40	34
	0.1 - 0.5	55	44	50
	0.51 - 1.0	15	8	11
	1.1 - Above	3	8	5
Rweya	Nil	74	63	69
	0.1 - 0.5	16	30	23
	0.51 - 1.0	5	4	5
	1.1 - Above	4	3	3
Forest plantation	Nil	77	80	79
	0.1 - 0.5	15	17	16
	0.51 - 1.0	4	0	2
	1.1 - Above	4	3	3

as Omuharambwa who made sure that people abided by the rules of cultivating Omusiri. Thus, in order to cultivate 1 ha with annual crops, a farmer needed 8 ha of grassland and about 75% of households was estimated to cultivate Omusiri in the 1960s (Rald and Rald, 1975).

During the fallow period, the Rweya could only be used for cattle grazing and grass cutting for mulching, thatching and home carpeting. After the Rweya was fully regenerated, Omuharambwa reported to the chief who would allow people to use that piece of land again for Omusiri cultivation.

Historical development of tenure systems and cropping pattern

In the late 1880s, there was an outbreak of rinderpest that killed about 90% of all cattle in the district. Consequently, the pastoralist way of life became untenable (Steenhuijsen, 1999). Having lost their source of wealth, the pastoralists were forced to re-orient towards crop production. Although their experience in farming may have been limited, their cattle-based wealth had yielded them considerable political power. It was during this time when a new feudalistic form of land tenure known as Nyarubanja (large banana plantation) is believed to have emerged in Bukoba. However, the actual origins of this form of tenure remain conjectural, based on interpretations from court proceedings and chiefs belonging to the ruling clans (Pokorny, 1973). The Nyarubanja lands were controlled by the chief who could allocate it to individuals of the ruling elite, leaving the former owners as tenants, obliged to pay tribute to the new owners. Although, the emergence of the Nyarubanja system meant a discontinuation of co-evolution of tenure and land use and drastically altered property and labour relations on the affected farms, its significance as a distinct land tenure system should not be overestimated. First, Nyarubanja did not compromise the structural links between different land use types of the Bukoba farming system.

Nutrient transfers between different land use types were maintained, albeit now by cattle owning tenants. Secondly, Nyarubanja tenure was of little significance in comparison to customary tenure arrangements. By the end of 19th century, it was estimated that the Kibanja under Nyarubanja tenure occupied about 10% of the total Kibanja area whilst the rest remained under customary tenure arrangements (Kalikawe, 1974). Besides Nyarubanja, freehold tenure was introduced in Bukoba as the territory that currently comprises mainland Tanzania became incorporated into the German empire in 1885. Characterised by a complete and unrestricted entitlement to the land, the freehold system served to facilitate European farmers' settlement and investment in agriculture. However, such new tenure arrangements had limited impact in Bukoba because its inhabitants had been given usufruct rights for large parts of land that was treated as 'un-owned' (URT, 1994). However, freehold land tenure comprised a mere 2% of the arable land area

in the district (Mutahaba, 1969). Its introduction therefore hardly affected the existing Nyarubanja and customary tenure arrangements, and these tenure forms remained unaltered during both the German and the succeeding British colonial administration (Mutahaba, 1969).

As new tenure arrangement was introduced during the colonial period, also new cash crops notably coffee (during second half of 19th century) and tea (in 1950s) which had impact on land use were introduced. Since coffee was a perennial crop, its introduction reinforced for the development of continuous cultivation and permanent settlement of farming households on the Kibanja. However, tea was only grown in estates at the beginning occupying about 365 ha, which is a relatively small area in the district. Later in the 1960s smallholder farmers were involved in tea farming where each farmer was allocated about one third of a hectare of Rweya for tea cultivation occupying a total of 1245 ha. The cultivation costs and important inputs were provided by the state, thus marking the appropriation of communal Rweya by outsiders - the state. As matter of fact, the introduction of such cash crops contributed to the commoditization of land as Cory and Hartnoll (1945), states:

"…sale of land in Bukoba was practically unknown until within the last forty years and therefore there were no rules under customary laws to deal with it."

Although, the existence of Kikamba land is tied up with the Kibanja and was there for long time past, its significance and use increased with time in response to declining productivity of the Kibanja. Therefore, in the context of this discussion, as coping strategies, farmers felt compelled to cultivate sweet potato in rotation with maize in the Kikamba as the Kibanja failed to produce adequate bananas, the staple food of farming families. To substantiate this, an elderly farmer narrates:

"During the old days when the Kibanja was still productive, we were not eating emayaka (Anything eaten in the household besides banana literally including root crops such as sweet potatoes, cassava, and yams) because people would as much as possible avoid contemptuous attitude from neighbours being regarded as a hunger stricken household" (Elesi, 2006) Bukoba farmer – personal communication.

