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"More vital to our future than we realize?" Learning from Netting's thesis on smallholder farming 25 years on

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Abstract

Twenty-five years on from Netting's paradigm challenging thesis about the dynamic efficiencies of household organisation and the sophisticated nature of smallholder farming systems, the work continues to have relevance to contemporary debates about the future of smallholder agriculture in sub-Saharan Africa (SSA). This review is organised around four contemporary challenges for smallholder agriculture in SSA: (1) market centralization, liberalization, and falling commodity prices; (2) shifting agricultural research agendas and innovation funding; (3) environmental degradation and climate change; and (4) population pressures, large land acquisition and limited land availability. In each case an argument inferred from Netting's thesis is presented alongside recent evidence, predominantly from research in SSA that supports and challenges it. Based on the lessons of Netting, in this contemporary context, it is argued that smallholder systems continue to have value and relevance, and that rather than implementing protectionist strategies based on generic assumptions about smallholder vulnerability, that effort should be made to learn from the diversity of smallholder systems and knowledges.

Key words: Smallholder farming, Africa, innovation, adaptation, sustainability

Introduction

In 1993 Robert McC Netting collated a lifetime's academic study – ethnographies of the Koyfar society of Northern Nigeria, histories of Swiss alpine peasant farming, and studies of land tenure systems and agricultural innovation around the world – into a convincing and paradigm challenging thesis about the dynamic efficiencies of household organisation and the sophisticated nature of smallholder farming systems (Netting, 1993). Netting successfully breaks down some of the stereotypes of the small family farm that have seen, and continue to see, them characterised as non-entrepreneurial subsistence producers, disengaged from and unresponsive to market systems, particularly in the contemporary African context. He provides compelling examples of smallholding practices, such as the elaborate ridging, tillage, and soil restoration systems of the Koyfar, as knowledge-rich and innovative, and he describes sophisticated and adaptive land tenure systems, from

shifting cultivation and unilineal descent within East African cattle herding societies to the sustainable use of common pool resources within private property systems in the Swiss Alps.

Twenty-five years on his thesis has particular pertinence in a context of continued debate around the focus on smallholder agriculture-based poverty alleviation and economic development in Sub-Saharan Africa (SSA). There has been renewed attention on the agricultural sector within international development efforts in SSA, stimulated in part by the 2008 World Development Report and the Comprehensive Africa Agriculture Development Programme (CAADP) of the African Union, and more recently the Malabo Declaration. However, polarised perspectives about the extent to which this effort should be directed towards or away from smallholders (e.g. Collier and Dercon, 2014 vs Wiggins et al. 2010) is reflected in simultaneous efforts towards smallholder farming investment, such as is evident in the Alliance for a Green Revolution in Africa and the Millennium Villages Programme, and the diversion of national and international agricultural research and state investment away from it. The counter-argument to the focus on smallholders points to the limitations of smallholder agriculture as an engine of growth and pathway to poverty alleviation, suggesting that this is better simulated by strategies that release non-farm labour into the rural economy (Ashley and Maxwell, 2001) and facilitate migration to urban areas (Diao et al., 2010), with redirection of investment towards larger scale commercial agriculture.

We must be careful not to read Netting's arguments and romanticise about smallholder agriculture, not only would that be to misrepresent Netting's nuanced reflections on rural life, but it would also be to deny that there are persistent and symptomatic inefficiencies, social inequalities and injustices within some African smallholder farming systems, to which Netting does not necessarily not pay due attention. It is important too to recognise that the market, population, and environmental context within which smallholder farmers in SSA operate has changed in profound ways over the twenty five years since Netting's thesis. Key characteristics of the contemporary within which smallholder farming exists include: (1) market centralization, liberalization, and falling commodity prices; (2) shifting agricultural research agendas and innovation funding; (3) environmental degradation and climate change; and (4) population pressures, large land acquisition and limited land availability.

The contention of this paper is that in spite of the gaps in his accounts, and even within today's profoundly different context, aspects of Netting's thesis continue to hold pertinent, and in some cases (at least within emergent conventions of agricultural development) forgotten, significance. Netting's own attempt to draw out the implications of his findings for the future of smallholder agriculture were insightful, and had striking relevance to a number of the contextual trends described above:

> "Even for those parts of the earth that are still land-rich, an agricultural utopia based on fossil fuel power, chemical fertilizers and bug killers, and biotechnology on factory farms is beginning to look expensive and hazardous…. My contention is that smallholder intensive systems achieve

high production, combine subsistence and market benefits, transform energy efficiently, and encourage practices of stewardship and conservation of resources. If this analysis is correct, we shall not everywhere witness the dispossession and demise of smallholders and their replacement by factory farms and landless wage workers" (Netting, 1993: 320)

With this in mind, this paper revisits some of the core arguments of Netting and presents recent academic evidence. The review is organised around four contemporary challenges for smallholder agriculture in SSA. In each case an argument inferred directly or indirectly from Netting is presented alongside recent evidence, predominantly from research in SSA that supports and challenges it. This is then synthesised into lessons that the Netting thesis and contemporary evidence holds for research, policy, and international development agendas.

