

# **Implications of sustainable agricultural intensification for family farming in Africa: Anthropological perspectives**

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## **Abstract**

In this paper, we will explore the ways in which sustainable intensification interventions often overlook fundamental social dynamics in rural landscapes. We provide evidence of the underlying social, political and environmental contexts that affect farmers' land-use decisions. While there are numerous initiatives to promote a Green Revolution for Africa, many tend to be dominated by technical fixes that fail to understand rural farmers' conditions or aspirations and focus narrowly on increasing productivity. These technical solutions rarely address the broader social, economic and political challenges to agricultural production and farmers' livelihoods. Finally, top-down technical approaches frequently fail to build on the local knowledge, innovative capacity and expertise of farmers and members of rural communities throughout Africa. Examples from fieldwork in Ghana, Ethiopia and Tanzania are used to illustrate our arguments.

**KEYWORDS:** smallholder farmers, family farms, Africa, sustainable intensification, development and anthropology

## **Introduction: intensification, food security and expert-driven development**

In many countries in Africa, smallholder farmers, agro-pastoralists and pastoralists are under considerable pressure: pressure to sell or lease their land to national and foreign investors; pressure to engage in national and global markets; and pressure to pursue agricultural practices that are "climate smart" and intensify production to meet local and national food production goals. Central questions arise regarding from where this pressure comes, how goals are defined, from whom and what evidence is used to spur changes in smallholder farming in rural Africa. This paper examines how narratives about agricultural intensification and global food needs support not only national and global policies affecting smallholder agriculture in Africa, but also the promotion of particular kinds of

interventions designed to increase production. These narratives, while communicating powerful but often simplistic messages about the need to improve food supply, often ignore essential social, cultural and political realities in African farming communities. As Li observes, these narratives enable the translation of complex and messy realities into linear approaches leading from the identification of problems, to design of interventions, to positive results (2007). They also place the designers of interventions in the role of ‘trustees’ working to optimise ‘the lives of others’ (ibid.: 5).

In order to meet food security and foreign exchange needs, intensification of production is at the centre of most agricultural development programs. As most farming in Africa is carried out in small to medium-size family farms, considerable debate has emerged about the viability and success of these farms. There is a growing literature debating the appropriate size of farms for meeting food and cash needs (cf. Wiggins et al. 2010). Arguments in favour of large farms claim they have greater efficiency and benefit from economies of scale. Meeting the food needs of ‘9 billion people by mid-century’ by producing 70 percent more food (FAO 2011) is a common refrain used to justify the need for large-scale farming either through foreign-direct investment or by national investors. However, increases in food supply do not necessarily lead to reductions in hunger or improved livelihoods: ‘hunger is most often a consequence of economic access to food rather than a lack of supply’ (Garnett & Godfray 2012: 12). Furthermore, according to the UN Food and Agriculture Organisation (FAO) (Gustavsson et al. 2011), approximately one-third of the world’s food is wasted rather than consumed. The need to intensify production and produce more “food” (often it is biofuels), has led to an explosion of speculation in agriculture and land, or “land grabs”, which demonstrates quite clearly the threat that intensification narratives and the supposed necessity of large-farm production poses to small- and medium-scale farms. As Peters argues, this explosion of large-scale investment in land, which results in the removal of farmers from land they have long held, depicts an ‘inevitable agro-industrial future which makes millions of Africans “surplus” to the needs of capitalist investment’ (Peters 2013b: 537). While many people in Western countries are questioning this vision of an agricultural future, in many parts of Africa, it is being rolled out as a necessity for meeting overall development goals.

Related to, but not easily reconciled with the need to produce more food, is the contention that food needs to be produced more sustainably so that the underlying natural resource base will be intact for future generations. Garnett and Godfray elaborate on the contradictory and ambiguous qualities of the idea of sustainable intensification and how it can be used to defend and promote numerous positions on how to approach agricultural development (2012). Whether it concerns “development” more broadly, or agricultural development more specifically, anthropologists have provided examples of how these Western ideas about “progress” and “productivity” overshadow and ignore the values, goals and knowledge of farmers in many parts of the non-Western world (cf. Sillitoe 1998; Escobar 1995; Gardner & Lewis 1996). As Guyer and Peters observed about one agricultural development project: ‘farmers in the project were not simply experimenting with production but building community ties and a repertoire of diversified activities in accordance with long-range goals’ (1987: 204).

Many development agencies and international research centers, such as the Consultative Group on International Agricultural Research (CGIAR), often take a narrow approach to intensification by focusing on increased use of inputs in the form of improved seeds and animal breeds, chemical fertiliser, irrigation and mechanised agriculture. This approach is primarily technical and interested in quantifiable increases in production. As such, it ignores the history of Africa's decline in agricultural production and how it has been influenced by colonial and post-colonial economic and political policies (Davidson 2012). Major players in the agricultural development industry (CGIAR, the Alliance for a Green Revolution in Africa [AGRA], USAID, and other donors) have a tendency to assume a linear model of development, from "traditional" and "unproductive" to "modern" and "efficient" farming. This approach to agricultural development unquestionably justifies the role of external experts in spurring this transformation. There are numerous examples of indigenous intensification, but these are often overlooked and not well understood by technical experts. As Stone et al. point out:

it is seldom remarked that agrarian intensification, the process of increasing output per unit of land area and time can be achieved using indigenous ecological knowledge, local crops, and traditional or innovative low-energy methods of turning the soil, weeding, manuring, crop rotation, soil conservation, livestock husbandry, and arboriculture (1990: 7).

In the colonial era in Kenya, for example, African farming techniques were seen as the cause of underdevelopment: 'The cause of the problem lies far deeper, in the basic agricultural and economic defects of African tribal practices and the poverty of much of the land' (From Kenya: Correspondence of the Governor and the Secretary of State on the East Africa Royal Commission on Land and Population in East Africa (London 1952, p. 8), as quoted in Harbeson 1971: 235). In the current world of agricultural development, Davidson notes: 'the emphasis is unmistakably on bringing science and technology to the "unknowing" African smallholder. Again, such an approach carries forward an attitude toward African farmers as occupying an earlier stage of evolutionary history' (2012: 26). As a result, farmer and pastoralist knowledge and expertise is frequently either unrecognised or ignored.