To summarize, up to the end of the colonial period new tenure arrangements had been introduced in Bukoba district, yet their impact on the ground remained limited because only a small proportion of the land was affected by these new tenure systems. However, rather than changes in land tenure systems, there was incorporation of the area into colonial economy and the introduction of new cash crops (coffee and tea) that changed Bukoba's agricultural economy and smallholder farmers' land use practices (Rald and Rald, 1975). Such changes did not, however, end the long established structural link between Kibanja and Rweya lands.

Population pressure induced tenure change

Below, we first show how population growth drove both the fragmentation of Kibanja lands and expansion of Kibanja and Kikamba lands at the expense of Rweya land. Both developments reduced rural households' capacity to make their living from the land, forcing many into non-agricultural income earning activities. The population increase in the district (up to 233%) over last forty years might also have contributed to a decline in system productivity because available grass cannot satisfy the ever growing demand. This comes from the fact that establishment of one acre (0.4 ha) of new Kibanja on poor Rweya soils needs 16 tons of mulch for the first time, followed by 8 tons every year continuously to maintain the standard productivity (Rald and Rald, 1975). Figure 1 demonstrates how the area under Kibanja and Kikamba expands at the expense of Rweya lands since new Kibanja get established on the Rweya following increasing population density while experiencing shrinkage of the area under Rweya. In addition, average Kibanja size per farming family declined slightly according to available evidence (Table 3).

Two reasons, can account for this limited subdivision of Kibanja to smaller plots:

First, the habit of purchasing the land which was already common in the 1960s mitigated further land fragmentation (Table 1). Secondly, the inherent land inheritance system in Bukoba society slowed-down the subdivision of land in some families where only one son inherits the portion of the Kibanja, forcing other siblings (who only get a token share) to out-migrate or seek for non-agricultural sources of income. Since Rweya land resources were characterised by communal control, the productivity of the farming system was sustained.

The demand for cattle manure has also increased as farming population increased. Table 4 illustrates the number of farming households and those with cattle in Bukoba between 1958 and 2002. However, the proportion of households owning cattle declined almost by half during same period. This implies that few households tend to have more cattle than in the past thus facilitate social differentiation among cattle owner households in terms of farm productivity. In fact, households lacking cattle tend to have more Omusiri plots hence termed as Omusiri-dependent households; while those with enough manure have a tendency to rely more on Kibanja and are less reliant on Omusiri hence termed as Kibanja-specialized households (Maruo, 2002).

Table 3. Average *Kibanja* size per household estimated in different studies from 1955 through 2005 for selected wards in Bukoba district, Tanzania*.

Ward	1984	1997	2005
Kanyangereko (HRZ)	n.a	0.6 (120)	0.5 (74)
Izimbya (LRZ)	1.8 (20)	n.a	1.6 (77)
Source	Tibaijuka (1984)	Nkuba (1997)	Mwijage et al. (2009)

*In parenthesis denotes sample size on which the measurements were based in the respective years. n.a: not available.

Table 4. Number of households and cattle ownership in Bukoba district from 1958-2002.

Year	Number of households	Number of cattle	Households with cattle (%)	Average household size	Source
1958	62924	50339	20	4	Rald and Rald (1975)
1967*	101440	78000	14	5.4	Rald and Rald (1975)
1978*	73253	84176	13	5.5	MALD (1984)
2002	90502	65849	11	6.8	BOS (2002)

*Between these years the district was split into two namely Bukoba and Muleba because of increased population; BOS: Bureau of statistics.

Table 5. Estimated market value in Tanzanian shillings ('000') ha^{-1} of *Kibanja* and *Rweya* in Bukoba District, 1955-2005[1].

Land use	1955[a]	1965[a]	1975[a]	1985[b]	1995[b]	2005[b]
Kibanja	3	5.42	10 (1.4)	25 (0.62)	496(1.05)	1270 (1.47)
Rweya	-	-	-	1.26 (0.03)	62.5(0.13)	200(0.23)

[1] Values in parenthesis indicate US$ equivalent during the respective year. Sources: a) Rald and Rald (1975); b) based on discussion with elderly farmers (n=4), Bukoba, 14 July 2006.

If the level of nutrient transfer from the Rweya to the Kibanja is to be sustained, therefore, increasing cattle population is therefore necessary. However, this is constrained by the availability of grazing land.

