



Foresight4Food

International Collaborative Initiative

Farmers and food systems

WHAT FUTURE FOR SMALL-SCALE AGRICULTURE?

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KEY MESSAGES

IN A NUTSHELL

Transforming small-scale family farming is critical to long-term global food and nutrition security, tackling rural poverty and hunger, and to achieving the Sustainable Development Goals (SDGs). Commercial small-scale family farms of 20 ha or less are and will remain critical to food supply in middle- and low-income countries.

Although there is attention for the problems of small-scale agriculture in domestic and global fora, oversimplified narratives are hampering sound policy making and public investment.

A CRITICAL DUALISM

Of the 558 million farms with 20 ha or less land, 410 million or 72% are less than 1 ha. A very large majority of the smallest farms are not commercial and make only a marginal contribution to feeding growing urban populations. This creates a dualism in small-scale agriculture between a smaller number of commercial farmers who are above the poverty line and a large number of semi-subsistence farmers who are mostly very poor. This dualism has profound policy and development implications.

Transforming small-scale agriculture to be more commercially viable and to tackle poverty and hunger requires:

- a much more nuanced understanding of the diversity of small-scale farms and their farming contexts, and
- a reassessment of the implications of the structural changes in food systems and the wider economy for the livelihoods of different categories of small-scale farmers.

DIFFERENT OPPORTUNITIES

Meeting growing food demand for urban populations is a significant opportunity for commercial small-scale farmers (perhaps up to 30% of all those under 20 ha), but not for the large numbers of very small-scale farmers. Tackling rural and small-scale farmer poverty will require the development of livelihood options not based solely on farming.

Commercial small-scale agriculture and food systems-led rural economic development is critical to creating vibrant off-farm rural economies. These can create alternative employment and livelihood options and stem rapid migration to large cities.

More effective and differentiated policy mechanisms are needed to tackle the dualism of small-scale agriculture. On one hand, investments are needed to help optimise the efficiency, competitiveness and sustainability of commercial small-scale agriculture. On the other, there must be targeted strategies to support those trapped in rural poverty or who are transitioning to alternative employment. Input and output subsidies, and price support schemes, are generally blunt and ineffective ways for tackling the deeper and longer-term structural challenges of transforming small-scale agriculture.

DRIVING TRANSFORMATION

Moving forward requires much better country-level analysis of the structure of small-scale agriculture and rural poverty, coupled with long-term visions and strategies for transformation set within a wider food systems framework.

Enhanced national level multi-stakeholder and cross-sector foresight and scenario processes, underpinned by better data, are needed to develop such visions and strategies

Ultimately, greater political commitment is required to bring about change. This calls for stronger and more influential coalitions for change, and greater public understanding and support.



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1 INTRODUCTION

What does the future hold for the world's 500 million small-scale farms as food systems change? A significant transformation of small-scale agriculture is needed to realise the SDGs, and to achieve healthier, more equitable and environmentally sustainable food systems. This report argues that a much deeper, more nuanced and up-to-date understanding of small-scale agriculture and family farming is urgently needed to drive such a transformation.

Some 2 to 3 billion people still depend on small-scale agriculture for their livelihoods. Amongst this group are the world's poorest, most food insecure and most vulnerable people, who are furthest from the goals of SDG 1 and SDG 2. However, small-scale farmers are not a homogenous group. They have highly varied incomes, land sizes, assets and gender dynamics, and they farm in profoundly different environmental and market contexts. Yet all too often the narratives about small-scale agriculture do not make these distinctions, which hampers sensible discussion about policy options leading to misguided public investments.

Small-scale farmers in all their diversity are part of a wider food system that is undergoing significant structural transformation. The opportunities and risks for the future for small-scale agriculture need to be understood within this wider food systems context. Changes in food systems are being driven by urbanisation, changing diets, new patterns of agricultural and food sector investment, technology, climate change, and resource depletion, along with changes in the wider contexts of political economics, global trade and geopolitics. That food systems, over the last half century, have met the huge increased demand for food has been an astonishing achievement. However, we are now faced with the downsides as recognition grows about how unhealthy, environmentally unsustainable and inequitable many of the ways we produce, distribute and consume food have become.

New visions are needed for how food systems will operate into the future and the place of small-scale agriculture and family farming in these systems. There are undoubtedly opportunities for small-scale farmers, but certainly not for all. Policies will have a big influence on how economically inclusive or exclusive food systems of the future will be, with huge implications for the small-scale agriculture sector and rural poverty.

There is nothing inevitable about the future direction of our food systems. What happens is a political choice – accepting the consequences of the status quo or taking action to bring food systems into better alignment with health needs, planetary boundaries and social equity. What unfolds will be the outcome of the incentives put in place by policy decisions driven by the politics of trade-offs, interests and influence.

This report contributes to creating informed and compelling narratives about desirable futures for small-scale agriculture. Such narratives are necessary to sway interests and generate political will for change. They need to be grounded in systems thinking, supported by synthesis of research, and underpinned by alternative scenarios to assess trade-offs and re-imagined policy options.

This report is driven by asking two different questions:

1. How important will small-scale agriculture be to the future of feeding an increasingly urbanised world?
2. How important will small-scale agriculture be to tackling poverty, malnutrition and inequality?

The report draws on recent data about small-scale agriculture to offer challenging perspectives on these two questions. It highlights the linkages between changes in food systems and the challenges for transforming small-scale agriculture. The dynamics between the evolution of food markets, emerging patterns of investment, and changes in how small-scale farmers make a livelihood are explored to offer ideas about an agenda for transformation. The report also provides a synthesis of recommendations on small-scale agriculture made in key reports and literature from the last 10 years.

The objective of this work is to provide a set of conceptual framings that can help to unpack the complex issues around small-scale agriculture, highlight where more data and understanding is needed, and provide a reference point for debate.

The paper is based a longer report on the findings of the Farmers and Food Systems project carried out by the Food Systems Transformation Group at the University of Oxford's Environmental Change Institute (ECI) and funded by the Open Society Foundations (OSF).

Caveat: There is much literature on small-scale agriculture and agricultural led economic development. Yet despite the analysis and insights of this work, the challenges and barriers to transformation seem not to have shifted markedly over the last 20 years. Consequently, it seems justified to re-emphasise, in an integrated way, the issues and perspectives that have been raised by many others. In doing so, we make a more explicit link between small-scale agriculture and the emerging global agenda on food systems. Much of the analysis on small-scale agriculture, for example, well synthesised in the recent works of Hazell and Rahman (2014) or Mellor (2017), may not be particularly new to those familiar with the literature. There is, however, a desperate need to keep projecting this deeper understanding into wider narratives, policy debates, stakeholder dialogue, development thinking and decision-making.

2 UNDERSTANDING SMALL-SCALE AGRICULTURE

The role of small-scale agriculture in feeding the world and tackling poverty and hunger is a long-debated development issue. The advocates point to the large number of people who still depend on small-scale agriculture for their livelihoods and that much of the food consumed in low- and middle-income countries is produced by small-scale agriculture (Wegner and Zwart 2011; Poole 2017). The critics point to migration out of agriculture as economies develop and that poverty reduction depends largely on jobs and economic development outside agriculture (Collier and Dercon 2014). Investment in agriculture as a driver of development has waxed and waned over the decades (FAO 2017a).

Existing data provides limited information on what sized farms are producing what, where, and with what level of productivity and profitability. However, a few big picture issues are clear. First, the livelihoods of 2 to 3 billion people depend on small-scale agriculture. Second, while estimates and definitions vary, small-scale agriculture still supplies a significant proportion of the food consumed in non-OECD countries (IFAD 2013). Third, many small-scale farmers live below or just above the poverty line and small-scale farming is not a livelihood most aspire to or would wish on their children.

For decades, numerous national government and international development programmes have sought to improve the lot of small-scale farmers, with mixed results at best. Low commodity prices, poor infrastructure, weak extension systems, market failures, poor financial services, corruption, and the politics of poverty and food, all conspire to make the transformation of small-scale agriculture an uphill battle. While huge strides have been made in tackling poverty and hunger on a wider scale, the 1 to 2 billion people being left behind at the very bottom of the economic pyramid, often with very poor nutritional status, are predominantly rural people linked to agriculture.

Rethinking small-scale agriculture requires recognition of the complexity of ambitions between commercialisation, tackling poverty, ensuring food and nutrition security, safeguarding the rights of the vulnerable and protecting the environment. All too often, agricultural policy becomes layered with perverse incentives driving market failures that end up hampering both commercialisation and poverty alleviation objectives (Mellor 2017). Breaking out of the small-scale agriculture impasse will inevitably require a much better understanding of trade-offs between different policy objectives and how downsides can be managed through alternative policy mechanisms. The dynamics and trade-offs between commercialisation, food and nutrition security, and social protection need to be part of how different transformation pathways are explored.

The development sector has invested heavily over the last decade in promoting market systems approaches, value-chain development, linking farmers to markets, and commercialisation of small-scale agriculture, often in partnership with private sector players (Woodhill *et al.* 2012; Woodhill 2016). While there are clear success stories, there is so far little evidence that this is driving a wider-scale transformation of the small-scale agriculture sector. Working with small-scale agriculture often proves to be expensive and difficult for the private sector and the scale of return for small-scale farmers is often insufficient to lift them up to a 'living income' (Gneiting and Sonenshine 2018; Farmer Income Lab 2018). Understanding scale is critical to the small-scale agriculture story. What scale of income is needed to support a farm family? What scale of land area is needed to provide sufficient income given different farming types? At what scale do farmers need to operate to be commercially viable?

2.1 Definitions

Small-scale or smallholder agriculture is a loosely used term (HLPE 2013; FAO and IFAD 2019). In this report, we use the term small-scale farmer rather than smallholder: small-scale refers to the economic scale or turnover and profit levels, while smallholder refers to land holding size. The priority is to understand and respond much better to the economic scale of a farming operation, rather than simply focus on landholding size. Different crops on the same land area give very different returns.