The Green Revolution preoccupation with increasing the production of single commodities, and providing "technical packages" has a fairly simple underlying assumption: that with, as Davidson (2012) suggests, a bit of tinkering and technical improvement, the problems of food security and producing surpluses for the markets can be fixed. As a result, the political, economic, social and cultural context in which African agriculture is embedded is frequently ignored. Davidson (2012) suggests that one reason for the lack of attention to, and interest in, these contexts is linked to the fact that most of the experts staffing international or national organisations working on agricultural development are economists, crop breeders, agronomists and other technical experts. Social scientists from disciplines such as political science, geography, sociology and anthropology are few and rarely in leadership positions. Systems approaches to agriculture, which consider the complexity of farming practices and the wider context, appeared during farming systems research in the 1980s, and systems thinking is once again making its way back into cur-

rent CGIAR projects, but is still often dominated by a focus on commodities and linear, tech-driven approaches.

While technical experts are an important source of new knowledge that can improve farmers' and pastoralists' lives, the delivery of such knowledge and accompanying technologies is rarely a consultative process. As Tiffen observes, 'it suits to view farmers as destructive of the environment (due to poverty, ignorance, or greed) and requiring direction, or at least, advice' (1996: 168). The consequences of technical expert-driven development programmes are documented particularly well by Li (2007), Leach and Mearns (1996), and Mitchell (2002). Because many technical experts have little knowledge of the social, economic and political context in which smallholders operate, the adoption of interventions is often far below expectations because of a mismatch between farmer and expert goals. Inevitably, there are unintended consequences, some positive, and some negative of any such intervention. Li, echoing Ferguson's (1990) observations on the "anti-politics machine", terms this approach to development "rendering technical" in which 'experts tasked with improvement exclude the structure of political-economic relations from their diagnoses and prescriptions' (Li 2007: 7).

This paper focuses on a few examples of small-scale household farming and livestock production systems in East and West Africa to illustrate how the dominant narratives around agricultural development ignore or misunderstand local practices, values, goals and challenges, and thus often result in limited adoption of technical interventions. Our observations are based on work conducted as applied anthropologists with the CGIAR and as academic researchers working outside of the development system. Within the CGIAR, our role has been to provide expertise in livelihoods analysis, policy, institutional analysis and household decision making. Our argument is that a more nuanced understanding of the African family farm is critical to current approaches to agricultural research for development. At the moment, in-depth anthropological analysis of African smallholder farming systems is largely missing from CGIAR research but should be playing a vital role in informing current attempts to promote sustainable intensification. We draw on experiences from Ethiopia, Tanzania and Ghana to demonstrate how the "family" farm is situated in wider social, cultural, political and biophysical contexts that influence farmers' strategies and choices and affects their interests in and ability to increase production. Programmes designed to intensify farm production often overlook farmers' use of a wider landscape and the relationships between farms and overall productivity across the landscape.

## **Methodology**

Data for this paper is derived primarily from qualitative field research involving numerous focus group discussions, interviews with a range of informants including male and female farmers and agro-pastoralists, government officials, schoolteachers, NGO personnel, and national researchers. The work in Tanzania has been carried out over many years under academic research grants. In Ghana and Ethiopia, research has been done, together with biophysical scientists, as a component of larger projects on land use, agriculture and natural resources management. In addition to the qualitative work, quantitative survey data was gathered in Tanzania, and in Ethiopia we draw upon results from a household survey carried out by the

International Food Policy Research Institute (IFPRI) in September 2010. In Tanzania, long-term fieldwork was carried out from 1990 to 2008. These trips varied in duration from several weeks up to two years. Work in Ethiopia involved regular short field trips ranging from a few days to several weeks periodically over four years from 2010 through 2014. Work in Ghana entailed short field trips, each lasting several weeks at a time, from 2011 to 2014.

## Overview of field sites

In Tanzania, the material is drawn primarily from long-term research in Mbulu district among the Iraqw community, an agro-pastoral Cushitic-speaking group in north-central Tanzania (Snyder 1996; 2005). Fieldwork was carried out over the entire territory where Iraqw are the majority occupants, i.e. Mbulu, Babati, Hanang and Karatu districts, but more intensive work was conducted in the Iraqw homeland near Mbulu town. Homeland population density is about 186 people per square kilometre, elevation ranges from 1500 to 2300 metres, and rainfall averages 1000 mm per year. Farm size averages 1.4 ha in the homeland, with farms as large as 20 ha in migration zones. The main crops grown include maize, beans, sweet potatoes, Irish potatoes, and wheat. Green vegetables, onions and tomatoes are grown for consumption and sale; cash crops of pyrethrum and coffee are also cultivated. Households keep cattle, goats, sheep, chickens, ducks and donkeys for consumption, transport, sale and ritual purposes. Iraqw are classified as agro-pastoralist because of their history, herding practices, and the significance of livestock in their economy and in their culture. In areas outside of the homeland, the dominance of livestock in their land use and economy is greater, and some communities have very significant herds.

In Ethiopia, work focused on five *kebeles*<sup>1</sup> in three districts in the highlands. Two of these districts (Jeldu and Diga) are in Oromia region; one (Fogera) is in Amhara Region. Despite the cultural and linguistic differences between Cushitic Oromo and Semitic Amhara, the population across the three study districts is predominantly mixed crop-livestock farmers. In terms of biophysical characterisations, the three districts vary by elevation (from 1140 to 3152 m), rainfall (from 974 to 2037 mm), and agro-ecological zonation. Farm size also varies by site. Fogera has the smallest farm sizes (1.37 hectares per person) in comparison to Jeldu and Diga (1.53 and 2.70 hectares respectively). Cropping strategies differ according to biophysical characteristics. Teff and wheat are grown in all the sites, Irish potatoes and barley in Jeldu, rice in Fogera and maize in Diga. Livestock is important in all sites and includes cattle, sheep, goats, donkeys, mules and horses, used for traction, transport, meat, fuel (manure), and milk.