The socio-economic forces of tenurial change

The traditional land tenure systems, as hypothetically outlined in the previous study were by this time already undergoing modifications. For example, through the replacement of hereditary chiefs by appointed territorial authorities. Moreover, the introduction of perennial crops and technological improvements facilitated for agriculture development in terms of making more permanent settlement and more profitable farming. Growing of cash crops (coffee and tea) offered further possibilities for individual exploitation. The rising shortage of land and various investments in improvements imputed a more functional and commercial attitude towards land, and a monetary value for Rweya increased tremendously to a tune of more than 400% between 1985 and 1995; and by 180% between 1995 and 2005, despite its inherent poor quality of the soils (Table 5). However, previously the Rweya was considered as free good to all farming community members but in recent decades, these lands are grabbed by local wealthy farmers. Over the same period, community control over land tended to decay. In some villages where little land was available for allocation and none was abandoned, it followed that rights of allocation vested in the chief on behalf of the community were seldom exercised. The unprecedented increase in population also tended to build a closer personal identification with a specific area of land in the Rweya and to promote the spread of more intensive methods of land use; the interdependence of traditional society has been found increasingly incompatible with evolving market economy. At the same time, power went away from the traditional chieftainship towards elected councils and educated elites: rights of control over land were increasingly divorced from the other powers and responsibilities of chieftainship; and traditional relationships were further eroded by the acquisition of new skills and development opportunities. All these internal changes were related to, and deeply affected by socioeconomic development among the community that

acquired different attitudes towards land, and different views on cultural transformation.

Farmers developed ideas that land is a fully negotiable commodity that all land must be owned by someone, and that individuals rather than communal ownership of land is the cornerstone of a progressive society. Thus, with time the customary land tenure arrangements were increasingly undermined by socio-economic and political changes. In some instances, the customary tenure systems were condemned as inefficient, and blamed as potential catalysts to capitalist class formation if allowed to evolve on their own (Nyerere, 1967). In his article titled –The basis of African socialism (1967), President Nyerere explicitly states:

"The TANU government must go back to the traditional African custom of land holding. That is to say, a member of society will be entitled to a piece of land on condition that he uses it. Unconditional or freehold ownership of land (which leads to speculation and parasitism) must be abolished".

During socialist-inclined government, all lands in Tanzania were declared government properties vested in the president following the principles of Arusha declaration of 1967. During this time, the Nyarubanja and the freehold land tenure system was abolished and thus, somewhat reduced the land use rights of farmers. The nationalisation of land was followed by Tanzania's infamous "Operation Vijiji" of 1976 whereby people were resettled into Ujamaa villages where the land would be worked communally. In Bukoba district and other areas in the country with perennial crops and permanent settlement, the situation was slightly different. Villagers were not resettled, but required to create communal farms in what were considered to be 'open areas', the Rweya. As a result, traditional arrangements were disrupted. As we argued before, the land reforms during Nyerere's government meant that the administration of Rweya land was transferred from traditional chiefs to village development committees following the abolition of chiefdoms. In doing so, the capacity of ordinary villagers to regulate the use of communal resources was reduced

Village Development Committees became the administrative organ for allocating unoccupied land formerly vested in the chiefs but now claimed by the government. They also provided a link between political and administrative institutions rather than intervening directly. The role of the Mkondo and Omuharambwa diminished gradually, destabilizing the traditional mechanism that regulated the use of Rweya lands. Consequently, there was lack of regulatory mechanism of land use that was basis for rapid degradation of the Rweya such as uncontrolled fallow periods for Omusiri cultivation resulting to low productivity on those plots. During the second phase government after 1985 onwards, there was a comprehensive village land registration programme with intention to survey and demarcate village borders. Thus, a single right of occupancy was proposed for an entire village (including the Rweya land). In Bukoba, this land titling policy was most evident in the 'open' areas - the Rweya, where individuals were gradually increasingly claiming those areas especially those with economic and political influence. The claimants started planting trees, setting institutions or establishing private ranches (Figure 1). In doing so, the earlier roles of Rweya as a major source of nutrients for Kibanja through provision of grass and manure were gradually replaced by new uses. Figure 2 illustrates relative land cover of different land use types and their dynamics in Bukoba district within recent decades.

