IFAD
Investing in rural people

Smallholder farming, growth linkages, structural transformation and poverty reduction

Lessons and prospects for sub-Saharan Africa

by
David Suttie
International Fund for Agricultural Development

39 *IFAD RESEARCH SERIES*

The IFAD Research Series has been initiated by the Strategy and Knowledge Department in order to bring together cutting-edge thinking and research on smallholder agriculture, rural development and related themes. As a global organization with an exclusive mandate to promote rural smallholder development, IFAD seeks to present diverse viewpoints from across the development arena in order to stimulate knowledge exchange, innovation and commitment to investing in rural people.

The opinions expressed in this publication are those of the authors and do not necessarily represent those of the International Fund for Agricultural Development (IFAD). The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of IFAD concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The designations "developed" and "developing" countries are intended for statistical convenience and do not necessarily express a judgement about the stage reached in the development process by a particular country or area.

This publication or any part thereof may be reproduced for non-commercial purposes without prior permission from IFAD, provided that the publication or extract therefrom reproduced is attributed to IFAD and the title of this publication is stated in any publication and that a copy thereof is sent to IFAD.

Author:
David Suttie

© IFAD 2019
All rights reserved

ISBN
Printed September 2019

IFAD
Investing in rural people

Smallholder farming, growth linkages, structural transformation and poverty reduction

Lessons and prospects for sub-Saharan Africa

by
David Suttie

39 *IFAD RESEARCH SERIES*

Acknowledgements

This work has been enriched by the advice, inputs and encouragement of Dr Jayne Stack, CeDEP, SOAS, whose expertise on the topic has been much appreciated throughout the research, writing and finalization processes. During the review process, valuable insights were also provided by Steve Wiggins, ODI, and by Fabrizio Bresciani and Edward Heinemann of IFAD.

About the author

David Suttie is Global Policy Engagement Specialist at IFAD. He is responsible for engaging in global policy processes, especially the Agenda 2030 follow-up processes to reflect rural dimensions therein, and for producing associated policy products sharing IFAD's experience and knowledge on inclusive rural transformation with a global audience. Suttie also works as a Visiting Lecturer at the Centre for International Economics, University of Rome Tor Vergata, where he delivers courses on Sustainable Development and Rural Change. He holds master's degrees in rural development and change from the School of Oriental and African Studies (SOAS), and in development economics and international cooperation from the University of Rome Tor Vergata, as well as a BA in business.

Oversight: Paul Winters, Associate Vice-President, Strategy and Knowledge Department.

Advisory Board: Fabrizio Bresciani, Shirley Chinien, Edward Heinemann, John Hurley, Bruce Murphy, Lauren Phillips, Paolo Silveri and Abdelkarim Sma.

Editorial Management Team: Aslihan Arslan, Helen Gillman and Laura Sollazzo.

Abstract

In the context of urbanization and expanding markets for agricultural products, the prospects for smallholder farming systems to contribute to development across sub-Saharan Africa is particularly relevant today. Despite scepticism among some, arguments in the literature point to potential productivity, inclusion and multiplier non-farm growth benefits arising from the development of small-farming systems. This research investigates such viewpoints by categorizing countries according to whether national agriculture is small-farm dominated or large-farm dominated and looking at variables dependent on relevant socio-economic phenomena. Findings indicate small-farming countries have performed better in improving levels of productivity, reducing poverty and advancing structural transformation in the period in question. Findings are robust to the effects of differing levels of rural investment. However, sample sizes and the nature of data collection in a context of scarcity limits the capacity to generalize findings. Although the research finds small-farming countries outperform large-farming countries in progress across these variables, bivariate analysis does not establish that linkages from agricultural development to first, poverty reduction and, second, structural transformation are stronger in small-farming contexts. Overall, findings show that possessing an agricultural sector dominated by smallholdings is no impediment to making progress across key indicators of social and economic development. Consequently, reflection on the merits of public expenditure to support smallholder models and opportunities to leverage private finance in smallholder farming are emphasized. Further, the scope for integration of small- and large-farming models in mutually beneficial arrangements can be a useful complement to mechanisms that support exclusively smallholder farming models.

Table of contents

1 Introduction

Urbanization is a global megatrend, with increases in the shares of population living in urban areas expected to proceed throughout the developing world in the decades ahead (UNDESA, 2014). Increases in levels of urbanization are projected to be particularly stark in sub-Saharan Africa (SSA) (ibid), where rates of poverty and undernourishment remain the highest in the world (United Nations, 2015; FAO, IFAD and WFP, 2015, p.8). Urbanization is seen by many as a necessary condition for widespread poverty reduction in SSA (Collier and Dercon, 2014), but others have expressed caution that expanding urban populations are not being accompanied by economy-wide structural transformation (Losch et al., 2014; Proctor, 2014). The latter emerges as a key reason that progress in employment generation and, consequently, poverty reduction across SSA has been relatively disappointing (IMF, 2013; UNCTAD, 2013; UNECA et al., 2015)[1] considering the high rates of growth (ACET, 2014; Wiggins, 2016) and urbanization in recent decades.

Against this context, smallholder farmers[2] – the vast majority located in rural areas – are heavily represented among the numbers of poor globally (IFPRI, n.d.). This in part accounts for the frequent focus of poverty alleviation investments and aid on smallholder farming, although Collier and Dercon (2014) point out that advocating for focus on smallholder agriculture cannot be validated simply because that is where most of the poor are currently employed.

Debates around smallholder farming in an urbanization context centre on the role it can be expected to play in stimulating structural transformation and poverty reduction. Prospects for addressing high transaction costs associated with providing services to smallholders and linking with markets at acceptable public cost (Wiggins, 2016, p.45) through integration with large and small actors upstream and downstream of agrifood value chains must be considered in this analysis.

Many authors have highlighted increased productivity and incomes in agriculture as driving non-farm growth linkages (Haggblade, 2005; Mellor, 1995) with some noting that smallholder-driven growth has been instrumental in historical experiences of structural transformation and poverty reduction in Western countries, as well as many in Latin America and Asia (HLPE, 2013, p.55). However, the success of large-scale farming models in some countries and subregions therein (for example the Cerrado region of Brazil, or the north-east of Thailand) (Collier and Dercon, 2014), the unresolved debate over the role of smallholder farms in SSA's development and structural transformation (Wiggins, 2016), and the seemingly unstoppable pace of urbanization in the region, give rise to several questions that this research examines:

1. In the two decades from 1990 to 2010, the proportion of global poverty concentrated on the African continent increased from 15 to 34 per cent (World Bank, 2013).
2. Noting that a variety of definitions have been proposed, this research adopts that used by Wiggins (2009) and Nagayets (2005), in which smallholdings are understood to be farms operating on two hectares or less of owned or rented land.

- How do smallholder-dominated agricultural systems perform compared to larger-scale dominated systems with respect to changes in productivity, poverty and structural transformation?
- Is agricultural development driven by smallholder models more likely to lead to substantial reductions in poverty?
- Is agricultural development driven by smallholder models more likely to act as a driver for economy-wide structural transformation?

2 Literature review – background to existing evidence and theory

In order to frame an examination of the above research questions, a literature review to collect and analyse existing knowledge is set out in this section. The section is broken into two sub-sections: the first focusing on evidence related to how smallholder-dominated systems perform in reducing poverty, advancing structural transformation and increasing productivity; and the second reflecting on implications and prospects for SSA's development.

2.1 Contributions of smallholder-driven agricultural development for structural transformation and poverty reduction

Farm–non-farm growth linkages – referring to knock-on effects of agricultural growth to non-farm sectors (Haggblade, 2005) – are key drivers of structural transformation. There are multiple mechanisms by which agricultural growth can facilitate growth in other sectors. Broadly, these can be categorized as follows:

Product market linkages

As local agricultural output and incomes increase, higher farm incomes increase local effective demand, in particular for non-farm goods,[3] creating opportunities for non-farm entrepreneurship. At the same time, backwards and forwards production linkages come into play in farm-related sectors, in the former case to support production by providing local inputs, capital and services (for example, machinery, fertilizer and credit), in the latter case to support processing and distribution of agricultural products (for example, storage, processing centres, markets and restaurants).

Labour market linkages

Productivity improvements in agricultural labour potentially releases labour for employment in non-farm sectors without damaging food output levels. This was observed during the historical development process of today's developed countries (Ellis, 2013; Timmer, 1988) and can be regarded as being under way in many fast-growing emerging economies (World Bank, 2007). Further, higher agricultural productivity can be a driver for increased demand for capital (Stockbridge and Dorward, 2013a) – including machinery, but also human and social capital (Schneider and Gugerty, 2011).[4]

3. Engel's law states that as incomes increase, the proportion of household expenditure devoted to food declines (Engel, 1857, cited in Leon, 1967).
4. Increased commercialization and tighter supply chain links can lead to wider interactions among farmers, leading to the accumulation of social capital.

Productivity linkages

In addition to the release of labour, several modalities potentially lead to knock-on socio-economic benefits of improved agricultural productivity to other sectors:

- Higher and more diverse on-farm production may have nutritional implications for family farmers as well as for local consumers (Hawkes and Ruel, 2006), especially as a larger share of surplus production is marketed, leading to better health and productivity in the broader non-farm economy (Stockbridge and Dorward, 2013b), although the relationship between agricultural productivity and nutrition outcomes cannot be held to be an automatic one.[5]
- Improvements in skills, education and health in the agricultural sector as incomes increase may be transferred to non-farm sectors, particularly as labour market linkages begin to kick in.
- Higher on-farm productivity potentially lessens the demand for child labour, leading to improvements in youth health and education and therefore to the development of a more productive future rural labour force (FAO, 2016).

For the purposes of this research, we are interested in how these growth linkages play out in small-farming systems compared to large-farming systems. While the literature on agricultural to non-farm growth linkages is relatively abundant and well-established, the question of whether these linkages are stronger – or more inclusive – under different agricultural systems is relatively less explored.

The question of effects on poverty reduction emerges as the key question. Evidence and intuition suggest that smallholder agriculture is more rooted than larger-scale farming models in local socio-economic systems, with the latter tending to buy from relatively farther afield and often internationally (Hall et al., 2017). Indeed, case study evidence indicates that the role of small-scale, largely informal actors throughout localized food systems is frequently the dominant role (Tacoli, 2017). The question of whether growth emanating from smallholder farming sources may be expected to produce stronger local growth linkages, and in turn stronger results in terms of poverty reduction, therefore seems a natural one.

It is widely recognized that agricultural growth offers advantages in terms of poverty reduction (World Bank, 2007) and income growth among the poorest groups of society (De Janvry and Sadoulet, 2009). However, there is little quantitative evidence on whether this effect can be expected to be stronger if growth is focused around smallholder models rather than larger-scale farming systems. Frequently, it is assumed that this is the case, largely as a result of the concentration of the poor in the smallholder subsector – and much anecdotal and case study evidence supports the view that significant poverty reducing effects can be realized by focusing on the development of smallholder systems (IFAD, 2014a).

On structural transformation, the limited literature focusing on growth linkages from smallholder systems indicates significant effects. In South Africa, Ngqangweni et al. (1999) analyse growth linkages from smallholder production in the Eastern Cape, finding significant rural income expansion resulting from an injection of smallholder income. Also in South Africa, Simphiwe (2001) finds positive impacts on the development of the rural non-farm sector as a result of growth in smallholder incomes. Looking at economy-wide effects, in Zimbabwe, Bautista and Thomas (1998) show that agricultural production in which smallholders are dominant tends to result in the strongest multiplier effects on national

5. Greater attention has been paid in recent years to the potential to improve nutrition outcomes by investing in agriculture, although researchers have often struggled to establish a direct link between agricultural interventions and nutritional outcomes (Webb, 2013).

income while Jayne et al. (2010) note that there are very few examples of large-scale national poverty reduction that were not kick-started by rising incomes in the smallholder agriculture subsectors.