Contextualising Netting and the Persistent Smallholder Debate

'Smallholders Householders' is an ambitious synthesis of Netting's ethnographic work in a variety of agricultural systems that range in character from arable to pastoral, sedentary to nomadic, and from West Africa to western Europe to China. His discoveries and interpretations of these systems are shaped into a coherent, but nuanced, thesis about the mechanisms of smallholder intensification, the flexibility of household and family labour allocations and tenure systems, and innovation and modernization.

His work can be considered as a part of what, at the time, was an emergent wave of research effort to document local agricultural knowledge and innovation (Richards, 1979; Biggs and Clay, 1981; Farrington and Martin, 1988; Chambers, 1983; Altieri, 1983). Netting's research also took place in the context of increasingly critical interest in structural adjustment on the agricultural sector. Studies from economics and international development on the role of subsidies and grain marketing on smallholder agriculture and rural livelihoods (Lele, 1990; Bernstein, 1990), particularly in sub-Saharan Africa, were, in the 1980s and 1990s, the beginnings of a critical political ecology of agricultural development. This political ecology influence is evident in Netting's writing. In particular, he extends Boserupian ideas of innovation and intensification making the argument that intensification is driven predominantly by market incentives and the push of population pressures, requiring smallholders to adapt to the conditions of the broader market systems to which their production is linked and to the limitations of land availability. Netting's thoughts on the adaptations of smallholder agriculture to the changing broader structure within which it exists, also contribute to a dialogue that had long preceded Netting's own contribution to it. The book engages with Marxian depictions of the peasant farmer under communism and the politics of the Chayanovian critique of proletarianism. Netting's theory is one which adds explanatory weight too, as well as examples of the limitations of, the inverse-productivity law of Chayanov by examining the labour dynamics of the farming household, and the familial and cultural rules that shape intensive and flexible labour productivity, evident, for example,

in the dynamic agricultural labour calendar and flexible divisions of this labour within Koyfar production systems.

Something that set Netting's publication apart from the participatory farming systems research and the emergent political ecology literature of its time, was the combination of depth of insight and breadth of systems that he covers, something which has been rarely paralleled. However, in spite of this breadth, inevitably there are uncountable combinations of agri-environments, cropping systems, and political histories that are not accounted for in Netting's work. As such it is perhaps easy to critique his incomplete engagement with some of the widely recognised persistent challenges in African smallholder agriculture: particularly of poverty (World Bank, 2007), resource access constraints (Tittonell and Giller, 2013), vulnerability to environmental shocks (Morton, 2007), and the participation of youth (Sumberg et al., 2014). That said, Netting's work is far from a romanticization of smallholder agriculture, rather it exposes the struggles, inequalities and uneven power relations that can be just as characteristic of such systems as can the virtues that Netting highlights.

In spite of the gaps in Netting's accounts and the apparent permanency of the debate around smallholder farming, it is a pertinent time, and the Netting thesis a pertinent lens through which to reconsider the role and future of smallholder householder farms. Investment by the international agricultural development community – organisations such as the Consultative Group on International Agricultural Development and the Alliance for a Green Revolution in Africa – continues to focus on smallholders as a route to poverty alleviation. But more than ever this focus comes with a technocratic impact-at-scale philosophy (generally focussing on improved seeds and access to agricultural inputs) that is somewhat at odds with the diversity and local innovations of smallholder systems that Netting describes. At the same time, medium and large scale land acquisitions and private sector agribusiness investment are, in some sub-Saharan African countries, beginning to change the shape of the agricultural sector, not eradicating the smallholder, but in some cases exacerbating the kind of land/labour constraints that were a central tenet of Netting's analysis and theorisation. A further exploration of four aspects of the contemporary context of farming through the lens of Netting's thesis is presented below.