Definitions of small-scale/smallholder agriculture also vary from country to country. The most widely used definition of smallholder refers to farms of less than 2.0 hectares (HLPE 2013; IFAD 2013). Often, the term is used to refer to any farmer who is not large scale and/or not very financially well off. As we will discuss, when it comes to understanding who is contributing to the global food supply, distinguishing between different scales and segments of "small-scale" becomes exceptionally important (Christen and Anderson 2013).

A key distinction is between family farming and corporate farming. FAO defines family farming as: "a means of organising agricultural, forestry, fisheries, pastoral and aquaculture production which is managed and operated by a family and predominantly reliant on family capital and labour, including both women's and men's. The family and the farm are linked, co-evolve and combine economic, environmental, social and cultural functions" (FAO 2013, p.2). As Zimmerer (2018, p.31) notes,

“smallholders are a large, persistent, and internally diverse group that defies overly narrow definition and that overlaps but is not equivalent to the category of family farmers”. Corporate farming is where the farm is owned by a larger business entity and farm workers are employees of the business.

A variety of frameworks have been used to try and better characterise the diversity of small-scale farming (Mangnus and Metz 2019). Berdegué and Escobar (2002) created a two-dimensional matrix distinguishing between farm production environments and farmer assets, giving rise to three groups – subsistence farmers, small investor farmers, and large-scale farmers. Vorley (2002) distinguished between three rural worlds; 1) globally competitive farmers embedded in commercial agribusiness; 2) farmers engaged in local markets but struggling to make farming a viable livelihood; and, 3) those with limited access to productive resources who survive on low-waged labour and make minimal contribution to food production. The OECD identified five rural worlds, adding further graduations in Vorley’s basic model (Brüntrup 2016). Elbehri *et al.* (2013) identify four categories of smallholders: 1) those engaged in subsistence farming and who therefore lack access to markets or choose not to participate in them; 2) those with limited access to markets; 3) those with frequent access to markets; and 4) those entirely dedicated to commercial farming. Dorward *et al.* (2009) identified three strategies pursued by the rural poor, 1) stepping up, 2) hanging in, and 3) stepping out. This distinction was used by DFID in their 2015 Conceptual Approach to Agriculture. Hengsdijk *et al.* 2014 cluster smallholders by levels of food self-sufficiency and earnings. In this report, we further Dorward *et al.*’s (2009) framework and introduce a fourth category of “stepping in” to agriculture to cover the emergence of new investment into smaller scale farming often by salaried urban workers with rural roots. Table 1 integrates a number of the frameworks introduced above.



Disaggregating small-scale farmers according to the sort of conceptual frameworks outlined above is clearly critical for understanding their role in food systems and to developing appropriately targeted interventions. However, currently there is no consistent use of such frameworks, nor sufficient data to provide this more nuanced and disaggregated understanding.

2.2 Distribution of farm sizes

Currently the only disaggregated way to look at small-scale agriculture is in relation to farm size. Lowder, Scoet, and Raney (2016) conducted a comprehensive review on farm numbers and farm size distribution. They conclude the following:

- Globally there are at least 570 million farms;
- Of these, at least 500 million, approximately 90% are family farms;
- Approximately 475 million farms or 84% are less than 2 ha; and
- While family farms operate about 75% of agricultural land, the 475 million farms of 2 ha or less only operate about 12% of agricultural land.

Table 1: Disaggregation of livelihood categories. Source: Woodhill 2019.

Farming and livelihood category	Description and poverty status	Main rural worlds (OECD)	Main strategies
Small-commercial	Farmers < 20 ha well connected to domestic or international value chains using productivity, increasing technologies and management practices. Farming is an economically viable livelihood strategy enabling households to have an income well above the poverty line and approaching or above a living income. Farming is the dominant livelihood strategy.	1 & 2	Stepping in Stepping up
Semi-commercial	Farmers selling a significant surplus of production but loosely connected to markets with less than optimal use of productivity, increasing technologies and management practices. Mostly poor to very poor, may still be below poverty line, and struggle to approach a living income. May have diverse livelihood strategies.	2 & 3	Stepping up Hanging in Stepping out
Semi-/subsistence	Farmers who sell none or only a small proportion of surplus (usually to local markets) and who tend to have low productivity. Poor to very poor with many below poverty line. Depend on production for own food. May have diverse livelihood strategies.	3	Hanging in Stepping out
Landless farm workers	The landless poor who depend on low paid labour to survive. Mostly very poor, below or just at poverty line.	4	Hanging in Stepping out
Chronically poor	Extremely poor and marginalised groups landless or with largely unproductive land, who are often food insecure and highly vulnerable. Well below poverty line.	5	Hanging in Stepping out

During the 20th century, developed economies saw a dramatic consolidation of farms and a decline of agriculture sector employment. This pattern is not repeating itself on the scale that might have been expected as the economies of low- and middle-income countries develop. Hazell (2015) refers to a “reverse transition” of increasing numbers of increasingly small farms, but with diversifying off-farm incomes. In parallel, there is a growth of larger small-scale and medium-scale farms, and an expansion of corporate agriculture.

Drawing on the analysis of farm size distribution by Lowder, Scoet, and Raney (2016), and food and nutrient supply by farm scales (Herrero *et al* 2017; Ricciardi *et al.* 2018), we have summarised a global level categorisation of farms by land size and food production (see Box 1). While the data comes from a partial sample of countries, it illustrates key patterns discussed in the following sections.

Box 1: Disaggregating farm sizes, numbers, production and commercialisation

Sources: based on data from Lowder, Scoet, and Raney (2016), Ricciardi *et al.* (2018) and Herrero *et al.* (2017).

Farm size (ha)	% farms ¹	No. millions ²	Farm land ³	Scale	Food production % ⁴									Type	
					Cereals	Vegetables	Fruit	Sugar crops	Roots / tubers	Oil crops	Pulses	Livestock	Average		
>200	2	11.4	50	Large	17	11	17	34	8	38	16	17	20	Corporate (10%)	Family (90%)
50–200			10		22	18	17	15	15	24	18	23	19		
20–50			10	Medium	7	8	10	7	7	6	9	10	8		
5–20	4	22.8	10		31	35	34	29	37	19	35	30	31		
2–5	10	57	8	Small	21	26	20	13	30	10	19	17	20		
1–2	12	68.4	12												
<1	72	410													

1 Of 570 million farms in 161 countries, this farm size classification is from a subset of 460 million farms (classified from international comparison tables of the 1990 & 2000 rounds of the WCA for farm sizes) by Lowder, Scoet, and Raney (2016).

2 Assuming farm size percentages represent farm sizes worldwide, Lowder, Scoet, and Raney (2016) estimate these numbers by multiplying 570 million farms with the percentages.

3 Author estimates from Lowder, Scoet, and Raney (2016) – 106 country sample covering 450 million farms, representing 80% of world farms, with 85% global population, and 60% of agricultural land worldwide (does not include the Russian Federation & Australia).

4 Author estimates of production from global production of key food groups by weight from Herrero *et al.* 2017 (based on data from 161 countries, 41 crops, and 14 fish functional groups).

Small-scale agriculture and food supply

An oft repeated part of the current narrative on small-scale agriculture is that small-scale farmers produce 70% of the food consumed in low- and middle-income countries. But is this really true? The data in Box 1, and detailed regional assessment by Herrero *et al* (2017), points to a more nuanced analysis that has critical policy implications. It needs to be recognised that 72% or 410 million farms are less than 1 ha. The data indicates that this very large group of <1ha small-scale farmers make a marginal contribution to total food production (acknowledging significant country differences). Meanwhile, farmers of 1–20 ha make a very substantial contribution.

So while it may be true that all small-scale farmers of less than 20 ha produce 70% food in in low- and middle-income countries, this hides the reality that this is produced by a smaller group of small-scale farmers who mostly have land sizes of 1–20 ha. This suggests a fundamental dualism in small-scale agriculture between large numbers of very small-scale farmers who do not produce a great deal of food and a lower number of larger small-scale farmers who produce most of the food. The food this larger group of very small-scale farmers produce is critical for their own income, food and nutrition security, and for localised markets, but not so much for meeting the growing demands of urban populations.

The extent of this dualism varies across regions, countries and commodities. However, the policy implications are hugely important in terms of who will meet the growing demand for food, and how to tackle rural poverty and food insecurity. If a smaller group of farmers who have more substantial assets are already meeting the bulk of food demand, the market opportunities for the very large numbers with much more limited assets will be limited.

Poverty, hunger and livelihoods in small-scale agriculture

There are 736 million people, or 10% of the global population living in extreme poverty (using the international poverty line) (FAO, 2018a). Eighty percent of the extremely poor (<USD 1.90/day) and 76% of the moderately poor live in rural areas (Castañeda *et al* 2016). There is a high correlation between extreme poverty and the 821 million people who in 2018 are still suffering from hunger (FAO, IFAD, UNICEF, WFP, and WHO 2019).

Agriculture is the main employment sector for the poor, employing 76.3% of the extreme and 60.7% of the moderate poor (Castañeda *et al* 2016). Most of this group tend to be subsistence or semi-subsistence oriented and face significant barriers to entering higher value agricultural activities.

Assuming a family size of five, the 410 million farms of <1 ha equates to a total population of 2.05 billion people, the majority of whom, if not below the poverty line, are certainly at the bottom of the economic pyramid. Taking all farms below 20 ha, this population jumps to 2.79 billion. Adding in landless farm workers takes the number toward 3 billion or nearly 40% of the world's population. In other words, the livelihoods of 40% of the world's population remain connected at least in part to small-scale agriculture.