Finally, it should be pointed out that a review of relevant literature indicates that perceived productivity gains associated with larger-scale farming are by no means an indisputable fact, with studies demonstrating production per unit of land tending to be higher on small farms (for example: FAO and OECD, 2012; Larson et al., 2012; Lipton, 2006; Sen, 1966; Wiggins, 2009), largely as a result of the relative efficiency and lower transaction costs associated with using family, as opposed to hired, labour. More specifically, Wiggins (2009) advances multiple reasons why labour productivity may actually be higher on smallholder farms, most pertinently:

- Flexibility, availability and motivation of household labour used on small farms compared to hired labour on which large farms rely.
- Ability to withstand price slumps as a result of household labourers' preparedness to accept lower returns at a time when larger farms relying on hired labour would be likely to go out of business.
- Small farmers are likely to have more detailed knowledge of the specific characteristics of landscapes on their farms.

The same author also notes that surveys of different farm sizes in developing countries tend to indicate higher production per hectare on small farms (for example, Cornia, 1985, cited in Wiggins, 2009; Eastwood et al., 2004). For the present study, any evidence indicating relatively higher progress in advancing productivity for smallholder against larger-farming systems is of interest. Evidence to support smallholder labour productivity being comparable to or higher than larger-farming equivalents would be especially significant when considering future prospects in the context of sub-Saharan Africa, where labour is relatively abundant vis-à-vis capital.

2.2 Prospects for smallholder-driven growth and development in sub-Saharan Africa

The predominance of smallholder farming in SSA (FAO, 2010, cited in HLPE, 2013, p.28; Wiggins, 2009, p.2), as well as in much of Asia (Thapa and Gaiha, 2011), gives rise to the question of whether the development of this subsector could act as the driver of development and poverty reduction broadly. Notably, trends on average farm sizes are downwards in much of SSA as rural populations are set to continue to increase for the next several decades (Jayne et al., 2014). Further, trends in Asia's development have indicate that the smallholder model continues to predominate (Headey, 2015, cited in Hazell, forthcoming), seemingly undermining any expectation that smallholder models of agriculture are likely to decline in significance through the development process. Therefore, the smallholder model may well remain a significant feature of African agriculture into the future, implying that deeper understanding of its potential role in the region's development is required.

In the aftermath of the international food price crisis between 2006 and 2008, it is not surprising that the need for renewed focus on agriculture has generally been accepted as being central to the global development agenda (IFAD, 2010), reflected in the Sustainable Development Goals (SDGs) internationally agreed in September 2015. In this context, much

aid and focus are often devoted to the smallholder sector in SSA, although the extent to which adequate and appropriate investments and policies are being prioritized vis-à-vis African smallholder farming is still a subject of debate (Wiggins, 2016). However, the centrality of agriculture for inclusive development and the predominance of the smallholder subsector within farming in SSA cannot be taken in themselves as assurance that smallholder-generated growth offers the most compelling prospects for Africa's development. Collier (2008, p.74), for example, hypothesizes that the replacement of smallholder farming with larger-scale agribusiness models would "raise global food supply in the medium term", pointing to the stagnation of agricultural productivity per acre in Africa over the past four decades as evidence of the limited potential of the smallholder model. Although Collier (2008) does not advance any quantitative data to support his hypothesis, nor provide statistical demonstration of the so-called stagnation of agricultural productivity in Africa,[6] the questioning of the evidence base for an exclusive focus on smallholder agriculture (Collier, 2008; Collier and Dercon, 2014) indicates the relevance of the research questions under consideration herein.

While much of the justification for focusing on smallholder agriculture is grounded in its predominance in many developing countries,[7] empirical validation linking smallholder development to poverty reduction and structural transformation outcomes would provide a more compelling argument. In this respect, it will be relevant to balance disadvantages facing small farms – especially related to (possibly) productivity (Collier, 2008, p.116) and service provision (GIZ, 2012, p.29; Kelly, 2012; Wiggins, 2016, p.39) – against prospects for economic, social and environmental knock-on development gains from smallholder development.

In this respect, it is relevant to acknowledge examples of win–win relationships between smallholders and larger-scale farming models, with horizontal and vertical linkages between smallholders and other private actors providing opportunities to overcome challenges in linking the former group to markets. For example, outgrower and contract farming schemes that enable smallholders to access high-value markets and to "piggy-back" in terms of access to services (Collier and Dercon, 2014, p.95; GIZ, 2012; Kelly, 2012). Further, public-private-community partnerships, involving transfer of technology, infrastructure investment, institutional development and market linkages, have shown transformative impacts, with involvement of private actors while maintaining community ownership of initiatives being key to success.[8] Thus, the analysis need not exclusively boil down to an either-or discussion on smallholder agriculture vis-à-vis larger models. More generally, it will be relevant to reflect upon methods for overcoming transaction costs associated with smallholder business models, for example through smallholder organizations, institutional arrangements and public service provision (Ampaire et al. 2013; Poole and de Frece 2010; Wiggins 2016, p.49).

6. Statistical evidence provided by Wiggins (2014) contradicts claims of stagnating African agricultural productivity.
7. For example, see FAO (2012), IFAD (2013) and World Bank (n.d.).
8. As seen for instance in the Shashe Irrigation Scheme in southern Zimbabwe (Latham et al., 2015).

3 Research design and methods

This research will focus on the collection of quantitative data.[9] Although it would be useful to inform the statistical analysis with qualitative surveys and interviews with smallholder farmers, logistical difficulties (namely time and budgetary restrictions on travel and field work) mean that the analysis is overwhelmingly quantitative. Much of the quantitative interpretation is guided, therefore, by the literature review and existing theoretical knowledge on the topic.

Of interest in assessing the research questions is the relationship between smallholder agriculture development, structural transformation and poverty reduction. Ideally, our interest is not limited merely to the relationships themselves – that is, the extent to which variation in one coincides with variation in others – but with establishing causality between the variables. Ultimately, we are interested in establishing whether smallholder development causes stronger non-farm growth linkages, structural transformation and/or poverty reduction. However, the nature of the data available and feasible collection outlets mean the use of probability sampling is prohibited,[10] limiting the feasibility of statistical inference (Bryman, 2012, p. 347). So, realistically, this research can only set the scene and suggest possible hypotheses for future studies that might have access to more sophisticated and detailed data.

Given the objectives, it is appropriate to separate the sample of countries into two groups: one in which smallholder agriculture is the strongly predominant typology of agricultural holding nationally, and a second in which this is less so (see annex 1). This will be done through data provided in FAO (2014) on "shares of agricultural holdings and agricultural area, by land size class".[11] Although the focus of our analysis is on implications for SSA, data will be used from other regions also, because the experience of other developing regions is relevant in forming expectations for SSA. Given the heterogeneous nature of regional agricultural systems,[12] regional-specific criteria are be adopted to categorize countries:

- In SSA, where the share of holdings of two hectares and under is above 70 per cent of national agricultural holdings the country is categorized as a smallholder-farming country; where this condition is not met, it is categorized as a **large-farming country**.
- In Asia, where the share of holdings of two hectares and under is above 80 per cent of national agricultural holdings the country is categorized as a smallholder-farming country; where this condition is not met it is categorized as a **large-farming country**.

9. The raw data forming the basis of this analysis are contained in annex 5.
10. Samples are constructed based on availability of information, not according to principles of probability sampling.
11. Table A2 (FAO, 2014).
12. Agricultural systems exhibit heterogeneity across regions, farm sizes in land-abundant Latin American countries for instance being notably larger than those in relatively land-scarce Asia. The adoption of regional specific cut-off points for this study attempts to reflect this diverse reality of what may be considered a predominantly "small-farming country".

- In Latin America and the Caribbean, where the share of holdings of two hectares and under is above 40 per cent of national agricultural holdings the country is categorized as a smallholder-farming country; where this condition is not met it is categorized as a **large-farming country**.

Against this categorization, three dependent variables are measured: agricultural development, structural transformation and rural poverty reduction. The following sources are used for these continuous variables:

- **Agricultural development** – Agricultural value-added per worker (US$2005), extracted from IFAD (2016a, pp.366-369)[13]
- **Structural transformation** – Share of non-agriculture in GDP, extracted from IFAD (2016a, pp.366-369)
- **Rural poverty reduction** – Annual change in rural poverty rate, extracted from IFAD (2016a, pp.366-369).

Availability of panel data from above sources means that the two categories comprise 30 countries of the three regions, with data available from 1990 to 2014 (15 from SSA, 8 from Latin America and 7 from Asia; see annex 1). The patchiness of data in many countries in many years, means that the analysis is based around two points in time: one for the initial (earliest) data point for the country in question and one for the (most recent) latest data point. Misgivings related to these relatively small sample sizes will need to be borne in mind in drawing conclusions and generalizing findings globally.

Two forms of bivariate analysis are feasible given the typology of variables at the disposal of this study. First, by taking the small-farming countries/large-farming countries as nominal variables against the interval/ratio variables for agricultural development, rural poverty reduction and structural transformation, a comparison of means and eta could be fruitful to gauge potential differences in performance across the two country categories. Considering the latter, the nominal variable is clearly the independent variable in this analysis (Bryman, 2012, p. 345). Second, while it will be interesting to see the different mean country performances for the small- versus large-farming countries, it will, potentially, be equally interesting to establish whether the relationship between agricultural development on the one hand, and poverty reduction and structural transformation on the other, can be held to be stronger in either small- or large-farming countries. For this purpose – given we are now dealing with a bivariate analysis between interval/ratio variables – Pearson's r will be calculated using SPSS to examine the strength of the relationship in respective country categories.

The risk of observing spurious relationships is foreseen, considering how many other variables can be expected to influence the dependent variables. For example, investment in rural infrastructure could be expected to positively impact all three dependent variables leading to biased results. In order to observe and analyse this possible confounding effect, a contingency table is used to show the effect of rural investment on the dependent variables. This is done using data on public food and nutrition security investment per rural capita from the Brookings Institution (n.d.).

13. IFAD (2016a) extracts from World Bank (2015).

3.1 Limitations and potential issues

This research represents a humble attempt to shed light on extremely complex and dynamic phenomena. Before embarking on the analysis, it is important to be aware of the limitations in available data and associated analysis techniques in order not to overreach the potential scope and knowledge generation capacity of such an undertaking.

The literature review attempted to articulate the complex web of interactions and dynamics behind smallholder development, growth in the rural non-farm economy, structural transformation and poverty reduction. However, for the purposes of our analysis, in a context where data are scarce,[14] we are forced to utilize relatively simplistic indicators that are not in all cases available for all countries and cannot be said to fully represent the complexities laid out. It must be conceded that the definition of structural transformation boils down to the share of non-agriculture in GDP and, for development of the rural non-farm economy, share of rural non-agricultural GDP (the latter failing to distinguish between distress-driven income diversification and the pull of increased non-farm dynamism). This raises concerns related to validity (Bryman, 2012, p.171).[15] Much of the analysis is descriptive, with limited scope for statistical inference, meaning conclusions will need to be stated with caution and validated by further future research. In general, it is envisaged that conclusions may provide support for the notion that having smallholder-driven agriculture is not an impediment to economic development, and that certain social benefits seem to accrue, although it would be overstating the case to claim a positive correlation – and causality – between smallholder-based development and economic development indicators given the acknowledged limitations.

Issues with available data include the use of relatively crude thresholds to categorize countries' agriculture as "smallholder-dominated" or not, which necessarily brings a degree of arbitrariness into the analysis. The regionally adapted thresholds are open to criticism, in particular questions over the meaningfulness of grouping together African countries dominated by smallholders with relatively low levels of agricultural development and Latin American countries with more mixed distributions of farming models and much higher initial levels of agricultural development. The possibility, and likelihood, of debates on the classification of different countries is therefore acknowledged. At the same time, it is acknowledged that findings are indicative only and can be regarded as offering clues as to whether countries with larger distributions of smallholdings in national agriculture are at an advantage or disadvantage in their poverty reduction and development prospects. Relatively small samples, as well as the impracticality of experimental design in our context and topic, mean we are forced to rely upon statistical methods to adjust for the possibility of spurious relationships. Much future work on developing statistical systems to disaggregate different agricultural systems is needed and it is expected that these would provide the basis for future studies to further probe and investigate the relationships proposed in the present study.