In Ghana, research was carried out in the Upper East Region (UER) among several different villages. This region falls within the savannah vegetation belt; agriculture and livestock-keeping are the main livelihood pursuits. The population is about 117 people per sq. km, and land holdings range from one to three hectares. The average rainfall ranges from 700 mm to 1200 mm, and the rainy season is from late May to mid-October. Temperatures range from 23 to 35 degrees C. Crops grown include sorghum,

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<sup>1</sup> *Kebele* is an administrative unit of government in Ethiopia, roughly equivalent to a village.

millet, maize, groundnuts, and vegetables such as tomatoes, onions and green vegetables. Rice is also cultivated in irrigated areas and along river banks.

## **The family farm**

While the concepts of *family* and *household* have been much discussed in anthropology (cf. Guyer and Peters, 1987), considering how these social units are formed and what they do rarely features in development planning. Household economic surveys usually do not record information about households in the wider social context and, in interviewing the “head of the household”, usually capture a male-biased perspective. Frequently, quantitative data is gathered without the necessary qualitative work to sufficiently explain survey results. This information is then used for the planning of interventions.

Household composition in these sites can be very fluid. In Tanzania, a host of relatives of either the husband or the wife, and sometimes friends, might be resident at any given time and may contribute labour to farming or herding activities. In Ghana, compound households are multigenerational, and hierarchies based on age and seniority in marriage (i.e. first wife versus subsequent wives) are important factors in organising production and consumption. The size of compound households can vary significantly in Upper East, and the larger the size generally indicates a wealthier compound as more labour can be mobilised (Whitehead 2006). Blench, in his survey of villages in Upper East, found that the average compound household size was 19.7 people and ranged from one to 120 people (1999: 9). He noted that how the household is approached can lead to varying results:

mean household size is very large compared with most standard surveys of this area. This is because the definition of household used varies from one survey to another. It is common to take a small sub-unit of the large compounds in UER and analyse that as if it were a household. This has the effect of making the household look similar to those recorded elsewhere in Ghana but also distorts the underlying social structure which has very large households as co-operative units (1999: 9).

In the highlands of Ethiopia, households usually consist of a core family unit controlled by the head of the household, usually male. It is common for households to host distant family members who are employed as farm labourers or domestic servants. Many households depend on the labour, the sharing of resources and access to opportunities that such arrangements provide.

Migration makes household composition and its relationship to farming at times difficult to assess. Out-migration in the Tanzania site was more permanent than temporary and therefore did not have much of an impact on farming in the natal homes. In Ethiopia, migration can be both permanent and temporary. The migration of young men is essential to the household economy even if only in the effect of relieving the pressure on food resources. In Upper East Ghana, migration had been a feature of life even before the colonial era but increased due to colonial policy. In Blench’s (1999) survey, it was found that households in Upper East counted an average of 5.4 members as migrants, usually on a temporary ba-

sis. As with Ethiopia, although earnings from migration are low, the removal of household members during the lean season reduces stress on available food resources.

What is clear in all the study areas, is that household members have common but also sometimes competing interests. As Guyer and Peters emphasise, 'the solitary household assumed for European, Middle Eastern, Asian, Latin American and North American farmers and peasants is inapplicable to Africa, where there are social units centering on an adult male with authority over land and over his wife/wives and children who often have their own separable stocks of property and authority' (1987: 207). Gender is one organising principle for the access and control of resources and organisation of farming and other activities. Age then cross-cuts gender. While each study area has its own tradition of household structure and rights of access to land and resources, often the situation on the ground can vary significantly. The Iraqw, for example, assert that patrilineal descent is the essential criteria for access to land. However, deeper analysis reveals far more complexity with matrilineal kin also being significant in some households for access to plots.

## **Land tenure**

Land tenure is often a central focus in debates on intensification, and farming in Africa is clearly structured by national and local tenure systems. In much of the development literature, scholars argue that titling land and encouraging individual or household level rights of ownership is the best strategy for agricultural investment and productivity (cf. review by Place 2009). Some assert that only formal, legal rights to land provide incentives for farmers to invest in their land and in agriculture. Others counter this assertion, arguing instead that informal rights of access and use through customary systems allow security of access by those frequently omitted in formalised land titling systems, women and youth in particular. They suggest that customary rights can give as much security as more formalised legal systems. As with most of these debates, the reality exists along a spectrum and depends very much on the specific social and cultural contexts.

Anthropological research conducted throughout sub-Saharan Africa reveals that land is not merely a commodity (cf. Shipton & Goheen 1992 for a review). Land is the most important economic and social asset for the households who have access to it, but access and use are defined by membership to lineages, clans, chiefdoms, villages, ethnic groups, social networks, etc. Even when the farm size is so small that earning a living from it may be untenable, many are unwilling to give up land because it is the basis for a sense of belonging to a community and to a family (cf. Shipton 1989 among others). Tenure across the continent is complex and highly variable. In most countries, it involves a combination of formal, legal rights involving land title deeds with customary rights. As Shipton notes African land tenure is not about ownership per se, but instead rights and duties of use, transfer, access and control (1994).

## **Tanzania**

In Tanzania, all land is still considered to be under the state with the president serving as trustee. The Land Act and the Village Land Act of 1999 resulted in more power being devolved to communities allowing them to hold tenure over their lands and to oversee

land allocations within their borders. Both private and customary communal tenure are recognised. Among the Iraqw, land is accessed through multiple means through patrilineal inheritance practices; occasionally through matrilineal kin; provision by village elders and allocation by village government. Women access land either through government or through kin and husbands. The concept of ownership is a slippery one. While individuals have very clear ideas regarding who has access to and rights to control particular pieces of land, this clarity does not mean that there is not considerable negotiation and dispute, usually resolved either by government officials or local elders. In many parts of the districts that Iraqw inhabit, there is significant pressure on land resources, which gives rise to considerable competition, particularly within families. However, there is as yet no evidence of landlessness. Farmers do not hesitate to invest in agriculture or the health of their land even if they have no officially formal land title. The motivations for investment revolve around meeting short-term and long-term goals. For example, tree planting is widespread in Iraqw areas. In part, planting is motivated by government policy that declares that anyone who has trees on their land, and whose land is taken by the government for a public purpose (i.e. school or road), must be compensated for those trees at their potential value at harvest. In addition, trees are seen as an effective way of marking farm boundaries and thus declaring ownership of any land. Finally, trees are seen as personal savings accounts. Male household members plant them in order to use the proceeds from harvests for school fees or other large expenditures (Snyder 1996).