There are huge differences in the structure and dynamics of small-scale agriculture and poverty between different regions and countries. China alone accounts for 35% of all farms with an average farm size of 0.6 ha. India has 24% of farms with one-third being 0.4 ha or less, while 8% of farms are in Sub-Saharan Africa (Lowder, Scoet and Raney 2016). It is in China where the some of the biggest reductions in extreme poverty have occurred. The last decades have seen the dominance of extreme poverty shift from East Asia to Sub-Saharan Africa and South Asia. While the number of extreme poor in East Asia has dropped from 987 million in 1990 to just 47 million in 2015, numbers in Sub-Saharan Africa have increased from 276 million in 1990 to 413 million in 2015 (World Bank 2019). In Africa, the population is expected to double over the next decades but probably without the degree of economic growth experienced in Asia. Consequently, the prospect for continued and growing extreme poverty in rural Africa is high.

2.3 Conclusion

The emerging dualism of small-scale agriculture means that it is important not to conflate the challenges of tackling the poverty and malnutrition of small-scale farming families with the challenge of meeting growing food supply demands for urban populations. There is no doubt that these two challenges overlap significantly. However, differentiated policy mechanisms, and a sharper understanding of transition options, are needed to optimise the role of small-scale agriculture in tackling poverty and in contributing to urban food supplies.

While the macro-perspective is relatively clear, there are gaps in the data when it comes to the specifics of particular countries, localities, and commodities. There is also insufficient understanding of which categories of farmers under what policy regimes will be able to respond to future food demands, earn a living income, or meet their nutritional needs.



3 THE CONTEXT OF CHANGING FOOD SYSTEMS

A food systems perspective provides a way to better understand the constraints and opportunities for small-scale farmers. For example, what is the relationship between economic well-being and food security for small-scale farmers? What is the influence of new markets and technology on the viability of small-scale farmers? How do increasing standards affect small-scale farmers? How should services be tailored to different types of small-scale farmers and to what extent are necessary services lacking?

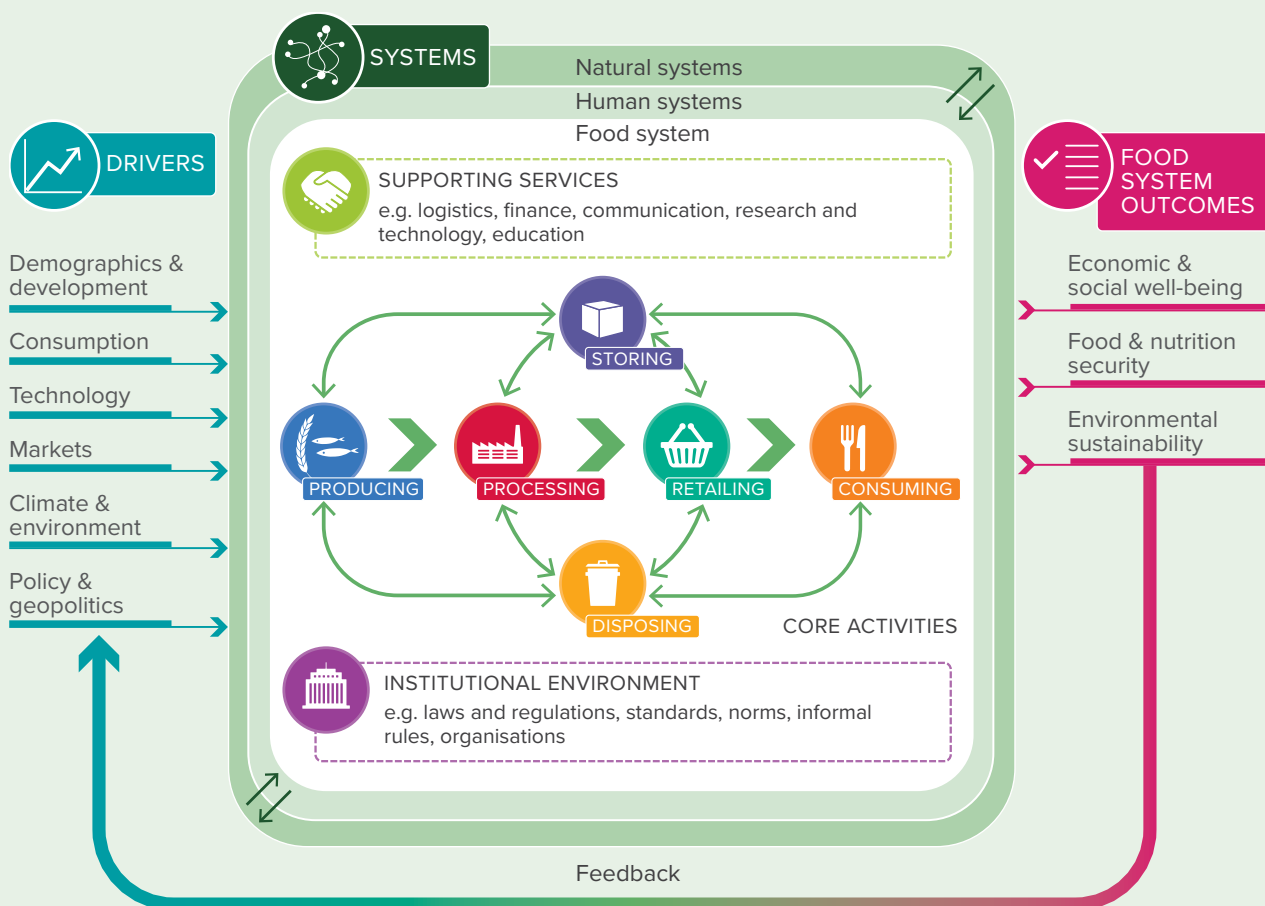
Figure 1 illustrates the main elements of a “food system”. At its core is a set of **food system activities**, undertaken by different actors, from primary production, to processing, retailing and consuming along with storage and disposal. In reality, food systems involve multiple interacting value chains. To function, these require a wide set of supporting services including, physical and market infrastructure, transport, financial services, information and technology. The incentives and operating conditions for actors are influenced by the **institutional environment** of policies, rules and regulations (e.g. food safety and quality, financial, taxation, environment etc.), consumer preferences and social norms (see Woodhill 2008). Together these institutions create the formal and informal “rules of the game”. The entire food system is influenced by a set of external **drivers** and trends related to population, wealth, consumption preferences, technological developments, markets, environmental factors and politics. The **outcomes** of how food systems function influence three main areas: economic and social well-being, food and nutrition security, and environmental sustainability (Ericksen 2008; Ingram 2011).

Four food system mega-trends are abundantly clear. One, food demand is going to dramatically increase and change over the coming decades, due to population growth, urbanisation and the demands of a growing middle class (FAO 2017a) (see Figure 2, below). Two, the world faces a health crisis from the “triple burden” of undernutrition, micronutrient deficiencies and overnutrition (Scarborough *et al.* 2011; FAO 2013) (Figure 4). The over-consumption of calorie-dense but nutritionally poor food is causing an escalation of non-communicable diseases such as diabetes. Globally, there is a very large mismatch between what we should be eating for a healthy diet and what is being produced (Figure 5). Three, food system activities will

continue to contribute significantly to greenhouse gas emissions, with climate change having negative impacts for food production and food security (Vermeulen *et al.* 2012; Springmann *et al.* 2018) (Figure 6, below). Four, the way food is produced means we are overshooting the earth’s capacity to sustainably meet the demand (Springmann *et al.* 2018; Willet *et al.* 2019) (see Figure 7, below). For a comprehensive review of these and other food system trends see also Serraj and Pingali (2019).

Changes in food systems have profound implications for small-scale producers with a complex mix of opportunities, threats and risks. Box 2 and Table 2 below outline the key trends associated with the food system drivers and likely implications for small-scale agriculture.

Figure 1: Food systems framework. Source: Foresight4Food Initiative.¹



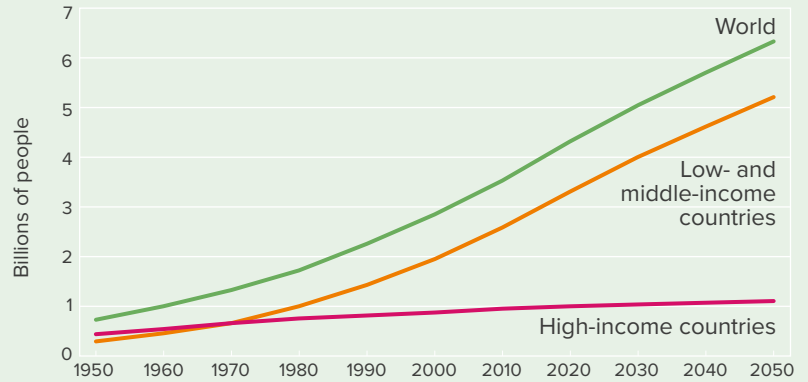
¹ This figure draws on insights from the FAO food system wheel, GECAFS food system model (Ingram 2011), Wageningen Economic Research (van Berkum, Dengerink and Ruben 2018), and the Making Markets Work for the Poor (The Springfield Center 2015). The Foresight4Food diagram keeps the core value chains at the heart of global food systems and focuses on the impacts of global drivers on the food system activities, regulatory environment, and supportive activities, the resulting systemic outcomes, and the feedback loops in the system.

18 **Box 2: Key food system mega-trends**

Urbanisation

Figure 2: Regional urbanisation trends.