Given limitations with data sources in the context of complexities under analysis, caution is needed around any positive statements on the direction and causality of observed relationships. More realistic will be a transparent analysis of trends, differences and relationships that form the basis for future research. In this regard, it is unfortunate that the opportunity to buttress quantitative approaches with qualitative studies (Howell and Kent, 2009a) is not feasible. For example, qualitative interviews with smallholders on the nature, trajectory and outcomes

14. See footnote 5.

15. The extent that thresholds for small-farming countries have been regionally adapted brings in some inconsistency of measurement, meaning issues relating to reliability (Bryman, 2012, p. 169) must also be acknowledged.

of their participation in the rural non-farm economy over time would have aided greatly in gaining a more in-depth, holistic understanding of issues. The latter would be particularly useful for gaining a deeper understanding of issues such as potential win-win relationships between smallholder and larger-farming estates, as well as an understanding of the efficacy and efficiency of different approaches to overcoming transaction costs facing smallholders. These may be earmarked as priorities for potential follow-up research.

4 Results and interpretation

The starting point for the quantitative analysis is to compare the mean performances in small-farming and large-farming countries in the area of agricultural development. Subsequently, the same will be done for poverty reduction and structural transformation. For the latter two variables, focus will then be placed on the strength of the relationship with agricultural development in order to test for potential differences in knock-on benefits from agricultural development to poverty reduction and structural transformation for small-farming versus large-farming countries.

To begin, three dependent (interval/ratio) variables are analysed in turn against the independent (nominal) variable, the latter articulated as the categorization of countries as predominantly small-farming or large-farming. The first question to be addressed is:

4.1 Do small-farming countries perform better in advancing agricultural development?

In general, there is an indication that this might be the case, with agricultural development proceeding more rapidly in the period covered by the IFAD (2016a) data.

Table 1 Productivity increase – small-farming versus large-farming countries

Farm size		Increased productivity (%)
Large-farming	Mean	44.867
	N	15
	Standard deviation	83.9419
Small-farming	Mean	67.220
	N	15
	Standard deviation	143.9353
Total	Mean	56.043
	N	30
	Standard deviation	116.3286

As table 1 demonstrates, the mean increase in agricultural productivity is over 67 per cent in small-farming countries, compared to less than 45 per cent in large-farming countries. However, the standard deviation is extremely high in both cases – indeed, even exceeding the mean – indicating caution is required in reading too much into the differences in means. The eta measure is notably low (0.10), with eta-squared indicating little explanatory power of farming size to agricultural development (see annex 2). Further, it is worth bearing in mind

that as data are drawn based on availability and not according to any principles of probability sampling, it is not appropriate to employ any tests of statistical significance (Bryman, 2012, p. 347). Thus, the different means can only be taken as a suggestion of a possible trend that would require further research.

While we are therefore not in a position to claim a productivity advantage for small-farming countries – not least due to the impossibility of claiming significance and the small sample sizes involved – the impression is that statements by Wiggins (2009) that "to have an agriculture dominated by small farms is no obstacle to growth" (p.2) seem to be supported. The possibility that conceptual explanations of productivity advantages on small farms, outlined in the literature review section, may have some grounding in country-level experiences merits further exploration.

Overall, the impression is that the scope for agricultural growth does not appear to be less in systems that are predominantly small-farming-oriented. Let us now turn to our second question:

4.2 Do small-farming countries perform better in reducing poverty?

It is worth recalling that much of the literature (e.g. IFAD, 2016a, pp. 37-40; World Bank, 2007) finds a negative association between agricultural development and rural poverty incidence. For the analysis herein, it is of particular interest to ascertain whether there is any evidence to build a hypothesis that small-farming countries generally perform better than their large-farming counterparts with respect to rural poverty reduction.

Table 2 reveals that, overall, small-farming countries in our analysis perform better than large-farming countries in reducing poverty. The mean reduction in rural poverty is 20.7 per cent for the former and 14.3 per cent for the latter. It is important to note that standard deviations are high in both analyses – in both cases the mean is little more than one standard deviation from 0. Thus, also noting that, as above, testing for statistical significance would not be meaningful for these data given that the sample has not been drawn using probability sampling (Bryman, 2012, p.347), a word of caution before extrapolating any meaningful, generalizable difference is merited. While being mindful of the need for caution, it is noteworthy that these differences in means are in line with expectations set out in the conceptual and literature review sections that small-farming countries may be expected to perform better in reducing poverty.

Table 2 Rural poverty reduction – small- versus large-farming countries

Farm size		Change rural poverty headcount (% points)
Large-farming	Mean	-14.333
	N	15
	Standard deviation	12.2258
Small-farming	Mean	-20.727
	N	15
	Standard deviation	20.5273
Total	Mean	-17.530
	N	30
	Standard deviation	16.9159

It is worth noting that stronger poverty reduction for small-farming countries seems most stark in environments of high rural investment, where mean differentials are highest (table 3). The role of rural investment as an intervening variable generally seems negligible given that progress in rural poverty reduction is not stronger overall in countries with high levels of rural investment within the sample (table 4).

Table 3 Comparing poverty reduction in low and high rural investment contexts for small-farming and large-farming countries

	High investment in FSN* per rural capita	Low investment in FSN per rural capita
Mean % point decrease rural poverty large-farming countries	-8.6	-20.9
Mean % point decrease rural poverty small-farming countries	-29.5	-18.5
n	11	19

* Food security and nutrition

Table 4 Rural investment and rural poverty reduction

	High investment in FSN per rural capita	Low investment in FSN per rural capita
Mean % point decrease rural poverty	-11.2	-14.2
n	22	31

The eta levels give reason for caution. The eta test of association is 0.19, suggesting the association between farm size and rural poverty reduction is relatively low, with eta-squared of 0.04 suggesting that in fact only 4 per cent of the variation in rural poverty reduction is due to farm size (see annex 2). Clearly, much stronger evidence than the observed mean differentials would be needed to build a defendable hypothesis.

Arguably more pertinent to our analysis is the nature of the relationship between agricultural development and rural poverty reduction. Although the previous section casts doubt on any perceived productivity advantages of large farms over small farms, the key is to understand how, and whether, given levels of agricultural development lead to differential outcomes in poverty reduction for small- and large-farming systems. Thus, the key question of interest is the following:

4.3 Is the relationship between agricultural development and rural poverty reduction stronger in small-farming countries?

Answering this question could contribute to shaping responses to the question of what may be regarded as acceptable public outlay for addressing the transaction costs faced by smallholders. Clearly, the case for devoting higher levels of public resources is strengthened if the resulting agricultural development can be expected to lead to better outcomes in reducing poverty than might be achieved with alternative, larger-scale based modalities of agricultural development.

Figure 1 Agricultural development against rural poverty incidence – large-farming countries (initial year)

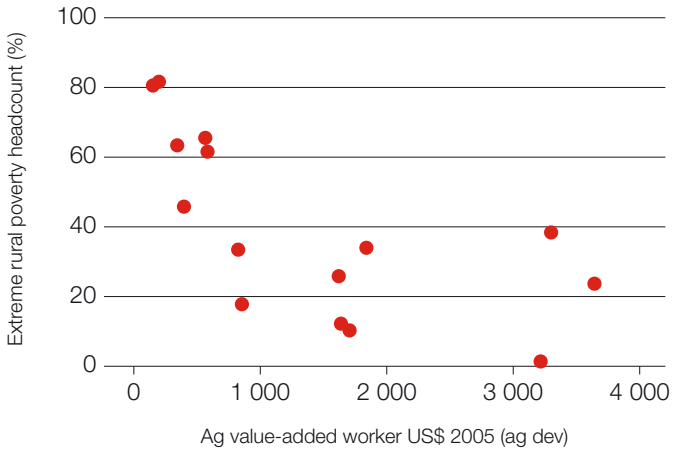


Figure 2 Agricultural development against rural poverty incidence – large-farming countries (latest year)

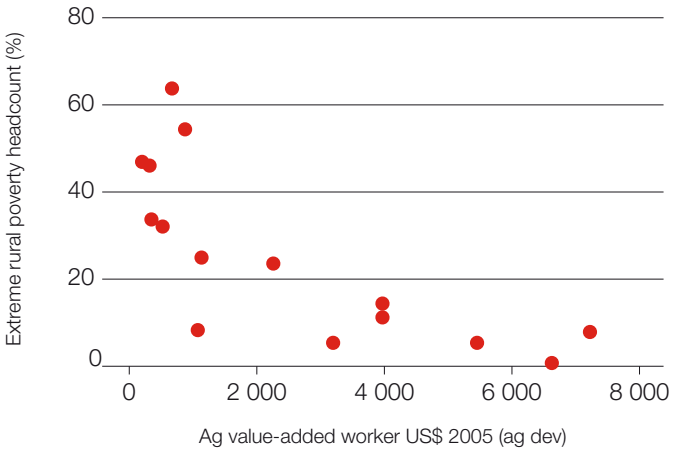


Figure 3 Change in agricultural development against change in rural poverty incidence – large-farming countries

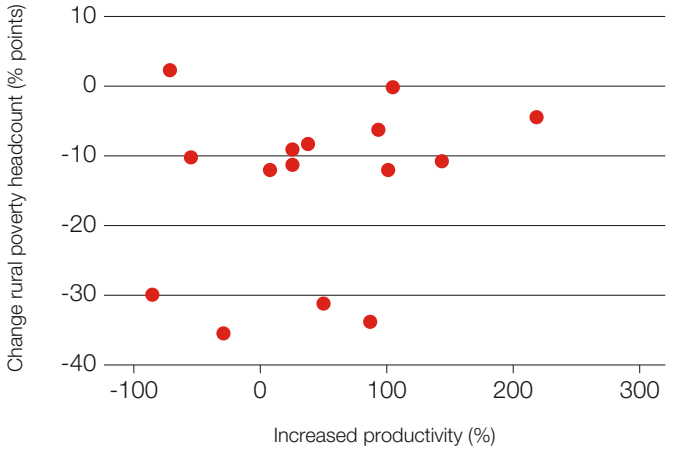


Figure 4 Agricultural development against rural poverty incidence – small-farming countries (initial year)

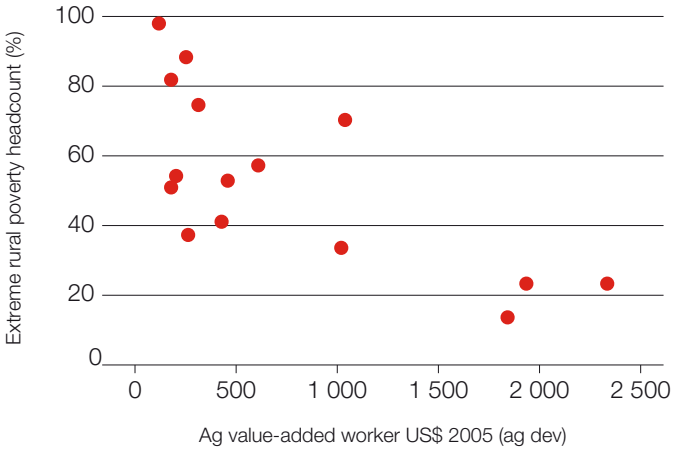


Figure 5 Agricultural development against rural poverty incidence – small-farming countries (latest year)