## **Ethiopia**

In Ethiopia, all land belongs to the state and user rights are controlled by the local administration, namely the kebele. In order to be allocated land by local authorities, an individual must be recognised and registered as a household head. According to a survey of rural Ethiopian households, two-thirds of land-user rights held by households come directly from the kebele not the family (Fafchamps & Quisumbing 2001). The study found that of the land that comes from the family, most comes from the husband's parents. However, many young men have to wait until the kebele allocates them land before they are able to marry. Female-headed households sometimes gain access to land from their husband or husband's family, but rarely from their own family. Historically women were excluded from kebele associations, unless they were heads of household: 'Men are the most numerous and most visible members, who have the most secure rights to resources and in particular the most direct rights to land use ... For women, almost all contact with the state is usually mediated through men' (Pankhurst 1990: 147–8). In recent times, however, it has become more common for women to receive land from the kebele, which represents a shift in traditional patterns of land allocation in rural areas. In part, this has been facilitated by changes in land policy whereby in 2005, the government launched a land registration and certification programme that provided leasing rights and compensation in the event of loss of land for state development projects. Recent studies in Ethiopia suggest that increased tenure security in the form of registration and certification may enhance farmer investment (Deininger et al. 2008), but this is likely to depend on the realities of implementation and farmer confidence in the certification process, which may be influenced by past experiences.

During the eras of both the Derg (1974–91) and the current Ethiopian People’s Revolutionary Democratic Front (EPRDF) regimes, the state has experimented with land redistribution policies. In the Ethiopian sites we worked in, the impact of these policies varied and influenced farmer choices and decision-making. In Fogera, the redistribution of land post 1991 by the EPRDF resulted in communal grazing lands being divided up and given to individual households, reducing the amount of overall grazing available for livestock, increasing pressure on the remaining grazing areas and leading eventually to households having to reduce their number of livestock. While Diga has not been subject to recent land redistribution, it was targeted for villagisation under the Derg. Farming households were moved from their rural farm lands into village clusters in highland areas. This practice was meant to encourage better use of and access to land and services. Farmers at the higher elevations, squeezed by population pressure and small land holdings, have since expanded into the lower zones, clearing forest land for farms. Both the Derg and EPRDF governments initiated resettlement programmes that moved people from highly populated highland areas of the country to lower population zones in order to relieve pressure on resources. The increasing population in Diga has also contributed to widespread deforestation. In Jeldu, land redistribution under the Derg led to greater fragmentation of holdings, creating challenges for resource allocation. Given that land allocation was based on family size at the time of redistribution, the land received by households may no longer be adequate. Large numbers of landless youth now depend mainly on sharecropping and off-farm activities for income generation.

In Ethiopia, landlessness is a feature throughout rural communities in the densely populated highlands. Land scarcity is perceived as one of the main constraints to agricultural production and has been identified as a driver of migration and sharecropping.

## **Ghana**

In Ghana, land tenure systems are quite complex. According to a USAID brief, roughly 80 percent of the land is under customary land tenure principles (USAID nd). The government is also running a land certification programme in which individuals can obtain title deeds for land parcels, but this is mostly being rolled out in urban areas. In Upper East Region in Ghana, customary land tenure is the rule. Land falls under the chiefs or the *tendaana* (sometimes referred to as “earth priests”) and follows the rule of patrilineal descent. The *tendaana* oversee ritual events but also are important in allocating land for farming and building. Men obtain farmland through inheritance and allocation by the senior men in the lineage. Women do not inherit land but access land through their husbands. Within family compounds, access to land is controlled by the compound head. In Bugri’s (2008) study in two districts in Upper East region, respondents felt their customary tenure over the land they cultivated was secure and did not affect their decisions about how they invested in agricultural production. While women’s reliance on accessing land through their husbands may not appear to confer much security, women still invest as much as they can in the crops they cultivate on those lands. In addition, women access important economic tree species, such as shea (*Vitellaria paradoxa*) and dawadawa (*Parkia biglobosa*) through their husbands’ land but also negotiate access with other tree/

landholders. These resources are vital for the household economy and for women's income (Chalfin 2004). Compared to Ethiopia and some of the more densely populated areas in the Tanzania study, land in Upper-East region Ghana appears plentiful at first glance. However, even here, where field sizes and overall holdings are larger, all farmers complain that land is becoming scarcer, and they are unable to fallow anymore.

Much of the technical approach to agricultural development does not take into account the complexities of tenure and how interventions may work within those systems to the benefit of some but perhaps to the detriment of others (by threatening their rights to land use or other resources such as trees). Indeed, principles of access and control over resources are often overlooked when introducing technical interventions.

## **Dynamic social and environmental landscapes**

Much of the literature on agriculture in Africa focuses on household production and plot management. How these households are situated within a wider social and environmental context is usually not examined. We argue that landscapes are both a combination of biological and physical features overlaid by social and political relationships that structure people's use of these spaces. Farmers not only have fields dotted over different agro-ecological niches within the landscape, they are also affected by the actions of and relationships with members of other households in their own landscape and beyond. Use of the landscape is also highly gendered. A typical pattern is for women to focus on plots closer to the homestead to allow for child care and other household chores to be carried out more efficiently. In addition, women and men often access and have control over different natural resources within this larger landscape (tree products, grasses, honey, mushrooms, etc.). These resources are important sources of food and income for men, women and children. Such system dynamics, which include both social and biophysical factors, are often not well understood but are critical in order to understand farming strategies. In the sites in Ethiopia, Tanzania and Ghana, these landscape dynamics played out in different ways.