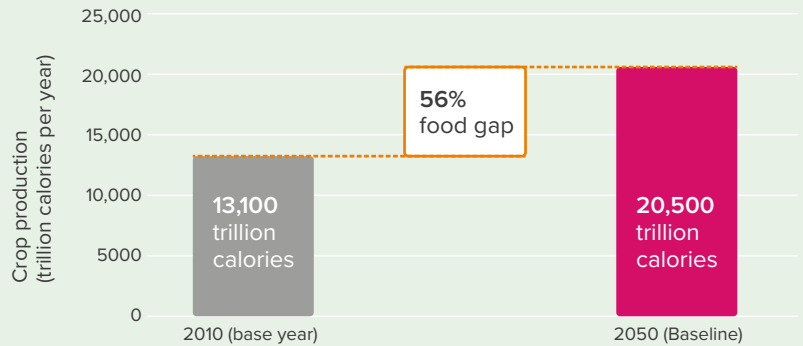
Population increase, urbanisation and a growing middle class in low- and middle-income countries will drive food demand. Source: FAO 2017a.



Food demand

Figure 3: The global food gap.

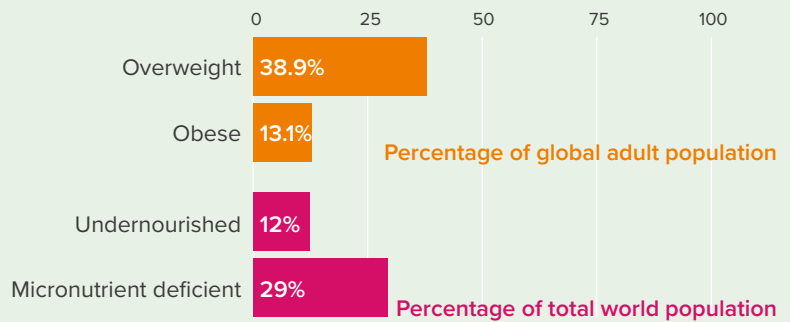
Food demand is projected to grow by 56% with a 68% increase in demand for resource intensive animal products and substantial increasing demand for fruit and vegetables. Source: Searchinger *et al.* 2019.



Nutritional status

Figure 4: Global malnutrition.

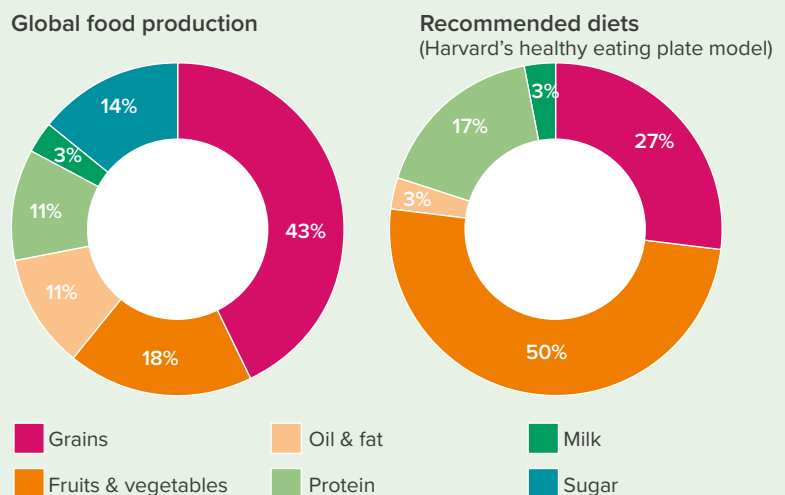
The world faces a “triple burden” of undernutrition, overweight / obesity and micronutrient deficiency, with high economic costs. Source: adapted from CCAFS 2019, Development Initiatives 2018.

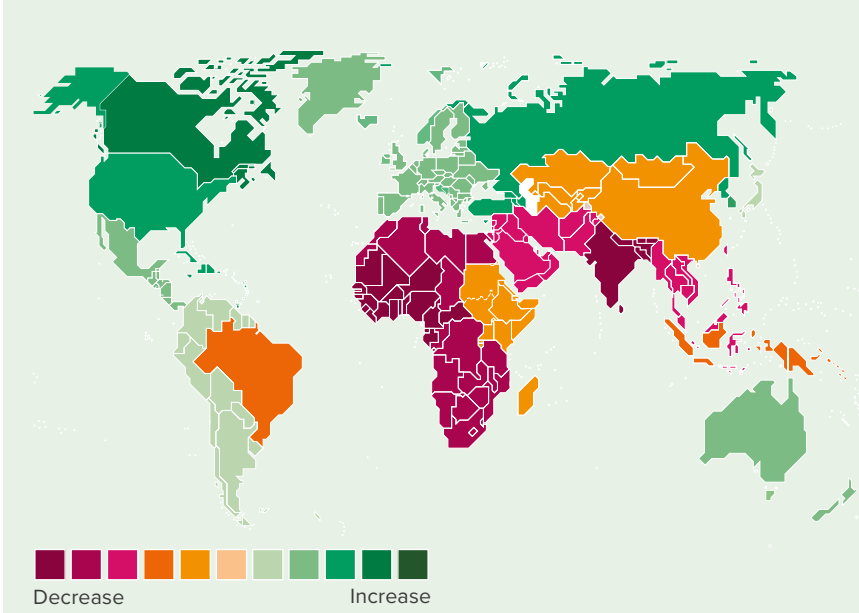


Balance of production and nutritional needs

Figure 5: Global production as compared to recommended diets.

Globally there is a huge imbalance between what is needed for a healthy diet and what is being produced. For example, we produce less than a quarter of the amount of fruits and vegetables needed for healthy diets. Data source: KC *et al.* 2018.

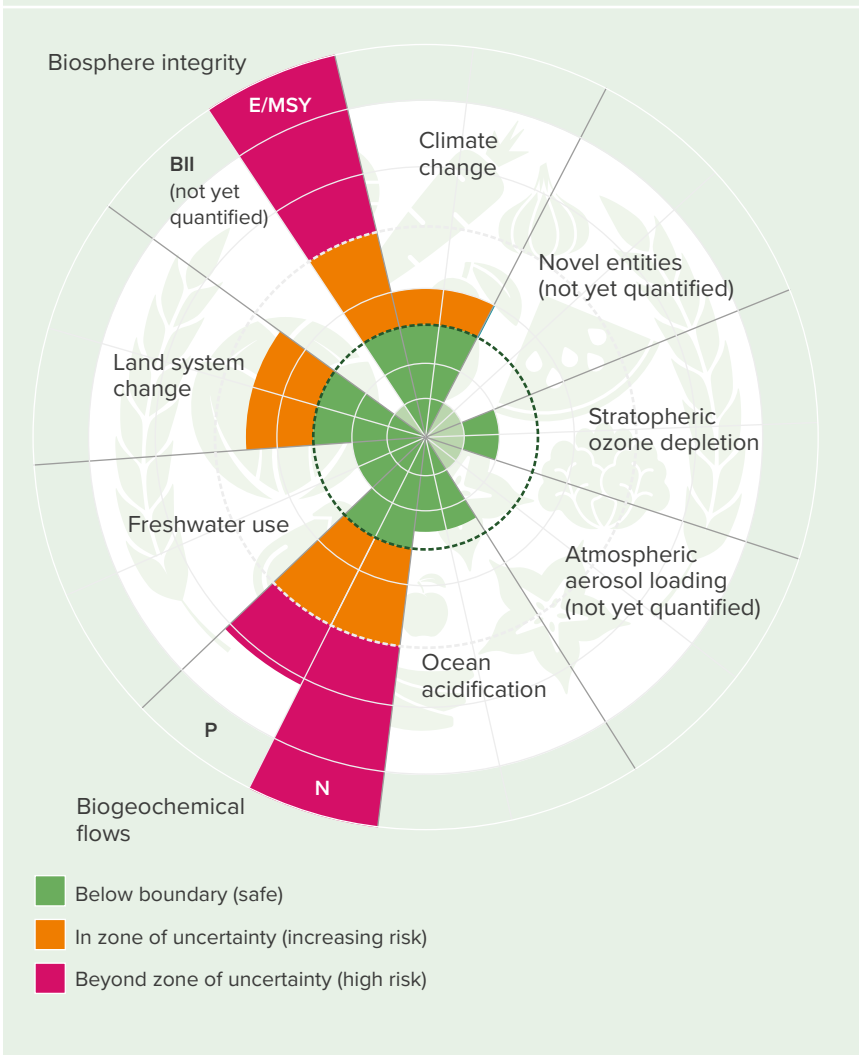




Food and climate change

Figure 6: Changes in agricultural production in 2050 (climate change relative to baseline scenario).

Food production is a major contributor to climate change while also being negatively impacted. On average, yields will decline, compounding the challenge of meeting future food demands. Extreme weather events will create great risk for food security. Impacts will be worst for low and middle-income countries. Source: FAO 2018a and 2018b.



Keeping within planetary boundaries

Figure 7: Planetary boundaries.

Food production is a major contributor to natural resource degradation and over exploitation. Dramatic increases in resource use efficiency are needed to ensure “planetary boundaries” are not catastrophically exceeded. Source: Lokrantz/Azote, based on Steffen *et al.* 2015.

Table 2: Summary of key food systems drivers, trends and implications for small-scale agriculture

Demographics and development	
Key trends	Likely implications for small-scale agriculture
<ul style="list-style-type: none"> • Global population to reach 9 billion by 2050, and 11.2 billion by 2100 (FAO 2017a). • Africa and South Asia will see a major increase in population (FAO 2017a). • By 2050, more than 75% of the global population will live in urban areas (FAO 2017a). • 700 million people still live in poverty with majority of the extreme poor in South Asia and Africa (FAO 2017a). • By 2050 global middle class will double to 6 billion (Kharas 2017). • Average incomes in LMICs will remain at a fraction of those in HICs, and inequality will widen (FAO 2017a). 	<ul style="list-style-type: none"> • Increased overall demand for food with market opportunities. • Poor urban consumers will create social and political pressures for low food prices. • Elongated rural-urban food supply chains with increasing demands for bulk supply, and quality and safety standards. • Economic development and urbanisation in rural areas will create increased off-farm livelihood options. • Small-scale farmers will be adversely influenced by increasing inequalities. • Agriculture and the food sector will remain critical employers and means for distributing wealth.