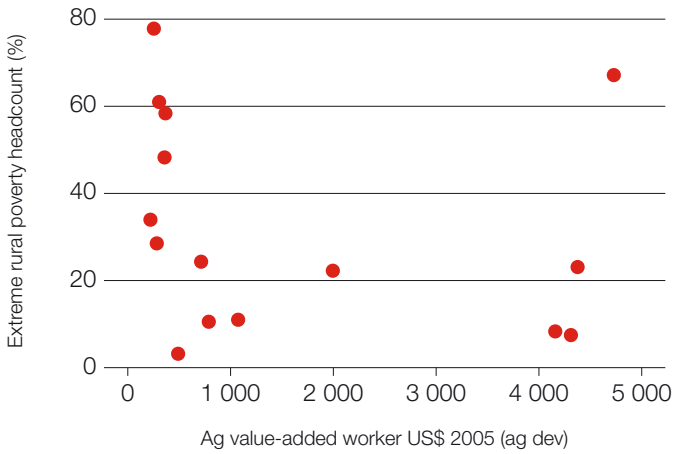
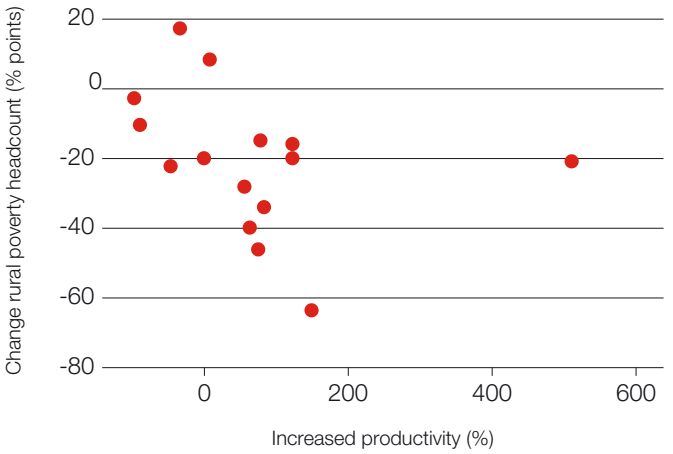


Figure 6 Change in agricultural development against change in rural poverty incidence – small-farming countries



Scatter plots of the incidence of rural poverty against level of agricultural development – for initial and most recent years under consideration in small-farming and large-farming countries, as well as a change versus change analysis throughout the period in question – reveal a generally negative linear relationship (figures 1-6). The approximately linear relationship indicates that an examination of Pearson's r can provide an indicator of the relative strength of the correlation for both small-farming and large-farming countries.

The picture that emerges is a mixed one, with small-farming countries showing a stronger negative relationship for initial levels of the variables, although this does not hold for data of the most recent year (table 5).

Table 5 Correlations between agricultural development (independent variable) and poverty reduction (dependent variable) – large- versus small-farming countries

	Large-farming	Small-farming
Initial versus initial	-0.674**	-0.717**
Latest versus latest	-0.755**	-0.212
Change versus change	0.242	-0.323

** Significant at 0.01

As the analysis is focused around rate of change dynamics, the relationship between change in agricultural development and change in rural poverty incidence is potentially of most interest. Table 5 indicates a stronger negative relationship between changes in the variables in small-farming countries – indeed, in large-farming countries the relationship is actually weakly positive. Thus, increases in agricultural productivity are associated with reducing rural poverty rates in our subset of small-farming countries, while this is not obviously the case in large-farming countries.

Generalizing these findings would require further research. As well as being only moderately negative, the Pearson's r value measuring change versus change dynamics for small-farming countries is not significant at any level. The corresponding value of r-squared is 0.10, indicating only 10 per cent of the variation in rural poverty is explained by agricultural development in small-farming countries (see annex 3).

Overall, these figures represent tentative indications of a comparatively stronger relationship between agricultural development and poverty reduction for small-farming countries than is observable in large-farming countries. Given issues with significance level and sample size, further research would be needed to validate this.

Let us now turn our attention to the question of how the respective country categories perform in advancing structural transformation.

4.4 Do small-farming countries perform better in advancing structural transformation?

Answering this question requires disaggregation of the findings of IFAD (2016a, p.34-40) on a positive relationship between agricultural development and structural transformation – comparing how this relationship plays out in small-farming as opposed to large-farming countries.

As with the previous section, the conditions hold for an examination of mean comparisons and eta to be of utility – the structural transformation variable being ratio/interval and the small-farming versus large-farming categorizing being the independent, and nominal, variable. Notably, this indicates a better performance for small-farming countries in advancing structural transformation in the period in question, with the mean advance in non-agricultural GDP at almost 13 per cent compared to just over 4 per cent. Further, the standard deviation is smaller for small-farming countries, indicating a more consistent performance of the small-farming countries with respect to advancing structural transformation (table 6). As with the previous section, clearly caution is needed in drawing strong conclusions from these mean differentials, given the impossibility of assessing significance because data were drawn based on availability rather than probability sampling.

Table 6 Comparing means: structural transformation in small-farming versus large-farming countries

Size		Change non-ag GDP (% points)
Large	Mean	4.027
	N	15
	Standard deviation	9.5619
Small	Mean	12.820
	N	15
	Standard deviation	6.7059
Total	Mean	8.423
	N	30
	Standard deviation	9.2653

The eta value of 0.48 can be regarded as showing a moderate relationship between the variables – notably this value is much higher than the corresponding figure in the rural poverty reduction section. The eta-squared of 0.23 shows that approximately 23 per cent of the variation in structural transformation is explained by differences in the small-farming/large-farming country categorization (see annex 1). Overall, mean comparisons and eta provide evidence potentially supporting the conceptual analysis presented herein on small-farming models possessing inherent advantages in promoting structural transformation vis-à-vis large-farming models. These results offer encouragement in terms of establishing a premise for further exploring whether and how different agricultural systems influence prospects for advancing structural transformation.

To buttress the above findings, analysis of the extent to which the influence of a difference in levels of rural investment could be shaping the findings is of interest. Table 7 indicates that small-farming countries outperform their large-farming counterparts in both low and high rural investment contexts. This hints at a degree of robustness in the findings, suggesting that differential performances between small-farming and large-farming countries are not explained by differentials in levels of rural investment – possible reasons for this are examined later in this section.

Table 7 Comparing means for subgroups of high and low rural investment

	High investment in FSN* per rural capita	Low investment in FSN per rural capita
Mean % point change non-ag GDP share large-farming countries	2.8	5.4
Mean % point change non-ag GDP share small-farming countries	10.1	13.5
n	11	19

* Food security and nutrition

However, the pertinence of comparing the relationship between agricultural development and structural transformation in small-farming and in large-farming contexts – over and above observing differential (non-attributable) outcomes in structural transformation – is also to be stressed. This leads to the final question addressed in this section.

4.5 Is the relationship between agricultural development and advancing structural transformation stronger in small-farming countries?

On this question, the examination is impeded by observation of an apparently non-linear (curved) relationship between the variables, revealed in scatterplots generated in SPSS (figures 7-12). This tends to prohibit the use of Pearson's r (Bryman, 2012, p.342-343). However, it is worth pointing out that IFAD (2016a) leans heavily on the use of Pearson's r in its analysis of the relationship between agricultural development and structural transformation. Considering the need for caution, therefore, a glance at the respective Pearson's r value may not be a useless endeavour.

As with the previous section, the picture painted by examining respective Pearson's r values is a mixed one (table 8). Relationships between initial levels of agricultural development and structural transformation suggest a stronger positive relationship in small-farming countries, while for most recent levels the reverse is the case.

Given that it is the dynamics around change that we are interested in, the change versus change figures are arguably those of most interest. In this respect, perhaps somewhat surprisingly, examining the relationship between the changes in the two variables reveals little evidence for correlation. Pearson's r indicates only weakly positive relationships that are not significant at any level. Indeed, the equivalent respective r-squared values in the change versus change analysis of 0.02 for large-farm countries and 0.00 for small-farming countries (see annex 3) indicate the level of change in agricultural development has virtually no explanatory power for changes in structural transformation. Broadly, the evidence here does support possible expectations created by the literature view that structural transformation in small-farming contexts may be more strongly related to poverty reduction (given stronger roots of associated dynamics at local levels), with Pearson's r revealing little in this direction. Disappointingly and also bearing in mind problems associated with the non-linearity of scatterplots, overall the analysis of Pearson's r has contributed little to our understanding of the dynamics between agricultural development and structural transformation in different agricultural systems.

Figure 7 Agricultural development against structural transformation – large-farming countries (initial year)

Figure 8 Agricultural development against structural transformation – large-farming countries (latest year)

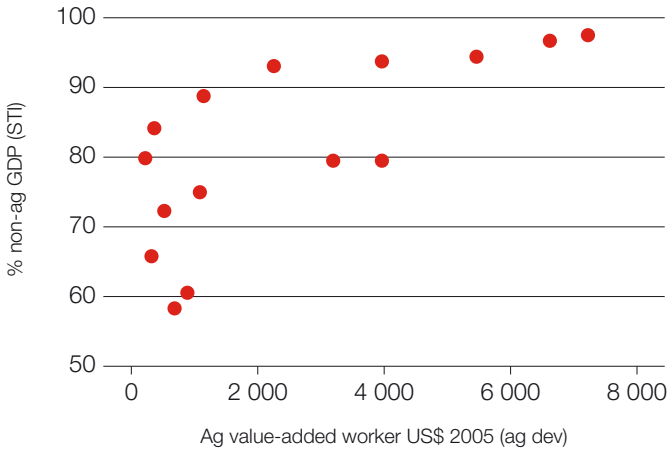


Figure 9 Changes in agricultural development against changes in structural transformation – large-farming countries

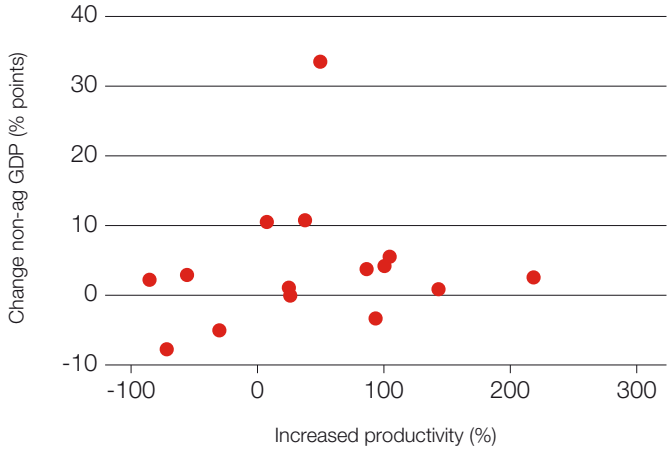


Figure 10 Agricultural development against structural transformation – small-farming countries (initial year)

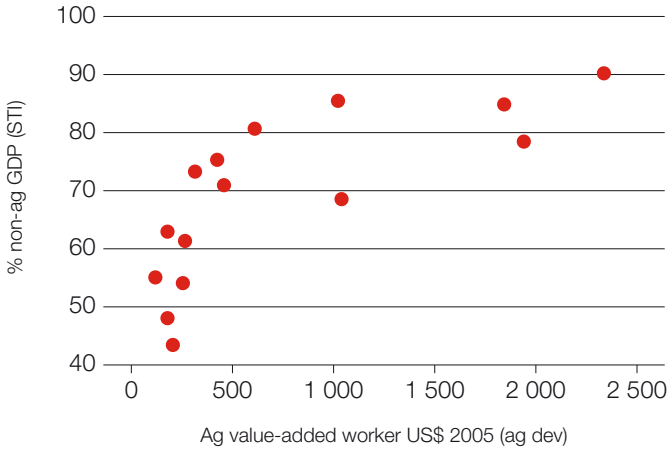


Figure 11 Agricultural development against structural transformation – small-farming countries (latest year)