Context 1: Market centralization, liberalization and falling commodity prices

Although not universal, the general trend towards the liberalization of domestic markets (e.g. the removal of import tariffs or price distorting mechanisms) coupled with the growing concentration of supply chains around those of major supermarkets (linked to consumption trends), means that African smallholders are increasingly part of a market system in which they compete with food producers at a global level (Hazell et al., 2010). Supply and demand dynamics and increasing innovations, efficiencies and cost savings in production have seen a real term reduction in farm-gate price for the majority of food commodities over the past twenty five years. Liberalization of food markets has been

geographically uneven, and the structural adjustment liberalization of African domestic markets, for example, has not been reciprocated in major western economies such as the European Union and United States, leaving African producers at a competitive disadvantage within these globalising markets.

Netting provides examples of entrepreneurial responses in smallholder production systems to market opportunities, as in the intensification of production within the cultivation practices of the Koyfar in response to the expansion of road infrastructure into the Jos Plateau region in the 1950s. The contemporary market conditions to which smallholders are adapting are, of course, distinct from those of the 1950s. Globalized supply chain demands have been behind a growth in large agricultural enterprise in Africa, most notably in export commodities such as flowers, vegetables, coffee, tobacco and cotton (Raikes and Gibbon, 2000; Hall et al., 2017; Pingali and Rosegrant, 1995). In such cases, it is often argued that the economies of scale associated with production and processing, and the abilities to invest in technology and infrastructural modernisation mean that it is increasingly these larger commercial systems that drive down commodity prices and are capable of competing in the global market (Collier and Dercon, 2014).

Netting recognises the competitive disadvantage of small scale production within certain supply chains, but argues that this is commodity specific. He points out the financial difficulties for small production systems competing in global markets for tropical fruits and fresh crops that are high yielding and require substantial processing, storage and transport infrastructure, such as bananas, sugarcane, and vegetables. However, he makes the case that where processing can be done within the household and at little cost, and where commodities are less perishable, the productivity of small-scale can compete with larger plantations. Netting and Collier and Dercon (2014) agree that economies of scale, in such systems, might be more significant in marketing and other parts of the supply chain than in production and processing.

As a consequence of centralised and globalised supply chains, standards and standardization are becoming more significant at the demand side, with commodity specific implications. Market centralisation is well documented as a driver of mechanisation of production in some commodities, but the higher labour densities and potential for attention to detail in smallholder systems can represent an advantage (Lee et al., 2012). This is part of the reason why we see that in certain commodities (e.g. coffee, cocoa, rubber, tobacco), in locations where labour is abundant and land constrained, a successful production model is one in which large scale production is achieved through smallholder grower sub-contracts (Ouma, 2015). The extent to which such systems present opportunities and risks for smallholders is debated (Coulter et al., 1999; Oya, 2012; Glover, 1990). There are, however, examples of such systems in which those smallholder producers maintain a significant amount of autonomous control over the management and production practices of their farm land – maintaining

successful small production systems but repositioning them to take advantage of new market opportunities (Porter and Phillips-Howard, 1997; Nyambo et al., 2009).

Context 2: Shifting agricultural research and innovation funding

Reductions in public and bilateral funding for international agricultural research, as well as limited investment in national research programmes in Africa, has seen a shift in the funding portfolio and focus on agricultural research and innovation (Sumberg, 2005; Sumberg and Thompson, 2012). As private and philanthropic funders have increasingly driven research agenda, a focus has moved towards impact-at-scale mechanisation and innovations such as biotechnologies (Brooks, 2015). Smallholder systems with limited investment and risk-taking potential are less well placed than larger commercial industries to adopt such innovation. Collier and Dercon (2014) argue that larger systems are better able to say abreast of and active within the diffusion of state-of-the-art technologies and can better manage risks associated with adoption. Their assertion is of particular significance within a context of reduced state agricultural extension, which has conventionally been thought of as the mechanisms through which information, services and technologies have been passed down to remote small farms (Poulton et al., 2010; Davis, 2008).

Netting argues that the intensification and sophistication of production systems does not equate simply to the adoption of modern technologies, but rather argues that systems are optimised by considered and dynamic responses to land and labour availability. The labour appropriate use of hoes within a complex soil preparation and weeding regime in the Koyfar production system is presented as evidence that such systems should not be dismissed as unmodern or of limited intensity. Emphasized in the analysis of Netting is the value of innovation and learning that comes through cross-generational communication, something that is particularly strong within smallholder householder systems. The innovative development of upland terracing for wet-rice farming systems in Asia (and the failure of such systems where imposed by those outside of traditional knowledge systems in Vietnam and Sri Lanka) and traditional Chinese soil management strategies are persuasive examples of this information exchange described by Netting.