The figure indicates a rapid decline of the area cover under the Rweya over the last 40 years from 1961 to 1999. It must be emphasized that the absence of an effective regulatory mechanism constrains smallholder farmers' access and use of Rweya as women interviewed while cultivating Omusiri elucidate:

'This season we requested the Rweya owner to cultivate Bambara nuts. However, we were only allowed to plant for this season only as the owner will plant trees after the crops are removed, and this is the trend year after the crops are removed, and this is the trend year after year nowadays'(Interview *Bi* Paskazia and *Bi* Silvia, Bukoba *Omusiri* farmers, Tanzania, 22 November 2006).

During the 1980s, there was public dissatisfaction with the government's land policies that triggered the formulation of the new land policy. In 1991, the then President Mwinyi appointed a commission of inquiry into land matters, mandated to review laws and policies and to make recommendations to the government for necessary reforms. Following the land commission's report, the National land policy (NLP) was formulated in 1995, followed by the Village Land Act of 1999. The policy recognizes a dual system of tenure that is the customary and statutory rights of occupancy and supports household farming through decentralized land administration at village level. Under NLP, individual title deeds are supposed to be issued by the village government for a piece of land they occupy after a formal application to the village council, whereupon the applicant is required to pay a fee.

According to NLP, the title deed granted under this procedure is given equal status to that granted by the commissioner of lands responsible for issuing land titles in central government. The aim of this provision was to provide peasant farmers with tenure security so that their land could be used as collateral in financial institutions.

However, of all interviewed farmers (n = 151), none had such a title for the land they owned, nor were they aware of the existence of such provisions, suggesting that the impact of the new land policy on tenure arrangements

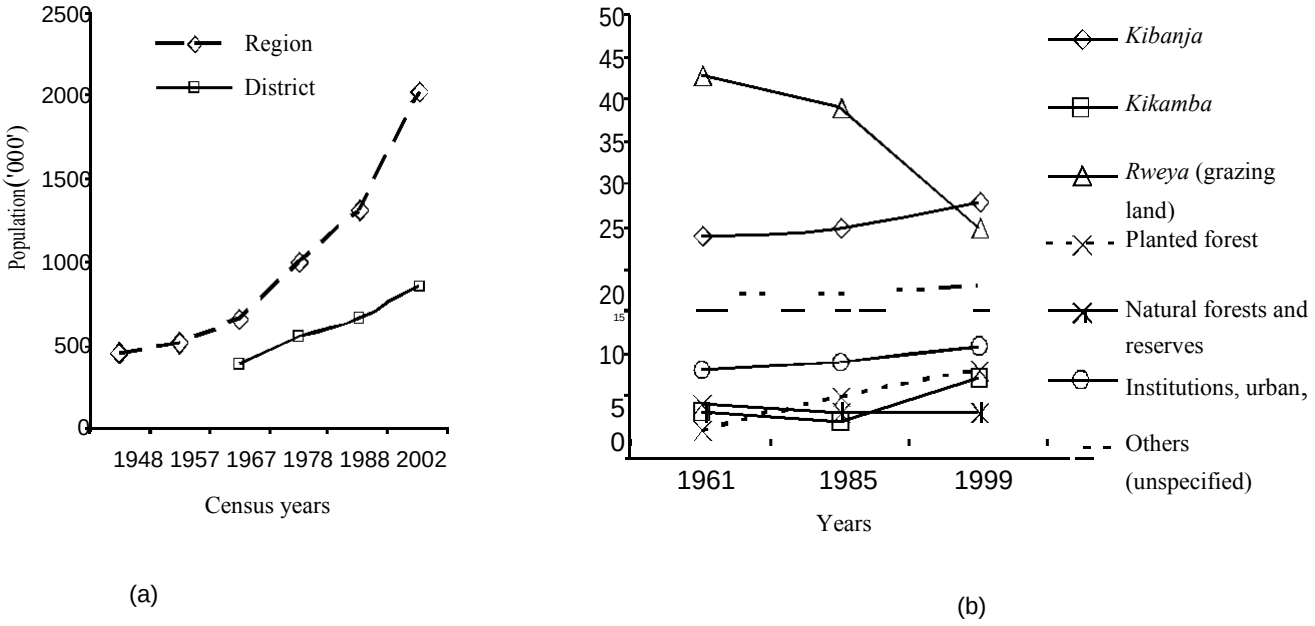

Figure 2. (a) Population growth for Kagera region and Bukoba district under the same land area (Source: Bureau of statistics); and (b) Relative proportion (%) of different land use in Kyamutwara division, 1961-1999 (After Baijukya et al., 2005).

was limited. Apparently, tenure arrangements for Kibanja land are regarded as secure by the farmers, which contrast plainly with the tenure arrangements pertaining to the Rweya land. In most villages, land grabbing is common and individuals involved are rewarded with strong, non-formal, individualized land rights, particularly in the Rweya. Field observations indicate that tree planting is done by farmers as economic venture and also as ways to legalize the ownership of land, thus imposing restrictions for access by rest of villagers. This contradicts the infamous claim that privatization of common land could potentially benefit the entire community (Lesorogol, 2005). In fact, this transformation is subject to unfair implementation by benefiting only few local elites. Although, the NLP recognizes “communal village land”, and requires that any allocation to individuals must be blessed by the village assembly, in practice this rarely happens.