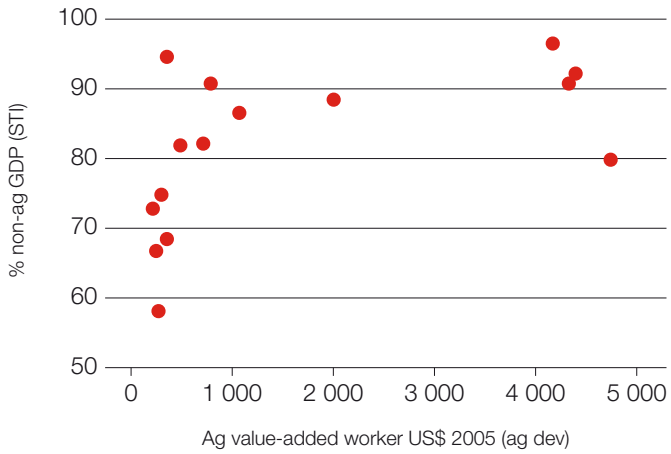


Figure 12 Changes in agricultural development against changes in structural transformation – small-farming countries

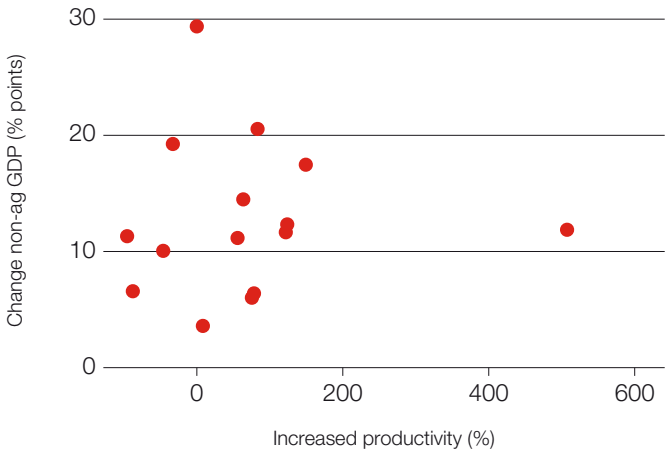


Table 8 Correlations between agricultural development (independent variable) and advancement in structural transformation (dependent variable) – large-farming versus small-farming countries

	Large-farming	Small-farming
Initial versus initial	0.656**	0.749**
Latest versus latest	0.717**	0.530*
Change versus change	0.139	0.014

** Significant at 0.01

* Significant at 0.05

The indication that changes in the levels of the variables do not appear to be correlated – apparently prohibiting any analysis of potential causality from the independent (agricultural development) to the dependent variable (structural transformation) – raises numerous questions.

First, is the possibility that while overall levels of agricultural development and structural transformation are largely in line with expectations – indicated by respective Pearson's r values all significant at 95 per cent confidence levels (and mostly at 99 per cent) for both country categories in both the initial and the most recent levels analysis[16] – the emerging dynamics are not in line with historical trends. The difficulty of late-transforming countries in diversifying their economies, in particular the slowness of modern industry and manufacturing to emerge (IFAD 2016a, p.69), possibly as a result of entrenched comparative advantages of earlier transforming countries in sectors such as manufacturing, could be one possible explanation for this.

Second, the prospect of dual causality, where structural transformation influences agricultural development (for example, through emergence of new technologies and market opportunities), as well as vice versa, also emerges as a potential factor in obscuring the analysis of so-called independent to dependent variable. This calls for further research, including of qualitative nature (for example, case studies), bearing in mind that scarcity of quantitative data on this topic – especially country-comparable data – is a constraint for research in this area.

4.6 Explaining the better performance of small-farming countries across productivity, poverty reduction and structural transformation

It is noticeable and noteworthy that the subset of small-farming countries outperformed their large-farming counterparts in progress made in agricultural development, rural poverty reduction and structural transformation for the period in question. At the same time, the bivariate analyses do not offer compelling evidence to support a hypothesis along the lines of rural poverty reduction and structural transformation being more strongly associated with agricultural development in small-farming countries relative to large-farming countries.

On the better performance of small-farming countries in improving levels of agricultural development, structural transformation and rural poverty during the period in question, it must be acknowledged that the methodology used does not allow statements to be made regarding the significance of observed differences in any of the three areas mentioned. There is insufficient evidence to rule out the results being simply due to random chance. However,

16. Respective coefficients of determination (r-squared) are noticeably higher at the initial versus initial and latest versus latest levels for both country categories, relative to very low values in the change versus change analysis (see annex 3).

results are in line with the conceptual analyses and advocacy of many previous authors and should therefore not be dismissed out of hand.

It has not been clearly established that differentials in the strength of the relationship between agricultural development, on the one hand, and both rural poverty reduction and structural transformation, on the other hand, are major reasons for the differences in means observed. Thus, it may be fair to consider potential alternative explanations that could be further explored in future research.

First, there may be basis to suggest that emerging contexts of urbanization, typified by the growth of small towns in relatively close proximity to rural areas (Tacoli and Agergaard, 2017), and generally higher demand for food in developing countries (Alexandratos and Bruinsma, 2012) might translate more readily into gains in productivity improvement and rural poverty reduction in predominantly small-farming landscapes. Given that smaller-scale farmers tend to be relatively more focused on local markets (CFS, n.d., p.2), it is likely that higher demand from relatively local towns would be of more significance to smallholders than to larger corporate farms, which would be more likely to rely on distant buyers (Hall et al., Tsikata and Scoones, 2017). The incentives to improve productivity would therefore be greater in predominantly small-farming environments under emerging urbanization typologies. The resultant potentially higher earnings and poverty reducing benefits – being mindful of the concentration of many of the poor in smallholder farming (Losch, 2013; IFAD, 2014a, p.3) – would therefore be greater. This means it would not necessarily be the increased productivity that causes the rural poverty reduction per se, but that improvements in both productivity and rural poverty incidence tend to result from local urbanization patterns. Hence the favourable mean comparisons for small-farming countries, but the failure to pin down any specific relational effects with agricultural development (of which productivity increase was the main indicator).

Second, with respect to structural transformation, greater local-level dynamism due to local small-scale actors in food systems being more connected within and across communities (Tacoli, 2017) is likely to lead to more fluid interactions between farm and non-farm sectors. In larger-farming contexts, the involvement of fewer actors at the local level due to the relative capital intensity of large-scale farming and weaker roots in local communities might lead to relatively smaller knock-on effects on non-farm sectors. Of course, where vertical integration between small and large farms is promoted, it is reasonable to expect that local-level effects would still be observed, although it is not clear how widely these models are adopted. Overall, it is possible that the nature of emerging urbanization patterns and associated greater connectivity brings more farm to non-farm dynamism in a predominantly small-farming context. It may not be the case, however, that it is increases in agricultural productivity that are necessarily driving these phenomena, hence the differential means observed in structural transformation but the lack of compelling findings in the bivariate Pearson's r analysis.

Third, observed superior performances of small-farming countries across agricultural development, rural poverty reduction and structural transformation raise the question of whether convergence is at play. If the small-farming countries are starting at significantly lower levels for the three variables it may simply be that faster improvements are more feasible at lower levels. Such convergence would potentially be in line with the broader global observation that improvements in economic and social development are generally faster in (poorer) southern countries than they are in their (richer) northern counterparts (UNDP, 2013). Factors

such as diffusion of technology, increased trade and expanding private investment in poorer agricultural settings could be possible reasons for a convergence phenomenon. It is noticeable that, for each of the Asia, Latin America and SSA datasets, the initial levels of agricultural development and rural poverty incidence were worse in the small-farming countries. However, small-farming countries showed better initial levels of structural transformation in Asia and virtually the same level in Latin America (see tables 9-11). In addition, for Asia improvements on the initial rural poverty level went beyond convergence, being lower than the equivalent for large-farming countries by the latest year (see annex 4 for latest year figures). Thus, noting the smallness of the regional datasets,[17] results do not convincingly show that trends observed are solely related to convergence effects.

Table 9 Initial levels – Asia (means)

	Agriculture value added (US$)	Rural poverty incidence (%)	% non-agriculture GDP
Small-farming	414	55	72
Large-farming	676	38	64

Table 10 Initial levels – Latin America (means)

	Agriculture value added (US$)	Rural poverty incidence (%)	% non-agriculture GDP
Small-farming	2 046	20	85
Large-farming	2 371	15	86

Table 11 Initial levels – sub-Saharan Africa (means)

	Agriculture value added (US$)	Rural poverty incidence (%)	% non-agriculture GDP
Small-farming	430	64	62
Large-farming	1 006	58	77

17. While it might appear sensible to aggregate across regions in order to increase sample sizes, this was not thought to be meaningful given the large variance between regions in the levels of the indicators.

5 Implications for research, policy and investment

As already noted, this research has been constrained by lack of country-comparable data on the contribution of smallholders to national agricultural systems. The adaptation of statistical systems, in particular agricultural censuses, to enable the disaggregation of agricultural data by farm size would be valuable in deepening understanding of the contribution and potential of smallholder agriculture to sectoral and broader developmental goals in SSA and beyond. Further, focus on how information on rural economies in general can be more effectively collected, considering the informality of many of the farm and non-farm activities therein, is warranted.[18] The conclusions of this and other cited research relating to smallholder-driven development would certainly benefit from further exploration with the aid of more comprehensive and easier to define thresholds between what may be considered smallholder and larger-scale agricultural systems.

The results, if not constituting overwhelming support for the positions of those convinced of the imperative of prioritizing support for smallholder farmers (for example: IFAD, 2014b; Oxfam, 2017), certainly seem to cast doubt on those dismissing the potential of the smallholder model to contribute to development. At a minimum, the arguments of Wiggins (2009) – that an agricultural sector dominated by smallholders is not an impediment to achieving rapid growth – are supported. Moreover, while Wiggins (2009) considered largely agricultural growth, this study indicated that wider structural transformation and inclusion (i.e. poverty reduction) benefits can be added to the sectoral benefits Wiggin examines vis-à-vis smallholder agricultural models.

Overall, this study, in its own modest way, supports the evidence and positions in a wide body of literature concluding that there is a basis for the view that supporting smallholder farmers through enabling policies and investments can, at least under some conditions, produce significant socio-economic benefits.[19] Discussions around the implications of urbanization for outcomes related to food security, nutrition and wider economic development in SSA (as well as other regions), may do well therefore to consider support to small-scale agriculture as an avenue worth exploring. In this respect, greater attention could be dedicated to enhancing rural-urban linkages through better infrastructure and institutional connectivity, as well as recognizing and supporting the informal systems in which the majority of smallholders operate through refined decentralized governance approaches and extension of public services (Tacoli, 2017).

Understanding that potential exists for smallholder farming to contribute to socio-economic development in agricultural-based communities and beyond, a key question surrounds the issue of how to overcome the transaction costs facing smallholders in SSA. Of course, considerations of acceptable public cost are necessarily part of this discussion (Wiggins, 2016, p.4). That being acknowledged, the provision of rural services and infrastructure

18. Davis et al. (2014, p.9), is a notable contribution in this area.

19. For example: FAO (2014), HLPE (2013), IFAD (2013), Hazell et al. (2007), Lipton (2006) and Sen (1966).

for smallholders has been shown to generate reasonable development returns in Asia's transforming economies (Wiggins, 2016, p. 32). In the labour-abundant context of SSA, the potential for similar approaches – adapted to a rapidly evolving context – should not be readily dismissed.

These approaches would necessarily include basic rural services, especially relating to health and education, which have already proven effective in improving rates of education and gender equality, and reducing morbidity and mortality (Wiggins, 2016, p.48). While outcomes are noteworthy in themselves, potential linkages with (especially smallholder) agricultural productivity are also worth mentioning – indeed the health and education of smallholders is inherently linked with agricultural labour productivity (Hawkes and Ruel, 2006; Schultz, 1975; Appleton and Balihuta, 1996; Philipps, 1994). Given indications in the present research that the smallholder model is not less viable than larger-farming models, the basis for prioritizing expenditure on such public services in SSA appears well justified.