In addition to this exchange of knowledge and diffusion of innovation across time, examples of smallholder systems as innovation networks (Spielman et al., 2011) – farmer to farmer social organisation built around the sharing and dissemination of local knowledge such as in the Latin American ‘Campesino a Campesino’ movement (Holt-Giménez, 2006) – offer a persuasive counter argument to the dependence of smallholders on international technology transfers and extension services. Examples of cross generational knowledge exchange in African smallholder systems has been documented in relation to seed varieties (Westengen et al., 2014), land management strategies (Fairhead and Scoones, 2005; Kerr et al., 2007) and local weather indicators (Orlove et al., 2010; Thomas et al., 2007) , and Netting provides his own example in the description of in-depth local

knowledge of, and classification systems for, soil characteristics in the Koyfar system (p.50). However, there is mixed evidence about the strength and threats to these familial channels of knowledge exchange and innovation in SSA (Brush, 2007; Koohafkan and Altieri, 2010; Reij and Waters-Bayer, 2014; Roncoli et al., 2002).

Context 3: Environmental degradation and climate change

Agro-environments across SSA are, of course, highly diverse, but smallholder systems are disproportionately located within soils and agroclimates of marginal productivity. Climatic changes are similarly diverse, but vulnerability to the shifting of rainfall and temperature patterns and increasing frequency of climatic extremes is often greatest amongst small, resource-constrained agricultural systems, particularly those that are rain-fed rather than irrigated (Harvey et al., 2014; Morton, 2007; Mutabazi et al., 2015). Limited soil fertility and stability in arid or steep-sloped landscapes can present further limitations to productivity that smallholders may be less well equipped, than capital rich larger land owners, to address through inputs, irrigation or structural landscape modification (Morton, 2007). It has been demonstrated that the response of poor soils to fertiliser application, for example, is unreliable (Vanlauwe et al., 2015) and this is a significant disincentive for investment by resource-constrained smallholders (Marenya and Barrett, 2009). However, Netting makes the argument that smallholder systems are inherently adaptive and this is evident in the resilient Asian wet rice farming practices of maintaining soil fertility and the dry stone wall bounded terraces built in to the slopes of the Jos Plateau escarpment by the Koyfar, that he describes, as well as in more recent documented examples of sophisticated rain harvesting, runoff farming (Rockstrom, 2000) and groundwater extractions (Laube et al., 2012). These systems themselves are a product of the cross generational passing down of local knowledge.

In a context of increased uncertainty and variability in climate conditions, resilient systems are characterised, in part, by flexibility (Cote and Nightingale, 2012; Folke et al., 2002). Netting convincingly demonstrates the flexibility of the smallholder household unit, in terms of labour allocations, levels of intensification, diversity of production, and degrees of market participation. Crane et al. (2011) describe how flexible labour availability for smallholders in the eastern edge of the Bani River floodplain in Mali affords them the opportunity to make mid-season shifts in crop choices (between millet and sorghum) in response to seasonal weather, and Adams and Mortimore (1997) describe longer term adaptation through 'indigenous intensification' in Northern Nigeria, including strategies of manuring and short duration crop variety adoption, similarly facilitated by labour flexibility. Netting makes the argument that the long time horizons of family farming and the unique motivation of inter-generational security that comes with this gives smallholder households a unique perspective on sustainability, and it is the maintenance of the household and smallholding that drives adaptation.

Context 4: Population pressures and land acquisition and availability

Particularly in eastern and southern Africa, while land under agriculture has increased marginally, the population engaged in agriculture has tripled over the period 1960-2000 (Jayne et al., 2010). The pressures of large land acquisitions – 'land grabs' – have been much commented on, but the growth of medium sized enterprises, associated in part with the aforementioned globalisation of agricultural commodity trade, is also important, as is increasing inequality in access to and ownership of land and the growth of the rural landless (Jayne et al., 2003). Netting describes a wide variety of land tenure and customary rights systems of different levels of formalisation and flexibility. Whilst flexible systems of common property resource use and informal inheritances and temporary transfers of land, such as those characteristic of the Nigerian Hausa system that Netting describes, have been shown to be effective, it is also recognised that such systems are threatened by the trend towards land acquisition and investment.