Lacks of awareness of official policy documents and/or deliberate negligence by local actors are often the cause of this. Not surprisingly then, land conflicts are on the rise whereby communal access and individualized land rights clash just like elsewhere in Africa (Chimhowu and Woodhouse, 2006). Then again, the decline of productivity in this farming system might have been aggravated by prevailing socioeconomic developments and changes that also have weakened the structural link between the Kibanja and Rweya. Among the three predominant tenure systems, the Nyarubanja system was abolished on grounds of its perceived exploitative features, whereas the customary and freehold tenure became officially allowed through formal legal rules. The recognition of customary rights did not, however, mean that local 'traditional' institutions could enforce them. The socialism (ujamaa) ideology for example undermined such institutions that had enforced customary tenure arrangements. Subsequently, ideological shifts in policy notably neo-liberalism did not abolish or introduce new forms of tenure, and they strengthened a tendency to privatize the previously communally accessed lands. Thus, government policy had an indirect effect on land use change in the farming system as illustrated in Figure 1 showing how nutrient transfers from the Rweya to the Kibanja lands have declined emanating from changes in land use resulting from population pressure and socioeconomic developments.

Impact of tenure changes on cropping patterns and farm productivity

One criterion for gauging the social implications of land tenure change is productivity. At the initial stages of any land reform there is a likelihood of a decline in productivity due to instability and apprehension on the part of the farmers, the former landlords, and the governing class, who have to provide the essential supportive services and guidelines. As the Rweya land in the Bukoba farming system became under control of individuals, tensions and disputes arising from competition for available land resources have been growing. Restriction of access to such resources has had negative impacts on the productivity of home gardens (Kibanja) which heavily depend on soil organic matter

(Bationo et al., 2007). Table 6 compares average productivity for selected crops over time signifying a general decline in productivity for all selected crops, except tea (*Camellia sinensis*). In this farming system, the productivity of tea plantations depends on subsidized mineral fertilizers through a tea company which, during the reporting period was distributing farm inputs to farmers for their plantations. This arrangement did not apply to other food crops, thus explains why tea productivity is not affected by changes in tenure systems during the said period. However, up to the 1980s, farmers in Bukoba obtained cash from sale of mainly coffee and tea (Smith, 1984). Falls in sale prices of these crops in the world market during this period led to some farmers to abandon their coffee and tea plantations, thus making the land less productive. Besides, the continued decline in banana production led to crops like maize, cassava, and sweet potato to gain more importance as food crops and as alternative sources of income for farmers. Moreover, increased demand for wood as source of fuel energy and construction materials also encouraged establishment of more trees on the Rweya. The link between the productivity of Kibanja and the tenure system, therefore, is in this case established through tenure arrangements that hinder farmers' accessibility to Rweya resources that are essential for soil fertility replenishment.

It must be emphasized here that landlessness in Bukoba was rare prior to 1970s (Ilife, 1979). However, since then, it is getting common in recent years due to increased population pressure. Simultaneously, Kikamba lands have gained relative importance among farming households for food crops production because the crops grown in the Kikamba are annuals that allow short term flexibility in mitigating the complexity of tenure problems. Maize for example, is increasingly planted in the Kikamba in rotation with sweet potatoes compared to some decades ago when Kikamba-based maize was almost non-existent. At the moment, landless farmers and those with insufficient land and manure, tend to rent Kikamba from neighbours for growing maize or sweet potatoes, or cultivate Omusiri in the Rweya. When renting Kikamba, the tenants are usually not allowed to apply mineral fertilizer, due to wrongly conceived perception among landowners that mineral fertilizers spoil the land, reducing its long-term productivity, as per the confirmation by a

farmer found growing poor maize field in the 2005/6 season who recounts as follows:

'Look here mtaalamu (expert), I rented this plot from Mzee Yona with condition that I can plant maize so long as no mineral fertilizers are applied in his land; so i should abide to his condition so that I can be allowed to cultivate here next season' (Ishengoma, 2006) - personal communication.