In all sites, a household's position in the landscape partly determines what resources are available to it, and structures their decisions about how to use those and other more distant resources. In each landscape, farming systems have changed significantly over time, driven by population pressure, national policies, access to markets, poverty levels, infrastructure, the introduction of new crops and market opportunities.

In Ethiopia, having household plots scattered across the landscape has relevant costs and benefits for production. Diversified plots allow farmers to capture benefits of different micro-agro-ecological conditions and reduce the risk of crop diseases. According to discussions with farmers, there are differences in fertility and land size depending on where households are located. Elevation is a key defining characteristic of households' choices and constraints. Survey data revealed that households at higher elevations in the watershed have lower average annual value of production than those at lower elevations. Differences in the value of production according to elevation are in part due to variation in crop type and yields at different elevations of the watershed (particularly in Jeldu where average elevation from the valley floor to the upper slopes varies by 900 metres). In Fogera, yields are substantially lower in the higher elevations for all crops except

sorghum. Maize yields in low elevation households are 3.5 times that of high elevation households. Land in the higher elevations has steeper slopes and is harder to farm. There is also limited water availability, which means households are reliant on rain-fed cropping. In contrast, the flooded lowland plains are suitable for rice production and farmers can use residual moisture for subsequent crops as well as pumps for irrigated vegetables.

In Diga, an opposite pattern emerges in which maize yields decline significantly with elevation. This difference may be due to lack of soil moisture or ability to irrigate in areas higher in the watershed. Contrary to Fogera and Diga, Jeldu does not exhibit significant differences in the value of production by elevation. Although 45% of land is dedicated to teff in the lowlands (followed by sorghum and wheat) and no teff is grown in the top of the watershed, the higher elevation households have a higher value of production resulting in part from the profit from potatoes (a high value crop) in the middle and high elevations (9 and 8% of total area, respectively), which outweighs that of teff production in the lowlands. In addition, a greater share of plots receives fertiliser in the higher elevations of Jeldu, which may also contribute to the higher yields in these areas. The table below demonstrates the significance of the position of the household in the Ethiopia sites.

*Table 1: Location in landscape and differences in production in Ethiopia (Schmidt, 2010)*

District	Low elevation	Middle elevation	High elevation
<b>Fogera</b>			
Annual value of production (in ETB )	17,508	12,189	5,682
Fertilizer Use (% of plots)	13.2	20.7	3.7
Manure (% of plots)	11.7	11.9	15.2
Teff yields (in kg)	1,653	1,124	924
Maize yields (in kg)	2,758	3,188	771
Barley yields (in kg)	850	527	393
<b>Jeldu</b>			
Annual value of production (in ETB)	5,263	9,434	8,052
Fertilizer Use (% of plots)	7.6	35.8	44.2
Manure (% of plots)	12.3	17.8	13.1
Teff yields (in kg)	403	1,008	na
Wheat yields (in kg)	689	1,139	1,546
Barley yields (in kg)	988	952	952
<b>Diga</b>			
Annual value of production (in ETB)	17,410	14,479	7,319
Fertilizer use (% of plots)	1.6	1.3	0.8
Manure (% of plots)	9.9	14.5	15.6
Teff yields (in kg)	297	349	335
Maize yields (in kg)	1,592	1,269	765
Sorghum yields (in kg)	1,386	973	1,030

<sup>2</sup> The Ethiopian birr, the currency of Ethiopia

Landscapes are mosaics of cultivated plots, grazing areas, wetlands and forest. These resources are accessed differently, by different groups of people. For example, in Fogera, communal grazing areas are used by community members for a variety of practical purposes. They are used as a holding area for livestock during the growing season, keeping livestock away from cultivated fields and decreasing the chance of disputes. Poor women, who often have no livestock, also use the space to collect dung, which they use for fuel and fertiliser and sell to other households. Finally, young landless men who rely on livestock for income, use these spaces for fodder. Consequently, in one small segment of a wider landscape, different groups use the space and its resources differently. District experts have attempted to turn communal grazing areas into exclosures to address land degradation. This intervention may indeed regenerate these spaces, but it may also deny vulnerable members of the community access to necessary resources and shift patterns of degradation to new areas.

In Tanzania, there is considerable competition over access to valley-bottom land. These lands used to be reserved for livestock grazing and were reserves for grass used as roofing thatch. Today, most of these valley bottoms are under cultivation and indeed government extension services promote the development of these areas for food production. Because they contain more moisture and fertile soils, these areas are more productive than the fields on hill slopes, which have been farmed continuously for generations.

In the Iraqw highland homeland, farmers are linked to relatives and friends in other agro-ecological zones through exchanges of food and livestock. Beginning in the 1930s, due in large part to British colonial policy that favoured them over their Maasai and Datoga pastoralist neighbours, Iraqw began migrating out of the homeland in all directions. They now occupy a territory many times the size of their original homeland. This migration has resulted in homeland connections with kin and friends in all migration sites. Because these areas have slightly different agro-ecological conditions (in some of the lower zones, farmers use ox ploughs and thus cultivate larger farms), different harvest and cultivation schedules, and more space for rangelands, there is considerable exchange across these communities. When households are short of maize or another key foodstuff, they journey to other zones to exchange produce or ask for produce with the understanding that when they harvest, the household they are borrowing from may arrive and ask for food in return. In part, these exchanges are done to alleviate post-harvest losses and seasonal food shortages and in part to keep these vital social networks alive. These networks can also serve as conduits for information about markets, education and job opportunities. Iraqw also engage in exchanges with other ethnic groups. Datoga pastoralists come to the Iraqw homeland to exchange tobacco for maize. Mbugwe farmers exchange baskets for maize or beans. These exchanges enable households to access a much wider social and ecological landscape, and this inevitably influences the decisions they make on their farms.