If the smallholder model is to be advanced, approaches more directly tailored to supporting the requirements of smallholder systems will need to be systematically integrated into development planning. This means the provision of key services upon which smallholders rely to increase their productivity and incomes – especially extension, finance, infrastructure and risk management tools. These areas have been well explored in the literature and a range of tools have been developed by national and international development actors working with smallholders (for example: GIZ, 2012; IFC, 2013); however, existing approaches cannot be expected to work equally well in heterogeneous contexts. It is not within the scope of this research to synthesize approaches proposed in the literature to support smallholders, although it should be noted that findings from the present study indicate that the use of public financing to support such measures would not be without justification.

However, at a time where political and economic factors are creating pressure on levels of official development assistance (ODA), and public spending on agriculture is generally held to be inadequate (Mink 2016), a discussion on the role of private finance is a necessary element of this debate. Models where larger private actors provide services such as irrigation, training, finance and market access to smallholders have in many contexts proven beneficial for local smallholders (Latham et al., 2015). Consequently, there has been much attention devoted to so-called public-private-producer partnerships as a means to provide win-win scenarios for smallholders and larger private business actors (IFAD, 2016b). In this respect, there is merit in further exploring different models of vertical integration, where smallholders enter into partnerships with larger actors under different institutional arrangements. At the same time, while many successful examples have been documented, it must be borne in mind that whether or not smallholders benefit depends on the specific terms of contracts with arrangements over land ownership, sharing of incomes and debt repayment (Hall et al., 2017). Further, incentives for private actors to invest in smallholder systems are tempered by awareness of the inherent risks and uncertainties involved in rural and agricultural systems (Stockbridge and Dorward, 2013c), meaning that smallholders with relatively low levels of capacity and productive assets are often unlikely to benefit.

This raises at least three questions. First, how do you reduce the risks associated with private investment in smallholder agriculture? Second, how do you ensure partnership arrangements provide equitable benefits for smallholders? Third, how do you protect the least advantaged smallholders who are unlikely to benefit from such investments? On the first two questions,

there is a growing body of work (for example: GIZ, 2012; Kharas, n.d.; Wiggins and Keats, 2014) both applied and theoretical, while there is a perception the third question may require further attention, especially given growing evidence of the segmentation of smallholders into relatively heterogeneous groups, reflecting differing capacities to adapt and benefit from emerging commercial realities (Hazell, forthcoming).

One relevant avenue that has gained momentum is the possibility of adapted forms of social protection to protect smallholders at risk of being excluded – as well as to potentially enable those who may possess the capacity to compete in modern agrifood systems. This would require more systematic tailoring of programmes to the heterogeneous socio-economic conditions facing smallholders (IFAD, 2016c). In this respect, the distinguishing of social protection into three groups by Guhan (1994) is useful: "protective with the specific objective of guaranteeing relief from deprivation; preventive that directly seeks to avert deprivation; and promotional that aims to enhance real incomes and capabilities" (cited in IFAD, 2016c). Wiggins (2016, p.48) notes the impressive social returns to such programmes, while this study has considered the potential associated economic benefits of supporting smallholders. Overall, the impression is that adapted social protection as a vehicle not just for poverty relief, but for economy-wide development as well, is a relevant one in discussing future prospects for rural and smallholder development in SSA (FAO, 2015; IFAD, 2016c).

6 Concluding remarks

This research suggests that having an agricultural sector dominated by smallholdings might offer certain advantages in prospects for improving productivity, reducing poverty and broader structural transformation. While the quantitative analysis herein is far from conclusive on this topic, it does, at a minimum, question the viewpoints of authors such as Collier (2008) who are dismissive of the prospects for agricultural development in SSA under a smallholder model. Conceptual analysis from the literature relating to the labour intensity of smallholder farms, its tendency to be more routed in local socio-economic systems and specific advantages in terms of the knowledge and motivation of (largely family) workers, tend to be in line with our findings. It could be argued, therefore, that the targeting of policies and resources at the smallholder sector – recognized in the design of the SDGs – is justified.

Recognizing the need for further research underpinned by improved data systems that better reflect the smallholder share of national agricultural systems, this research calls for continued reflection on how to constructively engage with – and ensure the inclusion of – smallholders. Models of vertical integration and approaches to public-private-producer partnerships have shown some potential in certain conditions, as has the use of different modalities of social protection. Further reflection is merited on how to refine these models to more effectively enable heterogeneous groups of smallholders to contribute to – and benefit from – development processes across SSA, in particular by reducing the transaction costs involved with providing them with services.

References

African Center for Economic Transformation (ACET) (2014). *2014 African transformation report: growth with depth*. Accra, ACET.

Alexandratos N and J Bruinsma (2012) *World agriculture towards 2030/2050: the 2012 revision*. ESA Working Paper No. 12-03. Rome, FAO.

Ampaire E L, C L Machethe and E Birachi (2013) The role of rural producer organizations in enhancing market participation of smallholder farmers in Uganda: enabling and disabling factors. African Journal of Agricultural Research 8, 963-970.

Appleton S and A Balihuta (1996) *Education and agricultural productivity: evidence from Uganda*. Working Paper No. WPS/96-5. Oxford, Centre for the Study of African Economies, Oxford University.

Bautista R M and M Thomas (1998) *Agricultural growth linkages in Zimbabwe: income and equity effects.* Trade and Macroeconomics Division. Discussion Paper No. 31. Washington, D.C., IFPRI.

Brookings Institution (n.d.) *Ending rural hunger.* [Online]. Available from: https://endingruralhunger.org/ [Accessed 17 December 2016].

Bryman A (2012) *Social research methods*. 4th edition. Oxford, Oxford University Press.

CFS (Committee on World Food Security) (n.d.) *Policy recommendations: connecting smallholders to markets.* Available from: www.fao.org/3/a-bq853e.pdf [Accessed 30 May 2017].

Collier P (2008) The politics of hunger: how illusion and greed fan the food crisis. Foreign Affairs November/ December, 67-79.

Collier P and S Dercon (2014) African agriculture in 50 years: smallholders in a rapidly changing world? World Development 63, 92-101.

Cornia G A (1985) Farm size, land yields and the agricultural production function: an analysis for 15 developing countries. World Development 13 (4), 513-534.

Davis B, Di Giuseppe S and Zezza A (2014) *Income diversification patterns in rural Sub-Saharan Africa: reassessing the evidence.* World Bank Policy Research Working Paper 7108.

De Janvry A and E Sadoulet (2009) Agricultural growth and poverty reduction: additional evidence. The World Bank Research Observer 25 (1), 1-20.

Eastwood R, M Lipton and A Newell (2004) *Farm size*. Brighton, UK, University of Sussex.

Ellis F (2013) *Topic guide: agriculture and growth*. [Online}. Available from: https://assets.publishing.service.gov.uk/media/57a08a1040f0b649740003d8/EoD_TG01_Mar-squared012_Agriculture_and_Growth.pdf [Accessed 13 December 2016].

Engel E (1857) *Die productions- und consumtionsverhaltnisse des königreichs sachsen*. Zeitschrift des Statistischen Bureaus des Königlich-Sächsischen, Ministerium des Innern 8 (9), 1-54.

FAO (2010) *2000 World census of agriculture: main results and metadata by country (1996–2005)*. Rome, FAO.

FAO (2012) *Smallholders and family farmers.* [Online]. Available at: www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Factsheet_SMALLHOLDERS.pdf [Accessed 29 December 2016].

FAO (2014) *The state of food and agriculture. Innovation in family farming.* Rome, FAO.

FAO (2015) *The state of food and agriculture. Social protection and agriculture: Breaking the cycle of rural poverty.* Rome, FAO.

FAO (2016) *Decent rural employment: child labour.* [Online]. Available at: www.fao.org/rural-employment/work-areas/child-labour/en/ [Accessed 27 December 2016].

FAO and OECD (2012) *Sustainable agricultural productivity growth and bridging the gap for small family farms*. Interagency report to the Mexican G20 Presidency. Rome, FAO.

FAO, IFAD and WFP (2015) *The state of food insecurity in the world 2015: meeting the 2015 international hunger targets*. Rome, FAO.

GIZ (Gesellschaft für Internationale Zusammenarbeit) (2012) *Growing business with smallholders: a guide to inclusive agribusiness.* Bonn, GIZ.

Guhan S (1994) Social security options for developing countries. International Labour Review 133(1), 35-53.

Haggblade S (2005) *The rural nonfarm economy: pathway out of poverty or pathway in?* Paper prepared for the Research Workshop "The Future of Small Farms" Wye, Kent, 26-29 June 2005, IFPRI, ODI, Imperial College.

Hall R, D Tsikata and I Scoones (2017) *The pros and cons of commercial farming models in Africa.* [Online] The Conversation. Available at: http://theconversation.com/the-pros-and-cons-of-commercial-farming-models-in-africa-76355 [Accessed May 31 2017].

Hawkes C and M T Ruel (eds.) (2006) *Understanding the links between agriculture and health.* Washington, D.C., The International Food Policy Research Institute (IFPRI).

Hazell P (forthcoming) *Global trends in urbanization, agriculture and smallholder farming.* In: Global Agri-food Systems to 2050. Rome, Independent Science and Partnership Council, CGIAR.

Hazell P, C Poulton, S Wiggins and A R Dorward (2007). The future of small farms for poverty reduction and growth. Washington, D.C., International Food Policy Research Institute.

Heady D D (2015) *The evolution of global farming land: facts and interpretations*. Washington, D.C., IFPRI.

HLPE (2013) *Investing in smallholder agriculture for food security. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.* Rome, Committee on World Food Security.

Howell R and R Kent (2009a) *Conceptual issues in research methods, P506 Research methods.* [Online via internal VLE] School of Oriental and African Studies (SOAS). Available at: <https://elearn.soas.ac.uk/pluginfile.php/29925/mod_resource/content/1/RM_3740/content/module/pdfs/p506_unit_02.pdf> [Accessed 30 December 2016].

IFAD (2010) Introduction. In: *Rural poverty report 2011*. IFAD, Rome, pp.28-41.

IFAD (2013) *Smallholders, food security and the environment.* Rome and Nairobi, IFAD and UNEP.

IFAD (2014a) *Investing in smallholder family farmers…for the future we want.* Rome, IFAD.

IFAD (2014b) *Post-2015 Policy brief 3: Investing in smallholder family agriculture for global food security and nutrition*. Rome, IFAD.

IFAD (2016a) *Rural development report 2016: Fostering inclusive rural transformation.* Rome, IFAD.

IFAD (2016b) *How to do public-private-producer partnerships in agricultural value chains.* [Online]. Available at: www.ifad.org/documents/10180/998af683-200b-4f34-a5cd-fd7ffb999133 [Accessed 1 June 2017].

IFAD (2016c) Spotlight 1: Social protection. In: *Rural Development Report 2016*. Rome, IFAD.

IFC (2013) *Working with smallholders: A handbook for firms building sustainable supply chains.* Washington, D.C., World Bank.

IMF (2013) *Africa's got work to do: employment prospects in the new century.* Washington, D.C., IMF.

IFPRI (n.d.) *Smallholder farming.* [Online]. Available at: www.ifpri.org/topic/smallholder-farming [Accessed 15 June 2016].

Jayne, T S, J Chamberlin and D D Headey (2014) Land pressures, the evolution of farming systems and development strategies in Africa: a synthesis. Food Policy 48 (2014), 1-17.

Jayne T S, N Mason, R Myers, J Ferris, M Beaver and N Lenski (2010). *Patterns and trends in food staples markets in eastern and southern Africa: toward the identification of priority investments and strategies for developing markets and promoting smallholder productivity growth.* International Development Working Paper. Michigan, Michigan State University.

Kharas, H (n.d.) *Investing in inclusive rural transformation: innovative approaches to financing.* [Online] Available at: www.ifad.org/documents/36783902/659afea9-f850-4a5d-b1ff-0af97eba6217 [Accessed 7 June 2017].