Consumption	
Key trends	Likely implications for small-scale agriculture
<ul style="list-style-type: none"> • The world will need approximately 60% more food by 2050. • Substantial growth in demand for animal protein is predicted. • 800 million people (11% of the global population) still go hungry (FAO, IFAD and WFP, 2015) currently this is slightly increasing, in Africa 27% suffer severe food insecurity. • In 2016, ~ 40% of adults were overweight and 13% were obese (WHO 2018; Development Initiatives 2018). These rates are rapidly increasing. • Food systems are currently not producing foods necessary to supply a healthy and sustainable diet (KC <i>et al.</i> 2018). 	<ul style="list-style-type: none"> • A significant proportion of small-scale farmers globally will continue to suffer from hunger and malnutrition. • The rise of middle classes will drive aspirational diets and standards for food quality and safety, which can be difficult to meet. • Opportunities for small-scale farmers to tap into niche and higher-quality markets, if appropriate incentives are available. • Changes in staple and cereal markets as diets change and demands for animal feed increase. • Public health concerns may lead to increased demands for fruit and vegetables which could be higher value markets for small-scale producers.

Technology and Infrastructure	
Key trends	Likely implications for small-scale agriculture
<ul style="list-style-type: none"> • New and potentially disruptive technologies – biotechnology, robots and drones, remote sensing, advanced modelling, artificial intelligence, blockchain, 3D printing, meat culturing, and precision agriculture – are being developed and adopted rapidly. • 90% of the world’s population is now covered by mobile networks (ITU 2015). • Public agricultural R&D spending as a share of agricultural GDP in LMICs is less than 1%, compared to 3% in high-income countries (IFAD 2016). • LMICs are failing to meet infrastructure needs, with road, market and energy infrastructure being particularly lacking in rural and marginal areas. 	<ul style="list-style-type: none"> • Technology offers opportunities for small-scale agriculture to cost-effectively access financial and advisory services. • Technology use makes agricultural production more capital than labour intensive, creating barriers for small-scale producers. • Limited infrastructure investment and technological uptake in rural areas further marginalises small-scale farmers. • Technology enables linking of producers to socially, nutritionally and environmentally conscious urban consumers. • Enabling inclusive use of technology that benefits small-scale farmers will require focused public policy and investment.

Markets	
Key trends	Likely implications for small-scale agriculture
<ul style="list-style-type: none"> • Massive growth of food demand in LMICs with exports to OECD countries becoming less significant. • Dramatic growth in rural urban trade (elongation of markets) dominated by transitional market structures (micro, small and medium sized enterprises). • Changing patterns of staple consumption, and increased demand in non-staples. • Growth in global trade of agricultural goods with significantly increasing food imports by Africa. • Increasing but variable penetration of supermarkets in LMICs but not eclipsing the domination of transitional market structures (FAO 2017a). • Growing demand for food quality and safety standards particularly in modern and export markets but increasingly also in transitional markets. • Urbanisation in rural areas also creates new markets closer to producers. 	<ul style="list-style-type: none"> • Substantial market opportunities for those farmers who can operate at scale and adopt more sophisticated production technologies, management practices and marketing strategies. • Most of the opportunities will be in more productive agricultural areas with good physical infrastructure and coordinated value chain mechanisms that enable high levels of market efficiency and competitiveness. • The growth in non-staples and niche and luxury food products offers opportunities for production of higher value crops that can give better returns on small areas of land. • New markets in emerging rural urban centres reduce the infrastructure and access barriers. • Increasing penetration of supermarkets and modern market value chains create increasing market access barriers.

Climate and Environment

Key trends

- Climate change and environmental degradation significantly impacting agricultural production.
- Most LMICs are likely to experience drops in average yield of 3%.
- The food and agriculture sector produces 19-29% of total greenhouse gas emissions (Vermeulen, Campbell and Ingram 2012).
- Extreme weather events including floods, droughts, storms and extreme temperatures are rising significantly.
- Meeting future protein demands has significant resource implications.
- Agriculture accounts for 70% of all fresh water withdrawals and 80–90% in dryer areas (Vermeulen, Campbell and Ingram 2012).
- 33% of all global soils are estimated to be degraded (UNCCD 2017).
- Climate-change related impacts may contribute to an increase in global food prices (Porter *et al.* 2014).



Likely implications for small-scale agriculture

- Yield drops associated with climate change are projected to severely affect Africa and South Asia with small-scale farmers in these regions being more vulnerable and having limited adaptive mechanisms.
- Loss of yields due to soil degradation.
- Large numbers of small-scale farmers are highly vulnerable to weather extremes and natural disasters with limited resources to cope.
- Access, costs and risk limit the uptake of more resource conserving and climate smart technologies.
- Changing demographics and socio-economic profiles create more consumers who demand food produced in a sustainable manner. Viable small-scale farmers with better market connectivity will be able to tap into such niche markets.
- Micro insurance schemes will become increasingly important.

Policy and Geopolitics

Key trends

- Liberalisation and globalisation of food markets increase but with uncertainties and some increases in protectionism.
- Limited regional food trade in populous and food insecure regions of West Africa and South Asia.
- The global food price crises of 2007–08 and 2011 triggered riots in more than 40 countries, (FAO, IFAD, UNICEF, WFP and WHO 2017).
- Countries seek to ensure food security through domestic production in times of crisis.
- 489 million of the 815 million undernourished people and 122 million of the 155 million stunted children live in countries affected by conflict (FAO, IFAD, UNICEF, WFP and WHO 2017).
- Countries with high food demands and/or limited additional agricultural land are investing in regions like Africa.



Likely implications for small-scale agriculture

- Agricultural policy is politically sensitive as governments try to balance the need for secure and low priced food for urban populations with tackling rural poverty. This can lead to policies that are regressive for small-scale farmers.
- As small-scale farmers are also net consumers of food they are significantly impacted by food price rises.
- “Land grabbing” through foreign investment into agriculture puts small-scale farmers at risk.
- Small-scale farmers often have to compete in a global market place that has significant distortions.
- Domestic policies and attention for small-scale agriculture will increasingly be set within a context of geopolitical concerns related to trade, climate change, water scarcity and migration.
- Particular attention is needed for the specifics of supporting small-scale agriculture in areas of conflict.

3.1 Food systems, small-scale agriculture and rural poverty

Figure 8 illustrates linkages between food systems, small-scale agriculture, rural poverty and urbanisation. For both rural and urban populations, food systems need to be optimised to ensure good nutrition and livelihoods. They also must provide security/resilience in the face of shocks to the system from natural disasters, weather extremes, disease or market anomalies. Food prices are a critical underlying factor.

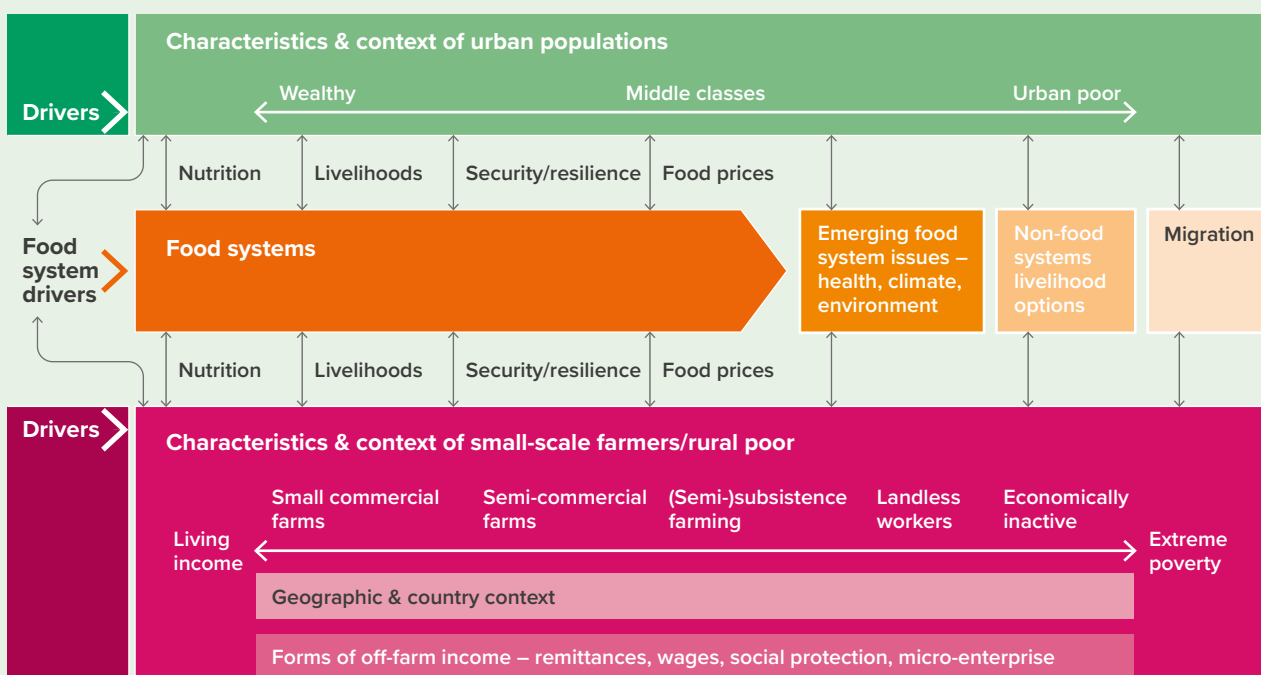
The bottom of the diagram illustrates the importance of understanding nutrition, livelihoods, security/resilience and food prices in relation to the different characteristics and contexts of the rural poor. Off-farm and non-agricultural income streams are increasingly prevalent for small-scale farming households which changes the degree of direct dependency on agricultural production.

There is growing societal, policy and political concern over an emerging set of wider food system issues. The response to these issues may have negative or positive consequences for different groups of small-scale farmers and rural poor. For example, implications of carbon financing, production of more nutritious foods, food safety concerns, or land use controls.