In Ghana, compound households farm fields close to their houses and invest their manure and compost resources in these plots. This pattern of investment is a common one and not unique to Ghana. In more distant fields, farmers do what they can with relatively limited labour and other resources. Getting fertiliser to distant fields is diffi-

cult without transport. While land is available to cultivate, fertile land is in short supply, which results in high competition for land along river banks. Labour, while available, requires payment, and obtaining cash can be a major obstacle. Rural finance is virtually non-existent and selling livestock is sometimes the only way to obtain cash either for food or for employing labour. Women have multiple strategies for meeting food security needs and earning cash, including peanut production for household consumption and sale. Women in northern Ghana also rely considerably on the harvesting and processing of tree products (i.e. shea and dawadawa) for household use and sale.

While we have outlined how men and women in these rural communities manage natural resources on and off their farms, it should be emphasised that most farmers throughout the continent also depend to varying degrees on off-farm activities. For women in Ghana, processing and trading foodstuffs, household goods, cloth, and tree products, is an essential livelihood activity. Migration to the south of Ghana for wage labour is a part of young men's strategies in the savannah regions. In Ethiopia, out migration by young men, and increasingly young women, is also central to the livelihoods of many households. Such off-farm activities are important in the household, local and now global economies. Successful trade and migration often depend on the development and maintenance of social networks that in turn facilitate other market and income-generating activities. Such social networks provide assistance during crises when sharing, exchange and cooperation become vital coping strategies for households. To summarise, farmers are rarely solely farmers and often operate on a scale beyond the household. As Bryceson (1996) has argued, there is a process of "deagrarianisation" occurring throughout Africa, which is reflected in increasing reliance on off-farm income generating activities.

## **Livestock management**

In all field sites, livestock are critical components of the household and regional economies. Much like land, they are not merely economic commodities or assets but also have social and cultural meanings that connect people across the landscape. They also enable the distribution of wealth and resources between households located in different parts of the landscape. Livestock management is often a target for intensification interventions but remains an area not at all well understood by technical experts who see large numbers of livestock as unproductive and environmentally unsustainable. Livestock have long been a target for de-stocking campaigns and zero-grazing programmes. Experts argue that farmers should keep fewer livestock and instead focus on increasing the productivity of these animals. This concern with productivity is frequently not what livestock keepers are interested in, as will become more evident below. Interventions that promote decreasing the number of livestock ignore the social and added economic value that livestock convey. Ferguson (1985) demonstrates this well for Lesotho, but these insights are very rarely incorporated into livestock planning programmes. This failure to incorporate the wider meanings and values of livestock and their links to social relations exemplifies what Li (2007) has observed in expert interventions where complex social, political or economic issues are reduced to a simpler technical intervention approach.

In the Ethiopian sites, livestock migration links highland with lowland areas. This system depends on arrangements made between residents of distant kebeles. In Jeldu, farmers in the highland zones send their livestock out of their kebele and occasionally the district for months at a time. These migrations, known as *daraba*, usually occur in the rainy season and are partly prompted by the lack of space in higher elevations and associated grazing shortages. Various forms of livestock loans are an important part of small-holder livelihoods in all of the sites. For the Iraqw in Tanzania, livestock are used for all important religious rituals, are used for bridewealth and link households both locally and regionally through a complex set of livestock loan practices. These loans enable poorer households to access and get benefits from livestock, they help wealthier farmers with more livestock to mitigate the risk of disease in their herds and to access food resources elsewhere, and they strengthen relationships between households. These loans may be between nearby households in a landscape or with households in other agro-ecological zones altogether. *Qasara* is a loan whereby the borrower has rights to use the manure and milk from a cow. *Komi* involves the borrowing of a brood cow which, if it gives birth to a female calf, is then returned to the owner. If a male calf is born, the borrower keeps the calf and the mother until a female calf is born. *Ua* is a loan of a bull in exchange for female stock, and *aslabua* is a gift of livestock to those who have suffered extreme herd losses. These loans are inherited down the generations and debts can be called in at various times depending on need and relations between the households. Goats and sheep may also be loaned out or given for specific purposes, such as when a mother gives birth and is thought to need considerable protein (Snyder 2002).

In Ethiopia, access to bullocks for ploughing is essential for household food production. If they do not have their own, farmers may borrow or rent oxen from relatives or neighbours. In Ghana, bullocks are also particularly important, and households with bullocks and ploughs enter into arrangements with households who do not have these resources, to plough their lands in return for labour or for cash. This system establishes interdependencies among households and is an asset for those who can afford to rent their oxen out. Livestock, here as all over the continent, are also a store of wealth and can be sold when needed to pay for essential expenses. The more animals a household has, the greater likelihood that they can withstand common shocks, such as illness and food deficits.

Manure is another essential benefit of livestock. The Iraqw have an elaborate system of composting manure, crop residue and household waste. Manure is carried to farms by women and applied before planting. In Diga, Ethiopia, farmers build *kraals* (small, mobile pens to contain livestock at night, in which manure then accumulates) which are moved around fields for varying durations until the land is sufficiently fertilised. However, informants suggest kraaling is growing less prevalent now because of declining livestock numbers and lack of labour available as children are now attending school. In Ghana, manure is used on farms whenever possible and, given the difficulty of securing chemical fertilisers, is an essential resource.

Livestock management in all the country studies takes advantage of specific niches and resources and involves the movement of animals across the landscape. Farmers across the three Ethiopian field sites express concerns that reductions in livestock

numbers would affect their ability to plough their fields, thresh their crops and provide milk for the family. Fewer livestock potentially affects manure availability, which in turn impacts farm productivity. Manure scarcity forces farmers to prioritise manure allocation to specific crops, which leads to differential patterns of fertility between plots. In addition, the decline of livestock numbers may have an impact on vital social networks, such as livestock exchange mechanisms, which act as a buffer for smallholders during crisis periods. The value of livestock as the glue in social networks is very rarely considered when pushing for a reduction in numbers.