Kelly S (2012) *Smallholder business models for agribusiness-led development: good practice and policy guidance.* Rome, FAO.

Larson D F, K Otsuka, T Matsumoto and T Kilic (2012) *Should African rural development strategies depend on smallholder farms? An exploration of the inverse productivity hypothesis*. Washington, D.C., World Bank.

Latham C J K, L Palentini, M Katemaunzanga and P Ashton (2015) From subsistence agriculture to commercial enterprise: Community management of green technologies for resilient food production. *Future of Food: Journal on Food*, Agriculture and Society 3(2), 8-17.

Leon P (1967) *Structural change and growth in capitalism.* Baltimore, John Hopkins Press.

Lipton M (2006) Can small family farmers survive, prosper, or be the key channel to cut mass poverty? The Electronic Journal of Agricultural and Development Economics 3 (1), 58-85.

Losch B (2013) *Africa's multiple challenges and options for structural change.* Presentation at the Wilson Center [Online] Available from: www.wilsoncenter.org/sites/default/files/Losch%20Presentation.pdf [Accessed 23 December 2016].

Losch B, K Hussein, C Bhavsar, O Ajilore and Y. Chiffoleau (2014) *Family farming facing the challenges of urbanization and employment.* Orientation paper, Working Group 4. Paris, CIRAD.

Mellor J W (1995) Introduction. In: Mellor J W (ed.) *Agriculture on the road to industrialization.* Johns Hopkins University Press, Baltimore, 1-22.

Mink SD (2016) *Findings across agricultural public expenditure reviews in African countries*. IFPRI Discussion Paper 01522. Washington, D.C., IFPRI.

Nagayets O (2005) *Small farms: current status and key trends*. Information Brief, Future of Small Farms Research Workshop, Wye, 26–29 June. Washington, D.C., IFPRI.

Ngqangweni S S, C L Delgado and J F Kirsten (1999) Exploring growth linkages in a South African smallholder farming area. Agrekon 38(4), 585-593.

Oxfam (2017) *Food security, agriculture, and livelihoods.* [Online]. Available at: https://policy-practice.oxfamamerica.org/work/food-agriculture-livelihoods/ [Accessed 31 May 2017].

Phillips J M (1994) Farmer education and farmer efficiency: a meta-analysis. Economic Development and Cultural Change 43(1), 149-165.

Poole N and A de Frece (2010) *A review of existing organisational forms of smallholder farmers' associations and their contractual relationships with other market participants in the East and Southern African ACP Region*. AAACP Paper Series, No. 11.

Proctor F J (2014) *Rural economic diversification in sub-Saharan Africa*. IIED working paper. London, IIED.

Schneider K and M K Gugerty (2011) Agricultural productivity and poverty reduction: linkages and pathways. The Evans School Review 1 (1), 56-74.

Schultz T W (1975) The value of the ability to deal with disequilibria. Journal of Economic Literature 13(3), 827-846.

Sen A (1966) Peasants and dualism with or without surplus labor. The Journal of Political Economy 74 (5), 425-450.

Simphiwe N (2001) *Prospects for rural growth? Measuring growth linkages in a South African smallholder farming area.* Working paper 2001–11. Pretoria, University of Pretoria.

Stockbridge M and A Dorward (2013a) *The rural non-farm economy, C230 Rural Development.* [Online via internal VLE] School of Oriental and African Studies (SOAS). [Accessed: 9 December 2016].

Stockbridge M and A Dorward (2013b). *Health and education, C230 Rural Development.* [Online via internal VLE] School of Oriental and African Studies (SOAS). [Accessed: 28 December 2016].

Stockbridge M and A Dorward (2013c). *The agricultural sector, C230 Rural Development.* [Online via internal VLE] School of Oriental and African Studies (SOAS). [Accessed: 1 June 2017].

Tacoli C (2017) *Informal food systems and food security in rural and urban East Africa.* IIED & IFAD, London.

Tacoli C and J Agergaard (2017) *Urbanisation, rural transformations and food systems: The role of small towns.* IIED, London.

Thapa G and R Gaiha (2011) Smallholder farming in Asia and the Pacific: Challenges and opportunities. Paper prepared for IFAD Conference on New Directions for Smallholder Agriculture, 24-25 January, Rome, IFAD.

Timmer C (1988) The agricultural transformation. In: Chenery H and T N Srinivasan TN (eds) The Handbook of Development Economics 1, 275-331.

UNCTAD (2013) *The Least Developed Countries Report 2013: Growth with employment for inclusive and sustainable development.* New York and Geneva, UNCTAD.

UNDESA (n.d.) *Sustainable development knowledge platform.* [Online] Available at: https://sustainabledevelopment.un.org/sdgs [Accessed 27 December 2016].

UNDESA (2014) *World urbanization prospects: 2014 Revision*. New York, UNDESA.

UNDP (2013) *The rise of the south: human progress in a diverse world.* Human Development Report 2013. New York, UNDP.

UNECA, AU, AfDB and UNDP (2015) *MDG Report 2015: Lessons learned in implementing the MDGs: Assessing progress in Africa towards the Millennium Development Goals.* Addis Ababa, UNECA, AU, AfDB and UNDP.

United Nations (2015) *The Millennium Development Goals report 2015.* New York, United Nations.

van Zyl J, H Binswanger and C Thirtle (1995). *The relationship between farm size and efficiency in South African Agriculture.* Policy Research Working Paper No. 1548. Washington, D.C., World Bank.

Webb P (2013) *Impact pathways from agricultural research to improved nutrition and health: literature analysis and research priorities.* Rome and Geneva, FAO and WHO.

Wiggins S (2009) *Can the smallholder model deliver poverty reduction and food security for a rapidly growing population in Africa?* FAC Working Paper No. 08, July 2009, Future Agricultures Consortium, IDS, UK.

Wiggins S (2014) African agricultural development: lessons and challenges. *Journal of Agricultural Economics* 65(3), 529-556.

Wiggins S (2016) *Agriculture and rural development reconsidered: A guide to issues and debates.* Rome, IFAD.

Wiggins S and S Keats (2014) *Smallholder engagement with the private sector.* London, Economic and Private Sector Professional Evidence and Applied Knowledge Services.

World Bank (n.d.) *Agriculture and poverty reduction. Agriculture for development policy brief.* [Online] Availableat:http://siteresources.worldbank.org/INTWDR-SQUARED008/Resources/2795087-1191440805557/4249101-1191957549239/Brief_AgPovRedctn_web.pdf [Accessed 29 December 2016].

World Bank (2007) *Agriculture for development*. World development report 2008. Washington, D.C., World Bank.

World Bank (2013) *The state of the poor: where are the poor and where are they poorest?* Washington, D.C., World Bank.

World Bank (2015) World development indicators. Washington, D.C., World Bank.

Annex 1 Country categorization

Asia

Small-farming countries	Large-farming countries
China	Lao People's Democratic Republic
India	Pakistan
Indonesia	Philippines
Viet Nam	

Latin America

Small-farming countries	Large-farming countries
Ecuador	Brazil
Guatemala	Chile
Panama	Colombia
	Nicaragua
	Paraguay

Sub-Saharan Africa

Small-farming countries	Large-farming countries
Cabo Verde	Burkina Faso
Ethiopia	Guinea
Lesotho	Mali
Malawi	Namibia
Mozambique	Senegal
Nigeria	South Africa
Tanzania	Togo
Uganda	

Annex 2 Eta measures of association

Measures of association: farm size (independent variable) and dependent variables

	Eta	Eta-squared
Increased productivity (%) * Size	0.098	0.010
Change non-ag GDP (% points) * Size	0.483	0.233
Change rural poverty headcount (% points) * Size	0.192	0.037

Annex 3 Coefficients of determination

Agricultural development (independent variable) and rural poverty reduction (dependent variable)

	Large-farming	Small-farming
Initial versus initial	0.454	0.514
Latest versus latest	0.570	0.044
Change versus change	0.058	0.104

Agricultural development (independent variable) and advancement in structural transformation (dependent variable)

	Large-farming	Small-farming
Initial versus initial	0.430	0.561
Latest versus latest	0.514	0.281
Change versus change	0.019	0.000

Annex 4 Latest levels (means)

Asia

	Agriculture value added (US$)	Rural poverty incidence (%)	Non-agriculture GDP (%)
Small-farming	769	12	85
Large-farming	919	22	79

Latin America

	Agriculture value added (US$)	Rural poverty incidence (%)	Non-agriculture GDP (%)
Small-farming	3 514	13	92
Large-farming	4 653	8	89

Sub-Saharan Africa

	Agriculture value added (US$)	Rural poverty incidence (%)	Non-agriculture GDP (%)
Small-farming	1 368	50	76
Large-farming	1 710	39	77

Annex 5 Raw data

Asia

Country	Span	% non-ag GDP (ST)	Change non-ag GDP (%)	Ag value-added per worker US$2,005 (ag dev)
Bangladesh	1990	67.2		267
	2014	83.9	16.7	608
Cambodia	1993	53.5		349
	2014	69.6	16.1	523
China	1990	73.3		317
	2014	90.8	17.5	791
India	1990	71.0		459
	2014	82.2	11.2	716
Indonesia	1990	80.6		613
	2014	86.6	6.0	1079
Lao PDR	1990	38.8		345
	2014	72.3	33.5	522
Pakistan	1990	74.0		857
	2014	75.0	1.0	1 087
Philippines	1990	78.1		826
	2014	88.7	10.6	1 148
Viet Nam	1990	61.3		266
	2014	81.9	20.6	489

SH: smallholder; RNF: rural non-farm; FSN: food security and nutrition

Increased productivity (%)	SH/ag holdings (%)	RNF income share (%)	Extreme rural poverty headcount (%)	Change rural poverty headcount (%)	FSN Investment per rural capita ($)
		36	70.1		
127.7		36	48.9	-21.2	16
			48.0		
49.9			7.7	-40.3	25
	98		74.1		
149.5			10.5	-63.6	173
	82		52.5		
56.0			24.4	-28.1	21
	88	31	57.1		
76.0		38	11.0	-46.1	20
	73		63.4		
51.3			32.1	-31.3	31
	58	45	17.7		
26.8		39	8.5	-9.2	11
	68		33.6		
39.0			25.1	-8.5	32
	95	30	37.0		
83.8		52	3.2	-33.8	19

Latin America

Country	Span	% non-ag GDP (ST)	Change non-ag GDP (%)	Ag value-added per worker US$2,005 (ag dev)
Bolivia	1990	83.3		594
	2014	87	3.7	670
Brazil	1990	91.9		1 712
	2014	94.4	2.5	5 470
Chile	1990	91.3		3 224
	2014	96.7	5.4	6 638
Colombia	1990	83.3		3 654
	2014	93.7	10.4	3 982
Costa Rica	1990	87.7		3 199
	2013	94.4	6.7	6 813
Dominican Republic	1990	85.5		2 502
	2014	93.8	8.3	8 321
Ecuador	1990	78.6		1 946
	2014	90.9	12.3	4 344
El Salvador	1990	82.6		2 133
	2014	88.6	6.0	3 583
Guatemala	2001	84.9		1 848
	2014	88.5	3.6	2 011
Honduras	1990	77.6		1 222
	2014	86.2	8.6	2 647
Mexico	1990	92.2		2 712
	2014	96.7	4.5	4 436
Nicaragua	1994	78.7		1 623
	2014	79.5	0.8	3 973
Panama	1990	90.2		2 344
	2012	96.5	6.3	4 187
Paraguay	1991	83		1 644
	2014	79.5	-3.5	3 203
Peru	1991	91.1		1 025
	2012	92.6	1.5	1 905
Uruguay	1990	90.8		5 475
	2014	91.9	1.1	10 297