Migration is a critical factor from multiple dimensions, again with potential positive and negative consequences. For example, outmigration brings remittances to rural areas, but may overcrowd urban areas and exacerbate urban poverty.

To be useful to the policy challenge of transforming small-scale agriculture, food systems thinking must unpack these relationships between the food system and different categories of farmers, and rural poor in different contexts.

Figure 8: Dynamics of food systems and rural poor. Source: Woodhill, 2019.



4 DYNAMICS OF SMALL-SCALE AGRICULTURE TRANSFORMATION

In this section, we explore the dynamics of small-scale agriculture transformation in relation to structural changes in markets, livelihoods, investment, and risk (see Figure 9, below). The wider system drivers outlined above shape these dynamics. How these dynamics play out for individual farmers is dependent on their specific characteristics and their context.

In low- and middle-income countries, urbanisation, increasing wealth and changing diets have driven a **market revolution** (1) in the flow of food from rural to urban areas. This is linked with significant domestic “**emergent**” **investment** (2) in farming and small- and medium-scale food sector enterprises. **Livelihood realities** (3) for small-scale farmers are also changing. The prices farmers receive for their produce are mostly well below what is needed to earn a living income off small areas of land. At the same time there are increasing off-farm livelihood options. This is changing livelihood strategies, the incentive structures for small-scale farmers to engage in agriculture, and creating non-farming survival strategies and poverty alleviation options.

The opportunities and constraints of small-scale farmers must also be understood in terms of their **farming context** (4) and individual **farm characteristics** (5). As discussed in Section 2, small-scale farmers operate in widely different situations of natural resource quality, governance and market access, while their own characteristics such as land size, assets, commodities produced, and family labour dynamics also vary significantly.

Underlying these five is the sixth dynamic of **risk** (6), which is changing as markets restructure, the climate changes, or natural resources degrade. The risk influences the decisions and investments of all actors in the food system and dramatically impacts the most vulnerable.

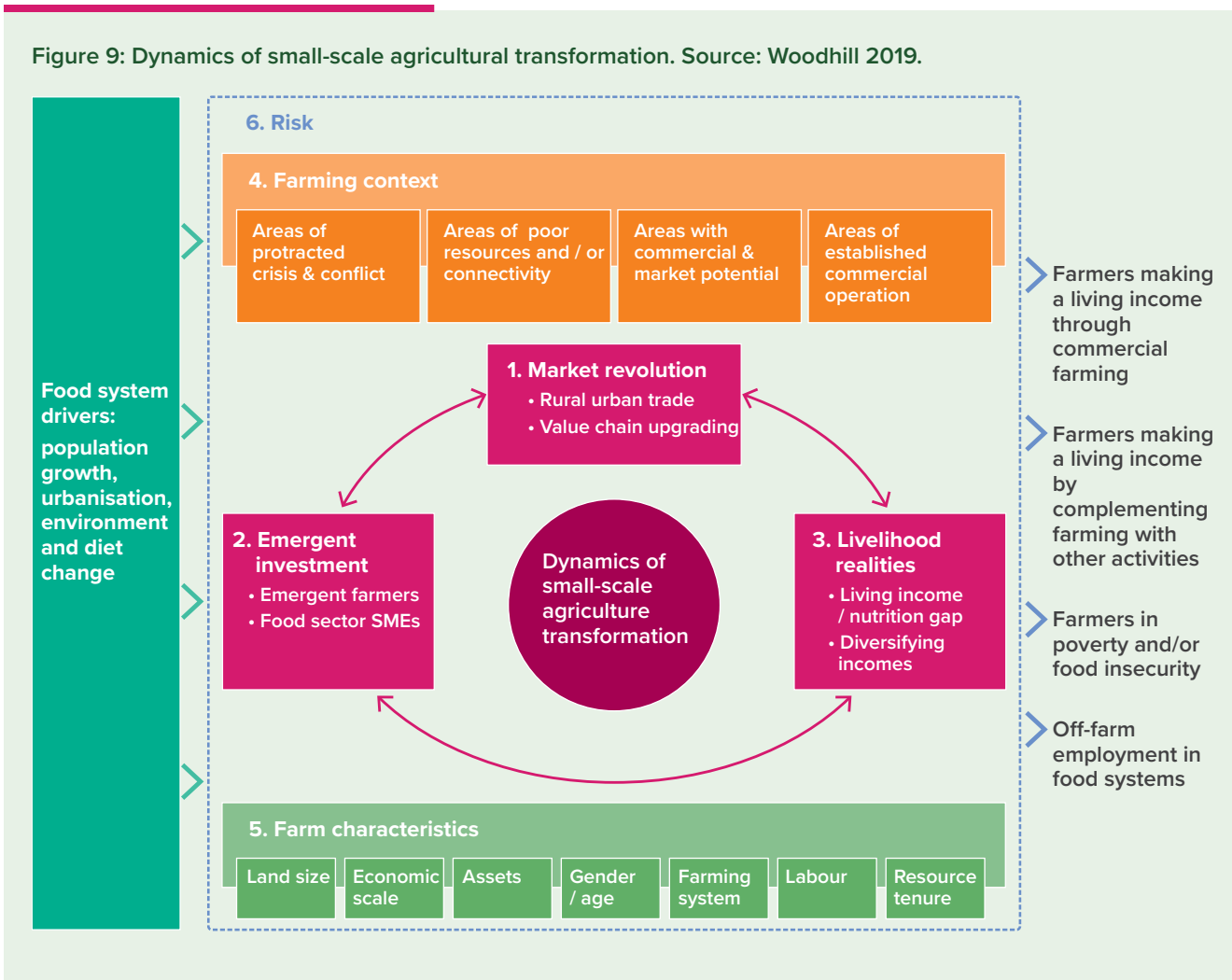
4.1 Market Revolution

Reardon *et al* (2019) refer to a “quiet revolution” of food markets that has occurred in low- and middle-income countries. This includes a rapid growth of small- and medium-scale enterprises operating in a transitional food markets.

The scale of change in food markets in developing economies and globally over the last 2030 years has been profound. This transformation is set to continue apace over coming decades. For example, rural-urban supply chains have developed rapidly. Haggblade, Hazell, and Reardon (2011) estimate this growth at 600–800% over three decades for Africa. Reardon and Timmer (2014) have it at roughly 1000% in Southeast Asia in the same period. These market changes are underpinned by deep structural shifts in procurement, retailing, value chain coordination, ownership and power.

Structural change in markets moves from “traditional” to “transitional” to “modern” (Reardon *et al* 2019). Traditional markets are highly localised, informal (no contracts) spot markets (cash based immediate transaction), with few if any formal standards in place.

Figure 9: Dynamics of small-scale agricultural transformation. Source: Woodhill 2019.



In transitional markets, there is elongation as food is transported from rural to urban areas over significant distances. A more complex set of intermediaries develops, and there is a mix of labour- and capital-intensive technologies. Quality standards start to be implemented but most transactions are still based on spot market relations. Modern markets are epitomised by the supermarket model. As markets become spatially long, there is often consolidation and concentration in the supply chain (e.g. limited number of retailers who purchase directly from large scale suppliers/producers), spot markets shift to contracts and futures markets, private and public standards become common place and there is a high degree of capital intensification. Reardon *et al's* (2019) key observation is that transitional markets dominate modern markets by far in low- and middle-income countries and are likely to do so for the foreseeable future.

The demand from this market revolution is being filled largely by a cohort of small-scale family farmers. However, more understanding is required about which farmers in what contexts are meeting this demand. Care is needed in making the assumption that this market growth means opportunities for those with a different asset base or sets of circumstances to those currently engaged. This substantial market change has occurred through large-scale endogenous processes, and despite constraints of transport, finance and market distortions. It has relatively little to do with market development initiatives of donor funding. There is no doubt that much can be done to upgrade and improve the efficiency and inclusiveness of these markets. However, the notion that most small-scale farmers struggle to connect with markets is not borne out by the evidence of this market revolution.

Small-scale farmer engagement in this market revolution rapidly drops off as one moves further down the economic pyramid of small-farmers. The fundamental development question is how far down the economic pyramid can one move in creating commercially viable small-scale farmers, at what cost and in what circumstances.

4.2 Emergent investment

On the back of this market revolution, low- and middle-income countries are seeing very substantial domestic investments in the food and agriculture sector, predominantly at a medium and small scale. These private domestic investments in food and agriculture are far larger than those of foreign private investors, national governments and development agencies (Lowder, Carisma, and Scoet 2012). There is growing evidence of salaried urban elites making substantial investments back into agriculture as “emergent farmers” (Jayne *et al.* 2016) and food sector entrepreneurs. This investment offers both opportunities and risks. It enables countries to meet growing urban food demand and drives growth of the agri-food sector. However, so far there has been limited domestic application of principles of responsible agriculture investment, such as the CFS-RAI. This brings the risk of domestic land grabbing, poor environmental practices and poor labour conditions.

Jayne *et al.* (2019) show that medium-scale farms are the fastest growing segment of the family farm sector in Sub-Saharan Africa, controlling more land than large-scale farms. Much of this growth comes from investment by urban and rural “elites” (emergent farmers) and not from existing small-scale farmers graduating to become larger and commercially viable. This trend has profound implications for the transformation of small-scale agriculture (Burke, Jayne, and Sitko 2019; Chamberlin and Jayne 2019). If new market opportunities in agriculture are being taken up on a significant scale by emergent investors, it potentially crowds out opportunities for existing small-scale farmers and undermines the development narrative of tackling poverty by helping to connect small-scale farmers to markets. The scale on which this emergent investment is occurring and its impact on commercialisation of existing small-scale farmers is not yet well understood. However, it is a trend that needs very careful attention in order to understand the dynamics of transforming small-scale agriculture.