## **When external “experts” intervene**

Many agricultural interventions are based on the views of external “experts” who decide what they think are the important problems and associated solutions. Many experts seem to base their suggested solutions on their ideas of what an ideal African family farm should look like, often ill-informed visions based on ideas of progress, success and modern farming (Scoones et al. 2005). In the Iraqw homeland, there was more than one attempt by external experts to introduce fish farming. While community members dutifully complied by digging ponds and stocking them with fish, they did not harvest, eat the fish or maintain the ponds after the experts left. The more conservative Iraqw in the homeland still observe the taboo on fish, which prohibits anyone from catching or eating the “children of the earth spirits” who live in the streams and water bodies. There were also a host of other reasons not to adopt fish farming, including lack of access to fingerlings and local markets, and unclear ownership rights over the fish in communal fish ponds. No one ever thought to ask whether local people actually ate fish. Another project was determined to change gender relations in the area by introducing modern cows (i.e. European crossbred cows kept for milk production) for women thereby subverting the custom of male livestock ownership. What occurred instead was that many women were asked by their husbands and brothers to sign up for the programme to get a cow. Very few people who participated in the programme thought of the cows as the property of the women. However, because women were made responsible for these cows, they had to do the work to care for them, cutting and carrying grass and crop residues. This added considerably to their work loads and, although milk production was increased, there was also no transport to the market located 15 km away (Snyder 2002).

In Jeldu, improved potato varieties were introduced in the 1990s as part of research for a development project. The initial technology was a great success: selected farmers were taught to produce seed potatoes and market them through cooperatives. As a result of this initiative, Jeldu became one of the primary sources for seed potatoes in Ethiopia. Due to the high demand, certain farmers experienced a dramatic increase in wealth. Subsequent research conducted in the area a number of years later found that these same farmers were experiencing a range of problems. Some had begun cropping potatoes continuously in order to increase their income, leading to crop diseases. Other areas of Ethiopia had started producing seed potatoes, resulting in increased competition and declining prices. Farmers who had shifted their livelihood strategies to focus on seed potato production were negatively affected. There were also reports of conflict between

community members due to inequitable farmer selection. These problems arose partly from the short research cycle, which meant there was limited time to sufficiently develop potato value chains and ensure that the benefits were equitably distributed.

The anthropologist Deena Freeman observed similar patterns in apple value chains in Chench, Ethiopia. This project also targeted relatively wealthy farmers, despite initially aiming to work with the poorest of the poor. Selected farmers had enough land to experiment with apples, were keen to learn new skills and techniques, had literacy skills and positions of influence in the village-level government. Similar to Jeldu, there was more interest in producing apple seedlings than fruit because seedlings reached a higher price at market. The interventions had a significant impact on the social dynamics of the area. Households with limited or no access to apple seedlings fell into poverty as local prices soared. The inequitable spread of the new technology led to a rise in theft, an increasingly divided society and incidents of severe conflict between community members (Freeman 2013).

The literature on development is riddled with such examples of unintended consequences and failed adoption of introduced technologies. The examples all share a common theme: the failure to adequately understand the local social and political context and a top-down approach to development. In line with neo-liberal ideology, there is an assumption that as long as the “right” things are put in place, society will take care of itself: ‘The great thing about agriculture is that once you get a bootstrap – once you get the right seeds and information – a lot of it can be left to the marketplace’ (Bill Gates cited in Mokoon 2014). There needs to be greater questioning of whether these expert visions are compatible with farmer realities and their own desires, as well as how they impact on individual households, the wider community and environment.

## **Conclusion**

Farming communities in Ethiopia, Tanzania and Ghana are neither homogeneous nor unchanging. Male and female farmers pursue numerous strategies to meet their and their families’ needs. In the sites described, a picture of a complex landscape mosaic emerges, on which farmers strategically make use of different resources and areas within their environment to pursue their livelihoods, experiment with new crops, engage in new markets, and search for new economic opportunities. Spatial differences within the landscape are important elements of the context that shape farmers decisions and capacity to adopt new practices. However, intensification programmes often ignore these realities of farming, as well as the agricultural expertise of farmers, and therefore fail to ensure that interventions are compatible with the social and ecological contexts, or smallholder interests, constraints and objectives. This has been well documented in a range of studies on the adoption of “improved” crop and land management technologies: for example in conservation agriculture (see Giller et al. 2009). Plans for intensification need to take into account the differentiated patterns of livelihoods and landscapes rather than considering whole areas as homogenous, and specific attention should be devoted to the environmental and social implications of proposed interventions. As Scoones et al. argue,

there is no single ideal pathway of agricultural intensification which all households will, or should, follow. Farmers' access to land, livestock and external sources of income govern the options open to them. And the trade-offs farmers make are mediated by institutional arrangements and are influenced by conjunctures of certain events (2000: 161).

The increasing role of non-farm activities and migration reflects a crisis in the agricultural sector, rather than economic development. In part, this is a result of increased pressure on land resources, but it also reflects the uncertain nature of agriculture and the perception by most of the younger generation that farming is not a worthwhile way of life. This view is reinforced by messages from educational establishments. As White (2012: 12) points out 'in most countries, formal schooling as currently practiced teaches young people not to want to be farmers.' Education contributes to a process of "deskilling" rural youth, in which farming skills are neglected and farming itself downgraded as an occupation (*ibid.*). Despite this trend, it is unclear what alternative livelihood options will be available for future generations of landless youth. Indeed, agricultural interventions and research for development projects do not seem to pay enough attention to what happens beyond the farm household, either in terms of spatial or temporal dynamics. More attention should be given to encouraging local innovations that build on farmer knowledge and expertise in order to create a wider range of opportunities for rural populations. This requires researchers to shift their focus towards participatory and collaborative approaches that empower farmers and farmer organisations, encourage capacity development, and put greater emphasis on institutional and policy issues.