SH: smallholder; RNF: rural non-farm; FSN: food security and nutrition

Increased productivity (%)	SH/ag holdings (%)	RNF income share (%)	Extreme rural poverty headcount (%)	Change rural poverty headcount (%)	FSN Investment per rural capita ($)
		49	49.2		
12.8			18.6	-30.6	84
	21		10.3		
219.5			5.6	-4.7	256
	25		1.2		
105.9			0.8	-0.4	355
	32		23.6		
9.0			11.4	-12.2	71
			4.7		
113.0			1.5	-3.2	356
			5.8		
232.6			3.2	-2.6	96
	43	62	23.1		
123.2		37	7.3	-15.8	40
			20.2		
68.0			1.6	-18.6	30
	88	33	13.6		
8.8		40	22.3	8.7	43
			29.3		
116.6			25.2	-4.1	43
			14.4		
63.6			4	-10.4	266
	21	32	25.6		
144.8		32	14.7	-10.9	74
	63	46	23		
78.6		50	8.3	-14.7	88
	20		12.2		
94.8			5.7	-6.5	77
			23.9		
85.9			7.1	-16.8	92
			0.3		
88.1			0.2	-0.1	1 056

Sub-Saharan Africa

Country	Span	% non-ag GDP (ST)	Change non-ag GDP (% points)	Ag value-added per worker US$2,005 (ag dev)
Benin	1990	65.3		509
	2014	76.5	11.2	977
Botswana	1990	95.1		888
	2014	97.6	2.5	734
Burkina Faso	1990	70.9		197
	2014	65.8	-5.1	323
Burundi	1990	44.1		233
	2014	60.7	16.6	132
Cabo Verde	1990	85.6		1 025
	2014	92.2	6.6	4 410
Cameroon	1990	75.4		540
	2014	77.8	2.4	1 271
Central African Republic	1990	50.7		430
	2014	41.8	-8.9	456
Congo, Republic of the	1990	87.1		502
	2014	95.2	8.1	837
Ethiopia	1990	48		180
	2014	58.1	10.1	278
Guinea	1990	76.2		150
	2014	79.9	3.7	221
Kenya	1990	70.5		415
	2014	69.7	-0.8	396
Lesotho	1990	75.3		427
	2013	94.6	19.3	365
Madagascar	1990	71.4		245
	2014	73.5	2.1	176
Malawi	1990	55.0		120
	2014	66.7	11.7	253
Mali	1990	60.5		563
	2014	60.5	0.0	883
Mauritania	1990	70.4		1 122
	2014	77.2	6.8	1 102
Mozambique	1990	62.9		180
	2014	74.8	11.9	303

SH: smallholder; RNF: rural non-farm; FSN: food security and nutrition

Increased productivity (%)	SH/ag holdings (%)*	RNF income share (%)**	Extreme rural poverty headcount (%)	Change rural poverty headcount (% points)	FSN Investment per rural capita ($)
			49.1		
91.9			43.5	-5.6	36
			20.9		
-17.3			15.0	-5.9	218
	32		81.6		
-27.9			46.0	-35.6	40
			87.3		
676.5			82.0	-5.3	17
	89		33.4		
-87.8			23.2	-10.2	240
			57.2		
-66.2			38.5	-18.7	88
			65.5		
10.1			71.7	6.2	19
			67.3		
-78.5			81.2	13.9	83
	87	13	50.8		
-46.0		6	28.5	-22.3	25
	65		80.7		
87.8			46.8	-33.9	10
		24	32.9		
7.8			48.5	15.6	24
	76		40.9		
-32.9			58.4	17.5	40
			87.6		
-31.8			92.4	4.8	12
	95	16	97.5		
122.5		13	77.9	-19.6	40
	45		65.6		
27.1			54.2	-11.4	59
			24.9		
-83.7			14.3	-10.6	85
	84		81.6		
508.9			61.0	-20.6	25

Country	Span	% non-ag GDP (ST)	Change non-ag GDP (% points)	Ag value-added per worker US$2,005 (ag dev)
Namibia	1990	90.2		1 845
	2014	93.0	2.8	2 265
Nigeria	1990	68.5		1 044
	2014	79.8	11.3	4 760
Rwanda	1990	67.5		198
	2014	66.9	-0.6	312
Senegal	1990	80.1		400
	2014	84.2	4.1	362
Sierra Leone	1990	53.1		733
	2014	44.0	-9.1	926
South Africa	1990	95.4		3 308
	2014	97.5	2.1	7 238
Swaziland	1990	89.6		1 173
	2014	93.7	4.1	1 450
Tanzania	1990	54.0		257
	2014	68.5	14.5	356
Togo	1990	66.2		582
	2014	58.3	-7.9	681
Uganda	1990	43.4		205
	2014	72.8	29.4	218
Zambia	1990	79.4		458
	2013	90.4	11.0	353

SH: smallholder; RNF: rural non-farm; FSN: food security and nutrition

Increased productivity (%)	SH/ag holdings (%)*	RNF income share (%)**	Extreme rural poverty headcount (%)	Change rural poverty headcount (% points)	FSN Investment per rural capita ($)
	39		34.1		
-53.9			23.7	-10.4	191
	74	17	69.9		
-95.8		40	67.2	-2.7	12
			82.0		
28.2			62.1	-19.9	35
	38		45.9		
102.5			33.8	-12.1	70
			71.8		
257.2			70.8	-1.0	33
	30[20]		38.3		
-83.8			8.3	-30.0	44
			52.5		
-82.3			47.4	-5.1	124
	75	46	88.0		
63.5		20	48.2	-39.8	14
	29		61.5		
-69.9			63.6	2.1	22
	73	26	53.8		
0.0		28	34.0	-19.8	16
			71.6		
-22.9			89.2	17.6	40

20. Author's estimate based upon literature finding indicating that "large-scale farms dominate South African agriculture" (van Zyl et al. 1995, p.9; see also Wiggins 2009, p.2) indicating that South Africa merits being categorized among the large-farming countries, despite the absence of precise estimates of smallholdings in FAO (2010).

The IFAD Research Series

01. Agricultural and rural development reconsidered
    A guide to issues and debates
    By Steve Wiggins
02. Migration and transformative pathways
    A rural perspective
    By David Suttie, Rosemary Vargas-Lundius
03. Fostering inclusive outcomes in sub-Saharan African agriculture
    Improving agricultural productivity and expanding agribusiness opportunities
    By David Suttie, Rui Benfica
04. The effects of smallholder agricultural involvement on household food consumption and dietary diversity
    Evidence from Malawi
    By Rui Benfica, Talip Kilic
05. Rural-urban linkages and food systems in sub-Saharan Africa
    The rural dimension
    By Karim Hussein, David Suttie
06. Why food and nutrition security matters for inclusive structural and rural transformation
    By Steven Were Omamo
07. Measuring IFAD's impact
    Background paper to the IFAD9 Impact Assessment Initiative
    By Alessandra Garbero
08. Fostering inclusive rural transformation in fragile states and situations
    By Karim Hussein
09. Social protection and inclusive rural transformation
    By Carolina Trivelli, Silvana Vargas, Jhonatan Clausen
10. Inclusive finance and inclusive rural transformation
    By Calum G. Turvey
11. Food safety, trade, standards and the integration of smallholders into value chains
    A review of the literature
    By John Humphrey
12. An evidence-based assessment of IFAD's end of project reporting
    By Bia Carneiro, Alessandra Garbero
13. Graduation models for rural financial inclusion
    By Khalid El Harizi, Xinjia Yan
14. Disbursement performance of the International Fund for Agricultural Development (IFAD)
    An in-depth analysis of drivers and trends
    By Tim Balint, Daniel Higgins, Paola Mallia, Silvana Scalzo, Paul Winters
15. Remittances, growth and poverty reduction in Asia
    A critical review of the literature and new evidence from cross-country panel data
    By Katsushi S. Imai, Bilal Malaeb, Fabrizio Bresciani
16. Getting the most out of impact evaluation for learning, reporting and influence
    Insights from piloting a Participatory Impact Assessment and Learning Approach (PIALA) with IFAD
    By Edward Heinemann, Adinda Van Hemelrijck, Irene Guijt
17. Population age structure and sex composition in sub-Saharan Africa
    A rural-urban perspective
    By Ashira Menashe-Oren, Guy Stecklov

18. Do agricultural support and cash transfer programmes improve nutritional status?
    By Seth R. Gitter, James Manley, Jill Bernstein, Paul Winters
19. Measuring women's empowerment in agriculture
    A streamlined approach
    By Alessandra Garbero, Emilie Perge
20. Transformation and diversification of the rural economy in Asia
    By Roehlano M. Briones
21. Does relative deprivation induce migration?
    Evidence from sub-Saharan Africa
    By Kashi Kafle, Rui Benfica, Paul Winters
22. Poverty reduction during the rural-urban transformation
    Rural development is still more important than urbanization
    By Katsushi S. Imai, Raghav Gaiha, Alessandra Garbero
23. The effect of the sectoral composition of economic growth on rural and urban poverty
    By Rui Benfica, Heath Henderson
24. Influence of nutrition-sensitive interventions on dietary profiles of smallholder farming households in East and Southern Africa
    By Marian Amaka Odenigbo, Patience Elabor-Idemudia, Nigatu Regassa Geda
25. Structural transformation and poverty in Malawi
    Decomposing the effects of occupational and spatial mobility
    By Rui Benfica, Margherita Squarcina, Alejandro de la Fuente
26. Exploration of a methodology for assessing the impact of policy engagement
    What impact and how to assess it?
    By Anna McCord, Ed Heinemann, Lauren Phillips
27. Asia's rural-urban disparity in the context of growing inequality
    By Katsushi S. Imai, Bilal Malaeb
28. Understanding the dynamics of adoption decisions and their poverty impacts
    The case of improved maize seeds in Uganda
    By Alessandra Garbero, Pierre Marion
29. Empowering through collective action
    By Pierre-Marie Bosc
30. Nutrition-sensitive value chains from a smallholder perspective
    A framework for project design
    By Isabel de la Peña, James Garrett, Aulo Gelli
31. Impact of modern irrigation on household production and welfare outcomes
    Evidence from the Participatory Small-Scale Irrigation Development Programme (PASIDP) project in Ethiopia
    By Alessandra Garbero, Tisorn Songsermsawas
32. Developing country-wide farming system typologies
    An analysis of Ethiopian smallholders' income and food security
    By Esther Boere, Aline Mosnier, Géraldine Bocquého, Alessandra Garbero, Tamás Krisztin, Petr Havlík, Tomas Elhaut
33. The impact of the adoption of CGIAR's improved varieties on poverty and welfare outcomes
    A systematic review
    By Alessandra Garbero, Pierre Marion, Valentina Brailovskaya
34. Farm size and productivity
    Lessons from recent literature
    By Douglas Gollin

35. Climate change mitigation potential of agricultural practices supported by IFAD investments
    An ex ante analysis
    By Meryl Richards, Aslihan Arslan, Romina Cavatassi, Todd Rosenstock
36. Who works in agriculture?
    Exploring the dynamics of youth involvement in the agri-food systems of Tanzania and Malawi
    By Kashi Kafle, Neha Paliwal, Rui Benfica
37. Determinants of cofinancing in IFAD-funded projects
    A call to rethink development interventions
    By Manda Dite Mariam Sissoko, Natalia Toschi, Lisandro Martin
38. Meta-evidence review on the impacts of investments in agricultural and rural development on Sustainable Development Goals 1 and 2
    By Jill Bernstein, Nancy Johnson, Aslihan Arslan
39. Smallholder farming, growth linkages, structural transformation and poverty reduction
    Lessons and prospects for sub-Saharan Africa
    By David Suttie

International Fund for Agricultural Development
Via Paolo di Dono, 44 - 00142 Rome, Italy
Tel: +39 06 54591 - Fax: +39 06 5043463
Email: ifad@ifad.org
www.ifad.org

facebook.com/ifad
instagram.com/ifadnews
linkedin.com/company/ifad
twitter.com/ifad
youtube.com/user/ifadTV

ISBN 978-92-9072-941-9