Non-use of mineral fertilizers emerged during the 1970s when farmers were supplied with fertilizers special for tea plantations, which, apparently, some farmers applied this fertilizer in the banana fields coupled with exceeding the recommended amount that resulted in soil acidification in those fields. Since then, most farmers felt that inorganic fertilizer has detrimental effects on their soils. From above empirical evidence and field observations, the effect of complexity of tenure systems in Bukoba case is reflected in limited rational supply of inputs for rented land, resulting to poor productivity per unit of land. The productivity of major crops indicated in Table 6 does not account for the quantity of used inputs for the realized outputs per hectare, and therefore may not be a sufficient indicator for the sustainability of the system. Hence, these data presents a sign for declining productivity for most important crops grown in the farming system.

Explicitly, nutrient balances that is net losses or gains of the most important soil nutrients on which crop growth depends, may provide a better understanding of sustainability of the productivity of the land. When the nutrient balances were calculated for Kibanja lands in selected farms, we realized that the Kibanja managed without adequate farm inputs of organic materials such as manure and mulch, were negative for important soil nutrients notably N, P, K, Ca, Mg and S (Table 7), implying a threat to sustainability of the system.

CONCLUDING REMARKS

In this study, we have discussed how agro-ecological processes and tenure arrangements are intertwined and examined how the productivity of individually-owned land (Kibanja) in Bukoba, Tanzania, critically depends on common land (Rweya). Tenure reform programs that aim to increase land productivity but that ignore such interdependencies, are likely to yield the opposite from what is envisaged – productivity decline. The historical co-existence and persistence of different land tenure arrangements for different land uses – as elaborated for this farming system – challenges evolutionary models of land tenure change, which view communal and individual access to land as mutually exclusive and successive categories. As the Bukoba case reveals, it is important for any policy change to take the structure of the farming system into account, as it ultimately shapes the productive use of the land. Although population pressure may have contributed to competition over available land based resources in Bukoba district, the changes in socioeconomic development may have induced changes in tenure arrangements and speeded-up the process of change in land use on Rweya as observed in recent decades. As a matter of fact, many African governments are involved in land tenure reform in smallholder farming systems. This is particularly true where government institutions have taken over or partly substituted customary systems led by chiefs and other community

Table 6. Estimated average productivity (kg $ha^{-1}yr^{-1}$) for selected crops in two periods in the three main land use types in the high rainfall zone, Bukoba district.

Period	*Kibanja*		*Kikamba*		*Rweya*	
	Banana	**Beans**	**Cassava**	**Potatoes**	**Bambara nuts**	**Tea**
1960-1980	13188[a]	450[a]	6682[d]	11702[d]	1500[d]	661[e]
1990-2000	2400[b]	125[c]	4843[d]	7888[d]	1371[d]	830[f]

Source:
a: Rald and Rald (1975); measurements on average 0.26 ha *Kibanja*
b: Mbwana et al. (1997); based on surveys and measurements (n = 180)
c: FSR (1990); based on household surveys (n = 120)
d: Authors' field notes (2005); data based on farmers' estimates (n = 5)
e: NEI, (1994); data based on factory records
f: Wijnalda, (1996); data based on factory records of farmers' sales.

Table 7. Reported nutrient balances (kg $ha^{-1}yr^{-1}$) of *Kibanja* under different management levels in high rainfall zones and low rainfall zones of Bukoba district[1].

Zone	Farm nutrient management level[2]	Nutrient balances					
		N	**P**	**K**	**Ca**	**Mg**	**S**
High rainfall zone	No cattle, no brewing	-76.2	-4.9	-50.0	-40.2	-26.8	-12.2
	No cattle, brewing	-73.9	4.2	-41.2	-39.8	-26.2	-12
	Indigenous cattle, no bedding	-7.5	10.8	-6.4	-13.9	-14.1	1.9
	Indigenous cattle, bedding	7.0	12.3	15.5	-10.9	-12.4	4.9
	Improved cattle under zero grazing	80.5	42.8	198.7	34.3	9.8	12.9
Low rainfall zone	No cattle, no brewing	-27.9	-2.7	-30.1	-6.5	-8.5	-3.9
	No cattle, brewing	-25.1	-2.0	-20.6	-4.8	-6.9	-3.8
	Indigenous cattle, no bedding	-8.7	1.6	-15.1	-1.6	-3.0	0.2
	Indigenous cattle, bedding	-3.9	2.4	-8.8	4.0	-2.3	0.7
	Improved cattle under zero grazing	11.0	8.9	32.1	12.5	2.4	5.0

[1]Source: Baijukya and Steenhuijsen Piters, 1998. [2]Nutrient inputs into the farm is through organic materials (for explanation: see text).

authorities. As this study has shown, integration of such 'modern' and customary regulatory systems is crucial, even if their jurisdictions relate to different land uses that may be highly interdependent. Thus any (partial) land tenure reform is unlikely to succeed if it is founded on inadequate information regarding the prevailing farming system.