Of course, the drive for smallholder intensification is taking place against a backdrop of larger political and economic forces that are significantly influencing the direction of the African agricultural sector. For example, public-private partnerships and large-scale investments by international agribusiness are increasingly presented as the most viable options for agricultural development. A number of African countries, such as Rwanda and Ethiopia, are experimenting with strategies such as land-use consolidation, land re-allocation and land banks, which are likely to pave the way for further involvement from private corporations. Although this may seem like a solution to problems of land fragmentation and economies of scale, these approaches are likely to curtail smallholder control over resources and decision making. As Davidson points out, 'The New Green Revolution's framework leaves no room for the dynamic, spontaneous, performative agricultural process of African farmers' (2012: 25). There is growing evidence that such developments are unlikely to be either sustainable or beneficial for local environments. Large-scale farming initiatives are often focused on achieving short-term economic benefits and lack the long-term generational responsibility and attachment to "one's own land" which one can argue is fostered by small-scale family farming. A range of studies also show that current corporate land investments are not fulfilling their promises to provide jobs for local people (Li 2002), often result in environmental degradation and forcibly displace large numbers of people. This not only affects the lives of farmers in the present but has grave implications for future generations who may be permanently

excluded from farming as a way of life. Such shifts in modes of production also stand to affect food availability and security at both local and global scales.

Intensification programmes are not dissimilar to structural adjustment programmes (SAPs), which took a top-down approach, and justified short-term pain (i.e. loss of livelihoods) with long-term success. Studies on SAPs have suggested that the losses in education and health through these programmes have resulted in long-term problems, the effects of which are still being dealt with today. The danger with intensification programmes failing is that it may be the smallholder farmers who are blamed, rather than the policies and implementation of the programmes themselves. These “failures” could then be used to justify further reforms that undermine poor households’ livelihoods. Indeed, land reform projects currently pose such a threat and are founded on the belief that smallholders simply cannot produce enough food to meet demands.

With this in mind, we need to ask whether any of the social and biophysical complexities and interconnections of smallholder farming in Africa really matter to those making macro-level decisions about development goals and trajectories. While there has been a rhetorical move away from top-down approaches to development, in reality they are still very much business as usual. It is important to analyse the agenda behind these approaches and their implementation. Do they represent a sincere belief that they are for the “greater good” and that farmers and the poor need to have their “awareness raised” or are they also a means to move smallholders aside for the benefit of more powerful interests? Again, as we have highlighted above, technical approaches usually ignore the power and politics that shape food production and distribution, but they can also be used in favour, sometimes unwittingly, of powerful interests.

It is commonly accepted that development interventions result in losses for some, but also benefits for others. Who benefits and who bears the burden is an important question, because as Adger argues, ‘powerful actors have been able to “tilt the playing field”’ in their favor (2006 cited in Brooks 2014: 16). Strategies for sustainable intensification and increased production need to be subject to greater critical scrutiny, and this is where anthropologists can potentially play a key role. We argue that anthropologists should engage in development processes precisely because they ask critical questions, highlight the complexities and point out the implications, both intended and unintended, something that those in more technical disciplines are often unable to do. Unfortunately, anthropologists are often reluctant to get involved with development initiatives. Li (2007) has shown how her own work led, in part, to a reform in land tenure in which customary rights were recognised but was then followed by a backlash in which the governor issued an edict overturning customary rights in Central Sulawesi. Thus, it can be disheartening when research recommendations run up against entrenched powerful interests.

In addition, reluctance to become involved also reflects a central emphasis in anthropology and social science on remaining “objective”, and not interfering in the communities we “study” as well as the discipline’s interest in more academic and less applied aims. Anthropology has not forgotten its past role as a “handmaiden of colonialism” and is understandably reluctant to be associated with neo-colonialist development processes. However, the current times suggest that such positions are increasingly untenable and,

as Sillitoe (2006) emphasises, the opportunities for anthropology to contribute to development work have never been better. Perhaps the current trends taking place in African agricultural development and the implications for smallholder family farms will give anthropologists a reason to take a more engaged stance.

## Acknowledgements

The authors wish to thank the generous contribution of Emily Schmidt from the International Food Policy Research Institute, who shared material and analysis from her quantitative survey supported by IFPRI's Ethiopia's Strategy Support programme. Nicole Lefore of the International Water Management Institute provided many useful ideas. We also thank Ambo University, Bahir Dar University, Bako Agricultural Research Center, Wollega University and Adet Agricultural Research Center of Ethiopia and Dr Saa Dittoh from the University of Development Studies in Tamale, Ghana for their collaboration. Support for the research in Ethiopia was provided by funding to the Nile Basin Development Project by the Challenge Programme for Water and Food to the International Water Management Institute and the International Livestock Research Institute. In Tanzania, support was provided by Fulbright-Hays fellowships and the International Centre for Research in Agroforestry. In Ghana, the International Fund for Agricultural Development and the Water, Land and Ecosystems programme of the CGIAR provided financial support. Finally, we want to thank the community members in Tanzania, Ghana and Ethiopia for the enduring patience, humour and generosity given to foreign researchers.

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## Povzetek

V članku bomo raziskali načine, s katerimi intervencije vzdržne intenzifikacije pogosto spregledajo temeljne družbene dinamike podeželskih krajin. Članek ponuja dokaze o osnovnih družbenih, političnih in okoljskih kontekstih, ki vplivajo na odločitve kmetov glede rabe zemljišč. Čeprav obstajajo številne pobude, ki spodbujajo Zeleno revolucijo za Afriko, v njih zvečine prevladujejo tehnični popravki, ki ne razumejo razmer ali želja kmetov na podeželju in se ozko osredotočajo zgolj na povečanje produktivnosti. Te tehnične rešitve le redko obravnavajo širše družbene, gospodarske in politične izzive kmetijske proizvodnje in preživetja kmetov. Nazadnje, tehnični pristopi od zgoraj navzdol pogosto ne temeljijo na lokalnem znanju, inovativnih zmogljivostih ter strokovnem znanju kmetov in članov podeželskih skupnosti po vsej Afriki. Ugotovitve so argumentirane s primeri terenskih raziskav v Gani, Etiopiji in Tanzaniji.

**Ključne besede:** mali kmetje, družinske kmetije, Afrika, vzdržna intenzifikacija, razvoj in antropologija

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