4.3 Livelihood realities

There are two key aspects to livelihood realities, living income and income diversification.

A living income is needed to afford decent housing, nutrition, healthcare, education and to cope with unforeseen or one-off expenses (Gneiting and Sonenshine 2018). Current agricultural prices combined with small scales of production and low productivity mean that few small-scale farmers earn a living income. Attention for living income has been driven in part by global agribusiness firms who have recognised that despite efforts to include small-scale farmers in their supply chains on fairer terms, their earnings still do not approach a living income (see Farmer Income Lab and Living Income Community of Practice). This is seen as a constraint to long-term continuity of supply as well as creating corporate reputational risk.

Without dramatic changes to their terms of trade or other forms of income, many small-scale producers will remain at the bottom of the economic pyramid – below or just above the poverty line. Tackling this problem is not a matter of improving prices or yields by 20, 30 or even 100%. Manifold increases in income would be needed for them to approach a living income. For a significant majority of this group, under current food pricing and policy conditions, graduating to commercially viable farming that provides a living income is not a realistic trajectory.

For many small-scale farmers, livelihoods are diversifying through on and off-farm employment, remittances, non-farm micro enterprises, trading and social protection payments. This has three implications. First, families are no longer as dependent on their farm productivity and income as they used to be, which is also reflected in the high levels of food purchases by farming households. Second, what becomes important is not the overall farm income but the return to labour from farming relative to other employment options. Having a very small plot of land is not necessarily a problem if it complements other sources of income (provided it gives competitive/worthwhile returns to labour). Third, access to other forms of income may negatively shift the incentives for farmers to fully or productively utilise their land. Across many farmers, this can shift overall agricultural productivity for a country.

4.4 Geographic and political economic context

Farmers live in very different geographic and politically economic contexts. These differences are critical in understanding what constraints and opportunities they face, and which types of policies and interventions can be effective. Disaggregating farming households in relation to their context is essential for understanding the nature of the transformation challenge.

We propose four contexts: The first is areas of protracted crisis and conflict. The second is marginal areas where there are constrained environmental conditions for agriculture and/or poor connectivity and services such as roads, market facilities, energy, extension and financial services. The third is areas where environmental conditions and connectivity provide potential for commercially oriented small-scale agriculture, but this potential has not been realised. The fourth context is where there is already a substantial level of small-scale and larger commercial agriculture with well-established market infrastructure and services. The context of areas of protracted crises and conflict may overlap with the other three contexts.

4.5 Farm characteristics

Within any context, there is a wide range of characteristics of individual farming households that affect their commercial potential and poverty status. These include land size, scale of economic activity, human capacity, financial assets, gender and age, family size, degree of family labour, resource tenure, and quality of their resource base.

Strategies to support small-scale farmers need to take account of these characteristics and the context in which they are farming.

4.6 Risk

Small-scale agriculture faces increasing risks of multiple dimensions. These risks include market price variations, weather variations, disease risks, natural disasters, poor quality inputs that lead to low productivity, declining soil quality, and poor contract enforcement with exploitation by input suppliers, traders and money lenders. Climate change is rapidly exacerbating extreme weather, disease and natural disaster risks. The nature of agricultural markets is to push risk down the value chain and onto producers.

High levels of risk reduce the incentives for financial institutions to service the agriculture sector and make it hard for farmers to access credit. Poorer farmers often find themselves falling back into poverty as a result of climate and market circumstances beyond their control.

Risk is a major barrier to the adoption of new technologies and management practices.

5 FUTURE SCENARIOS

The future for small-scale agriculture is uncertain in relation to markets, trade, climate impacts, technology, socio-economic factors and politics. Current trends may be substantially disrupted by any one of these uncertainties, with positive or negative outcomes for small-scale producers. Consequently, it is necessary to consider the transformation of small-scale agriculture in terms of possible future scenarios. This has two dimensions. One is exploring different ways food systems may change and the implications for small-scale agriculture. The second is exploring scenarios for how the wellbeing and contribution of small-scale farmers can be optimised in different possible futures.

Scenario thinking is a way of exploring how the future may unfold and what the implications for different groups and interests would be. Scenarios can help to make more explicit what would be desirable and undesirable futures, and to develop intervention strategies that are robust in all possible scenarios. Scenario analysis is part of the wider field of foresight and future studies. Undertaking informed foresight and scenario analysis regarding the future of food systems and small-scale agriculture, particularly at the national level, is, we argue, a critical element of creating understanding and political will for change.

Recent food systems scenario analyses have been undertaken by the Food and Agriculture Organization (FAO 2018), World Economic Forum (WEF) (2017), World Resources Institute (WRI) (Searchinger *et al.* 2019) and the InterAgency Research and Analysis Network (IARAN) (2019). Drawing on these and other sources, Table 3 summarises seven critical uncertainties that will likely shape the future of small-scale agriculture.

A detailed analysis of different scenarios is beyond the scope of this paper. However, three broad scenarios can be sketched that help to focus thinking around more and less desirable futures. These are: 1) the consequences of business as usual; 2) moving to more sustainable, equitable and healthy food systems; and 3) exacerbated inequality as those with wealth and power seek to insulate themselves from risks. The FAO report on the Future of Food and Agriculture: Alternative Pathways to 2050 (2018) is constructed around these ideas referring to them as 'Business as Usual', (BAU), 'Towards Sustainability' (TSS), and the 'Stratified Societies' (SSS) scenarios. The key features of these scenarios and the implications for small-scale agriculture are:

- **Business as usual:** The future develops along patterns that do not address critical challenges of food access, availability, sustainability, and equity, although efforts at achieving the SDGs continue in many countries. The situation for small farmers improves marginally in terms of general food security and access to new markets, but they are strongly affected by climate change, unequal distribution of economic development, technological innovation, and investments.
- **Towards sustainability:** Improvements in socio-economic and environmental domains improve equitable and sustainable access to basic human services, improve food security, and make significant progress towards resource-efficient production and consumption. Small-scale farmers benefit from a reduction in income inequality, poverty, and hunger, and gain equitable access to basic services. Technological adoption is made easier with improved incentives, and larger investments in sustainable practices and agricultural R&D. Small-scale farmers make significant contributions towards meeting the changing food demands of urban populations.
- **Stratified societies:** A highly divided global society presents greater challenges to sustainability and inclusive development. Elite classes protect their self-interest and direct their decision-making power to unsustainable development. This gives rise to growing poverty and food insecurity, exacerbated resource depletion, and increased regional and global fragmentation resulting from protectionist policies.

Recent work done by the Farmers and Food Systems Project, GCRF-AFRICAP, CCAFS, Food Secure and ACIAR-SDIP all illustrate the tremendous value of engaging cross-sectoral stakeholder groups in processes of dialogue driven by scenario and food systems analysis.

Uncertainty	Dimensions	
Economic developments	Substantial	Stagnant
	Economic development in MICs and LICs develops, creating significant off-farm jobs and generating public revenues for investment in public goods creating viable livelihood alternatives for a small-scale agriculture transition.	Due to stagnant economic development, small-scale agriculture is a livelihood of “last resort” for large numbers with increasing pressure on limited natural resources with limited or no public services and social protection.
Global connectivity	Open	Closed
	Cooperative global regime with open and fair-trade rules and concern for global equity creates market opportunities for small-scale farmers and a supportive development context.	Populism, nationalism, and loss of faith in global institutions creates barriers to trade with reduced concern and investment in small-scale agriculture.

Uncertainty	Dimensions	
Inclusiveness of economic development models	Equitable	Inequitable
	Supported by international commitments, national policies invest in the services, support and social protection needed for an equitable transformation of small-scale agriculture.	Constrained national finances and elite capture drive policies that exacerbate inequality with limited investment in and support for small-scale agriculture.
Climate impacts	Moderate	Severe
	Impacts of climate change on the majority of small-scale farmers are manageable as a result of mitigation and successful investment in climate-smart practices and resilience.	Significant unmanageable negative impacts of climate change on small-scale agriculture.
Technological innovation	Inclusive	Elite
	Technologies that can be adopted by and benefit small-scale agriculture are developed and widely promoted and supported by global and national commitments to ensure equitable benefits from technologies.	Technological innovations radically disrupt current food production and distribution systems in ways that make it increasingly difficult for small-scale agriculture to participate in a viable way.
Dietary change	Healthy	Unhealthy
	Driven by consumer awareness, public policy and food industry innovation, there is a fundamental shift toward more nutrient rich and healthy diets creating new opportunities for small-scale agriculture.	The current trajectory of unhealthy eating continues with over consumption of high calorific foods and low consumption of nutrient dense foods. Small-scale agriculture remains incentivised to produce staples at the expense of a nutrient rich diversity of crops.
Resource use efficiency	Efficient	Intensive
	There is wide scale development and adoption of natural resource and energy saving technologies and practices.	Growing food demands are met over the short term by expansion of agricultural land and continued resources depletion with longer term consequences.
Disease outbreaks	Contained	Severe
	Management and response strategies are put in place to quickly and effectively respond to disease outbreaks including support for small-scale agriculture.	Human, animal and plant disease outcomes become more common due to climate change and intensive production techniques with small-scale farmers being severely affected due to limited coping strategies.



6 TOWARDS A TRANSFORMATION AGENDA

Transforming small-scale agriculture over the coming decades must remain a fundamental development objective. This is to ensure that a large group of people are not left behind and to put food systems on a more sustainable and healthier trajectory. However, new thinking, framing, and visions are desperately needed. Scenarios for the future need to be constructed around a deeper understanding of the structural changes underway in food systems and rural economies. A much more nuanced and disaggregated understanding of different categories of farmers in different contexts is essential.