The conventional narrative associated with the marketization of land and increasing acquisition through large foreign direct investment, is that smallholder farmers are both unable to purchase land in sufficient quantity and, in some cases, claim and protect their rights to land maintaining its ownership and long term management. Although it should be borne in mind that large land acquisitions are diverse in nature (Borras jr and Franco, 2012; Hall, 2011) and in some cases are supporting of smaller scale systems, there are documented examples of dispossession of smallholders as a consequence of large land acquisitions in Côte d'Ivoire (Amanor, 2012), Angola (Chanda, 2010), and Ethiopia (Makki and Geisler, 2011), amongst others.

Peters (2009) argues that contemporary marketization pressures are driving a shift away from adaptive customary systems to more formalised self-implemented systems, something that is being promoted in national land reform policies (e.g. in Malawi). Netting's case studies suggest that this movement towards formalisation of private ownership is not universal, but is reflective of the adaptive and diverse systems of tenure that through history have been adopted in transient ways in response to market and population pressures:

> "Diverse and variable systems of tenure have evolved to meet the needs of specific groups of smallholders, and they form the crucial social institutions by which farm households relate to their environment, their neighbours, and other members of their larger society." (187-188)

The intensification of labour is a flexible compensatory mechanism in response to limited land availability, which smallholder households, such as those that Netting makes reference to in contexts as diverse as Zambia, Papua New Guinea, Mexico, and Switzerland, have effectively employed over generations.

Discussion

Conventional understandings of smallholder systems as vulnerable to the challenges of globalized markets, changing climates, and land use pressures have contributed to a questioning of their relevance and long term sustainability in a contemporary world increasingly characterised by such conditions. Examples of smallholder farming poverty traps, persistent yield gaps, and continued dependence on state subsidies (Dorward et al., 2005) and marketing boards (Birner and Resnick, 2010) lend weight to calls for economic development and poverty alleviation strategies that focus on the promotion of commercial agriculture and the shifting of rural labour away from small-scale agriculture. Little is explicitly said by Netting about climate change, the role of global markets, the real-terms reduction in commodity prices, and the growing pressures of large land grabs; profound changes in agricultural and food systems which were perhaps at most only emergent at the time of Netting's publication. However, the evidence presented by Netting, and other examples drawn on here, counters this dominant narrative of vulnerable smallholdings in as far as it demonstrates the diversity of smallholder systems; their size, portfolio of production, integration into markets, labour availability, technology, and land tenure arrangements. Across this diversity, which is of course characteristic of the agricultural sector as a whole, experiences of climates, markets and land use pressures are varied, and stories of poverty traps and dependency are countered by examples of local knowledge-based innovation and adaptive capacity, inverse productivity, flexible and sophisticated tenure systems, and entrepreneurial and profitable smallholder farmers.

It has been argued that non-competitive producers may be an inevitable casualty of economic growth, as has been the case in the agricultural and industrial revolution models of western economies (Diao et al., 2010). Valdes and Foster argue that "with growth we are almost certain to see a decline in the importance of what are now considered small farms" (p.1370). This assertion underpins new calls for a rethinking of smallholder-focused policy models in Africa that have protected these systems through support services, finance, input and extension (Collier and Dercon, 2014).

The values of smallholdings as laid out by Netting – that they are adaptive, flexible, innovative – similarly encourages a rethink of dominant policy and research and innovation models that have sought to intervene, in a top-down way, within smallholder systems. The lesson that should be taken here is that there are opportunities and benefits associated with the knowledge systems, productivity and ecological sustainability of such systems that can make a valuable contribution to food systems across scales. Netting might argue that research and policy should avoid actions that marginalise or disadvantage the smallholder, such that they inadvertently precipitate a future of large commercial monocultures, in which local knowledge of agro-ecological practice and production diversity is lost. As Netting points out, this is something that we can scarce afford: "the question of whether the practical and coherent smallholder system has a future is not in doubt. It may be more vital and necessary to our future than we realize." (Netting, 1993: 334).

Concluding comments

Twenty five years on, Netting's reflections on smallholder householder systems have, in some respects, an enhanced significance within the contemporary institutional context of market centralization and liberalization, shifting agricultural research and innovation funding and land acquisitions in SSA. His illustrations of the flexibility and entrepreneurism of smallholders in response to market driven change and resource constraints illustrate their inherent adaptability; perhaps driven by the long term motivations of family farms. However, we cannot be blind to the poverty traps and underdevelopment that are inherent to some small-scale production based agricultural economies. In tackling societal challenges, what the agricultural development community as a whole might take from Netting (and many of his contemporaries) is an understanding of the importance of the local – the need, as Netting himself did, to consider critically the institutional changes that are shaping agricultural change from an understanding of the historically- and locally-embedded experiences and responses of smallholder households.

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