Research prior to policy formulation is necessary, and research should be maintained at the implementation and evaluation stages to permit proper monitoring of outcome on land resources. In order to reduce the negative consequences of increased population pressure on Rweya, alternative technologies such as zero grazing where farmers grow their own fodders or mulch materials instead of depending on common resources are one of the options. The use of leguminous fodders or cover crops that fix nitrogen from the air and thus add nutrients to the system may also assist in sustaining productivity. Without external inputs such as mineral fertilizers, it is likely that soil fertility will decline further, perhaps causing a permanent shift away from production of highland banana to arable crops. Depending on the sale price, intercropping of coffee in the Kibanja may be an option that can economically justify for the use of fertilizers. According to the Village Land Act, the maximum limit to land holding is set at 20 ha per person residing in a village, yet there is no legal minimum limit of land holdings under Tanzanian land law. Given that population density is increasing rapidly in Bukoba, as in other regions of Tanzania, land fragmentation and landlessness are also increasing. At the same time, the area of *Kibanja* per household is decreasing.

Policy measures to intensify agriculture, the stimulation of out-migration to places where land pressure is less acute, or the provision of alternative employment opportunities outside agriculture may therefore be more relevant for maintaining the sustainability of farming systems than a continued pre-occupation with land

tenure reform.

ACKNOWLEDGEMENTS

We thank the European Union for providing financial support for this research in the framework of the AfricaNUANCES project (Contract no INCO-CT-2004-003729), and the farmers in the villages of Butulage and Butayaibega for cooperation during data collection.

REFERENCES

Atwood D (1990). Land Legislation in Africa: The Impact on Agricultural Production, World Dev., 18(5): 659-671.

Baijukya FP, Ridder N de, Masuki KF, Giller KE (2005). Dynamics of banana-based farming systems in Bukoba district, Tanzania: changes in land use, cropping and cattle keeping, Agric. Ecosyst. Environ., 106(4): 395-406.

Baijukya FP, Steenhuijsen Piters Bde (1998). 'Nutrient balances and their consequences in the banana-based land use systems of Bukoba District, Northwest Tanzania', Agr. Ecosyst. Environ., 71(1-3): 147-158.

Bationo A, Kihara J, Vanlauwe JB, Waswa B, Kimetu J (2007). Soil organic carbon dynamics, functions and management in West African agro-ecosystems, Agric. Syst., 94(1): 13-25.

Besley T (1995). Property rights and investment incentives: theory and evidence from Ghana, J. Pol. Econ., 103(5): 903-937.

Bureau of Statistics (2002). Population and housing census, Kagera Region, Tanzania. http://www.tanzania.go.tz/census/districts/bukobarural.htm (accessed 25 March 2009).

Chimhowu A, Woodhouse P (2006). Customary vs Private Property Rights? Dynamics and Trajectories of Vernacular Land Markets in Sub-Saharan Africa, J. Agric. Change, 6(3): 346-371.

Cory H, Hartnoll MM (1945). Customary law of the Haya tribe, Tanganyika territory. Frank Cass & Co, London, 299 p.

Deininger K, Jin S (2006). Tenure security and land-related investment:

Evidence from Ethiopia, Eur. Econ. Rev., 50: 1245-1277.

Haugerud A (1989). Land tenure and agrarian change in Kenya, Africa, 59: 61-90.

Ho P, Spoor M (2006). Whose land? The political economy of land titling in transitional economies, Land Use Policy, 23: 580-587.

Iliffe J (1979). A modern History of Tanganyika. Cambridge University Press, pp. 318-341.

Kalikawe TS (1974). The *Nyarubanja* land tenure system and its impact on the growth of coffee in Bukoba. BA Dissertation, University of Dar es Salaam, Tanzania.

Lorkeers AR, Tegamaisho R, van de Kop PJ (1996). *Rweya* soils, grasses, and *Rweya* use for cattle production'. Applied soil fertility project. Unpublished project report, ARI Maruku, Bukoba, Tanzania (mimeo).

Lesorogol CK (2005). Privatizing Pastoral Lands: Economic and Normative Outcomes in Kenya, World Dev., 33(11): 1959-1978.

MALD (1984). Tanzania livestock census (provisional report). Ministry of Agriculture and Livestock Development, Dar es Salaam, Tanzania.

Maliyamkono TL, Bagachwa MSD (1990). The Second Economy in Tanzania. James Currey, London, 198 p.

Maruo S (2002). Differentiation of subsistence farming patterns among the Haya banana growers in northwestern Tanzania, Afr. Study Monog., 23: 147-175.

Mbwana ASS, Mgenzi SRB, Steenhuijsen Piters Bde, Baijukya FP (1997). Banana Recommendations and Research Needs in Kagera Region. Field Note no. 70. Maruku Agricultural Research Institute, Bukoba, Tanzania.

Migot-Adholla S, Hazell P, Blarel B, Place F (1991). Indigenous land rights systems in Sub-Saharan Africa: A constraint on productivity? World Bank Econ. Rev., 2: 155-175.

Mutahaba G (1969). The Importance of Peasant Consciousness for Effective Land Tenure Reform: The Problem of Abolishing Nyarubanja Land Tenure in Bukoba District. Undergraduate Dissertation, University of Dar es Salaam, Tanzania.

Mwijage AN, Ridder Nde, Baijukya F, Pacini C, Giller KE (2009). Exploring the variability among smallholder farms in the banana-based farming systems in Bukoba district, Northwest Tanzania, Afr. J. Agric. Res., 4(12): 1410-1426.

NEI (1994). Coffee Sector Study report Kagera Region Tanzania. Netherlands Economic Institute, ZED and HVA International, Roterdam, The Netherlands. Nkuba, JM (1997). The diversity of the Bukoba farming system and its household typology, Kagera region, Tanzania. MSc dissertation. The University of Queensland, Australia.

Nyerere JK (1967). Ujamaa Essays on Socialism. Oxford University Press. Dar es Salaam.

Platteau J (1996). The Evolutionary Theory of Land Rights as Applied to Sub-Saharan Africa: A Critical Assessment, Dev. and Change, 27(1): 29-86.

Pokorny D (1973). The Haya and their land tenures: property rights and the surplus problem, Rural Afr., 22: 93-123.

Rald J, Rald K (1975). Rural organization in Bukoba District, Tanzania. København, Uppsala, Sweden.

Repetto R, Holmes T (1983). The role of population in resource depletion in developing countries, Pop. Dev. Rev., 9(4): 609-632.

Reining P (1967). The Haya: The agrarian system of a sedentary people'. University of Chicago, PhD dissertation, Chicago.

Rugalema GH, Oktingáti A, Johnsen FH (1994). The home garden agroforestry system of Bukoba district, North-West Tanzania. 1. Farming system analysis, Agrof. Syst., 26: 53-64.

Smith CD (1984). Sustainable development reconsidered: rich farmers of Kagera region in Tanzania, Labour, Capital Society, 27: 34-54.

Smith RE (2004). Land Tenure, Fixed Investment, and Farm Productivity: Evidence from Zambia's Southern Province, World Dev., 32(10): 1641-1661.

Steenhuijsen Piters Bde (1999). A concise History of Land Use in Kagera Region, Tanzania', in Folmer ECR, Schouten C and Baijukya FP (eds) Planning the Future: Past, Present and Future Perspectives of Land Use in the Kagera Region, Tanzania. Report for the 50th anniversary of ARI Maruku. LZARDI, Maruku, Tanzania.

Tibaijuka AK (1984). An Economic Analysis of Smallholder Banana-Coffee Farms in the Kagera Region, Tanzania: Causes of the Decline in Productivity and Strategies for Revitalization. PhD dissertation, Swedish University of Agricultural Sciences, Uppsala.

Toulmin C (2008). Securing land and property rights in sub-Saharan Africa: The role of local institutions, Land Use Policy, 26: 10-19.

URT (1994). Report of the presidential Commission of Inquiry into Land Matters, Vol. 1: Land Policy and Land tenure structure'. Ministry of lands, Housing and Urban development, Dar es Salaam, Tanzania in cooperation with the Scandinavian Institute of African Studies, Uppsala, Sweden.

VLA (1999). 'Act No.5 of 1999'. Village Land Act, Tanzania.

Wijnalda D (1996). Soil fertility, productivity and Nutrient Balances of Different Land Use Types in Bukoba District, Tanzania. MSc Dissertation, Wageningen University, Department of Soil Science and Plant Nutrition, Wageningen, The Netherlands.

Wily LA (2000). Land tenure reform and the balance of power in eastern and Southern Africa. Natural Resources Perspectives No 58. ODI/DFID.