Rural poverty and the difficult conditions for a majority of small-scale family farms has become a “stuck” problem. Over the last decade, not a great deal has changed in terms of the scale of rural poverty, despite the attention the issue has received, significant development investments and numerous reports with similar recommendations. In some ways this is paradoxical. Over the same period there has been the profound change in the dynamics of food markets, discussed above, which has managed to keep up with the demands of rapid population growth and urbanisation.

Five interrelated reasons are behind this stagnation of progress in transforming small-scale farming:

1. The un-nuanced understanding of the diversity of “small-scale farmers” and their different circumstances and needs – the dualism of small-scale agriculture.
2. A lack of political will, at all levels, for creating the policies and making the public investments needed to support an inclusive and sustainable transformation of small-scale agriculture (Birner 2018).
3. Limited country-level guiding visions for the future of food systems and small-scale agriculture that take a longer-term and systemic outlook.
4. Weak processes of interdisciplinary and systems analysis, dialogue and engagement across government, business, civil society and research.
5. The limited market power and political influence of small-scale farmers.

So, what is the way forward? Ultimately, the transformations of small-scale agriculture can only be driven through deeper national and local understanding and alliances for change that create political will for policy reform and public investment. Taking a systems perspective, we argue that a desirable transformation of small-scale agriculture requires three interrelated elements:

1. Clarifying the desired **outcomes** of small-scale agriculture transformation within the context of a food system perspective and based on scenario thinking about trade-offs, synergies and pathways;
2. Identifying the mix of **interventions** needed to realise desired outcomes and assessing their utility against different future scenarios; and
3. Putting in place effective **processes** that integrate science with policy, politics and public discourse through multi-stakeholder engagement and enable a more systemic approach to change.

These elements require technical inputs, but largely they are about institutional and political innovation (Woodhill 2010).

Thinking about the future transformation of small-scale agriculture must be set within the context of the deep structural changes that are occurring within the food sector and the wider economy. These changes, which were articulated in Section 3, are dramatically influencing the opportunities, incentives and constraints for small-scale agriculture in ways that were not the case even a decade ago.

6.1 Food systems outcomes, small-scale agriculture and trade-offs

What outcomes does society want from its food systems, and what role can which small-scale farmers play in delivering on these outcomes? What are desirable outcomes for which groups of small-scale farmers? How does all this vary from location to location and country to country? Which outcomes are in whose interests? Where are the trade-offs and where are the synergies? Despite the overarching goals, including the SDGs, clarity about longer-term desired outcomes that tackle the difficult questions about trade-offs, and illustrate costs and benefits of different pathways, are largely lacking. Without such detail it is hard to have sensible integrated intervention strategies that make a difference.

It is notable for most of the literature on small-scale agriculture that relatively little attention is given to trade-offs and the implications for bringing about change. These trade-offs will mostly play out at national and local levels, and it is at these scales that they need to be assessed in detail. Any substantial policy change to support the transformation of small-scale agriculture is going to quickly bump into trade-offs that have economy wide and deep political implications.

Box 3: Desirable small-scale agriculture outcomes.

Economic and social wellbeing

- Small-scale farmers are part of an inclusive food system economy that optimises fair employment for maximum numbers.
- Small-scale farmers are able to earn a living income.
- Vibrant rural economies provide off-farm employment opportunities.
- A managed transition out of agriculture for those who no longer want to farm and/or are unable to make a living.
- Women gain equitable decision-making power and access to resources/tenure.
- Agricultural marketing is inclusive and safe for women.
- Large outmigration of poor rural people that increases urban poverty is avoided.

Food and nutrition security

- Farm households have healthy balanced diets.
- Small-scale agriculture contributes to urban consumers having a healthy balanced diet.
- Household savings schemes, social protection and improved farming systems create resilience to food shortages/price shocks due to market fluctuations, climate change impacts and natural disasters.
- Informal and semi-formal supply chains are upgraded to improve food quality and safety.
- An optimal balance between small-scale agriculture, larger scale farming and imports in meeting national food and nutrition security.

Environmental sustainability

- Small-scale farmers adopt climate smart farming practices that reduce emissions and create resilience to climate change impacts.
 - Small-scale agriculture becomes part of sustainable landscape programmes that integrate farming with biodiversity conservation and protection of ecosystem services.
 - Small-scale farmers adopt optimal soil and water conserving practices.
 - Small-scale farmers minimally/optimally and safely use agro-chemicals.
 - Small-scale farmers are able to minimise food loss.
-

At the country level there is a need for clear visions about the future for small-scale farmers. What numbers and types of small-scale farmers in which locations could achieve commercial viability? At what scale would they need to operate to achieve a living income and what would be the implications? How many small-scale farmers will need to transition to alternative livelihoods over what periods, and how might this be supported?

The food systems framework identifies three overarching food systems outcomes; economic and social wellbeing, food and nutrition security, and environmental sustainability. These provide a starting point for specifying desired outcomes, trade-offs and synergies for the food system and small-scale agriculture. Currently, our food systems are trading-off longer-term environmental sustainability and human health against meeting shorter-term calorie needs, desire for increased animal protein and food industry profits. These macro level trade-offs flow into many options for the transformation of small-scale agriculture. Box 3 provides an indicative listing of desirable food system outcomes related to small-scale agriculture.

Trade-offs can be thought about in three dimensions, **issues, time** and **place**. Issues are the trade-offs between competing interests or system outcomes – eating meat vs protecting the environment, for example. Time is the trade-off between short and longer-term consequences, and place is the trade-off between impacts for different localities. Transforming small-scale agriculture to be more profitable, sustainable, and to produce a healthier diversity of food requires considering trade-offs from localised technical issues to global policy issues. For example, what is the trade-off between using crop residue to feed livestock vs using it to replenish soil organic matter? Or what is the trade-off for economic and environmental outcomes from meeting food demands from local food systems vs international trade? Box 4 provides an example of ten key trade-offs to be considered in transforming small-scale agriculture.

Box 4: Trade-offs

Prices for consumers vs producers

Implications: A difficult policy choice is between creating greater income for farmers and paying for environmental costs of food vs providing cheaper and readily affordable food for consumers, especially those living in cities. The political difficulty of this trade-off creates high subsidies for the agriculture sector.

Number of producers vs size of landholding

Implications: In many areas, constrained land resources means that to increase farm scale and become more viable, land consolidation is needed. This raises difficult trade-offs between large numbers having the security of very-small but marginal areas of land vs a smaller number being economically viable farmers. The nature of this trade-off very much depends on alternative livelihood options.

Larger vs smaller scale agricultural production

Implications: Larger vs smaller-scale production systems bring potential trade-offs between labour and capital, economic efficiency vs economic inclusion, and farmer resilience vs vulnerability.

Off-farm vs on-farm livelihoods

Implications: There are trade-offs between having large numbers of rural poor owning their own land and producing, even if marginally, vs having large numbers of people informally employed as farm labourers on very low and itinerant incomes.

Open trade vs protectionism

Implications: Open trade can increase opportunities for markets, increase export income and improve prices for consumers. It can also make it difficult or impossible for farmers to compete with imports and prevent sectors from developing.

Investment in agriculture vs other sectors

Implications: There are trade-offs for national governments between investing limited public funds into agriculture vs other sectors. This comes back to fundamental economic assumptions about the role of agriculture in economic development.

Calories vs nutrition

Implications: There are huge differences in small-scale agriculture oriented towards production of staple food crops to meet basic calorie demands vs systems that provide a range of nutrient diverse crops. There are trade-offs in costs of developing more nutrient beneficial systems vs the costs of poor nutrition.

Domestic or international food security

Implications: Countries can choose to ensure their food security through self-sufficiency, engagement in international trade, or some combination. The trade-offs are between risks of high global prices and a breakdown of open trade, risks of a country not being able to meet their needs due to drought, natural disasters or disease. There are also trade-offs in terms of the costs and implications for domestic producers.

Subsidies vs alternative public investments

Implications: In the short-term subsidies for agricultural inputs or price support schemes can encourage production, helping food security and raising farmer incomes. However, this can also be a trade-off between investing in infrastructure and services that create a more viable sector over the longer-term. It can also be a trade-off with creating efficient agricultural market systems.

Formalised vs semi-formal value chains

Implications: Western food markets are highly formalised, concentrated and employ relatively low numbers of people. Emerging economy markets remain semi-formalised with large numbers of small-enterprises and high levels of employment. The transition between the two has trade-offs in terms of opportunities for small-scale farmers, inclusive economic development, food quality and safety, foreign investment and export opportunities.

6.2 Interventions

The transformation of small-scale agriculture and food systems are systemic problems. They require solutions that consider how entire systems interact. It is impossible to control and engineer the behaviour of complex human and ecological systems. However, with smart interventions that consider system relationships, it is possible to nudge systems toward more desirable outcomes and dampen down undesirable directions. This requires ongoing policy learning and adaptation.

Radical shifts are needed in the single sector, piecemeal, short-term and powerful interest group driven approaches that often characterise public policy making. Not to suggest that this is easy, however, bending away from the trajectory of a business as usual scenario to something more desirable for all is going to require new and different approaches.

The food systems framework provides a starting point for such systemic analysis. It provides a basis for mapping out the relationships between key food system actors and the incentives that drive their actions, be it at local level for a specific value chain, or for a country's overall food system. A deeper understanding of the core activities of the food system and how these interact with supporting services and the institutional environment is needed to better identify intervention points and establish theories of change to guide transformation. Rapidly developing capabilities in computer modelling and visualisation open up enormous potential for more sophisticated analysis and hypothetical testing of what might work, and for exploring this in collaboration with stakeholders.

As illustrated in Table 4 and Appendix 1, across some 30 reports and studies going back over more than a decade, there is no shortage of general recommendations about what needs to be done to improve small-scale agriculture. The menu of better public services, access to financial services, improving the functioning of input and output markets, research and development, infrastructure and effective producer organisations is well established. What is lacking are country level and more localised small-scale agriculture transformation strategies with clear outcomes, and integrated, systemic pathways for change, targeted to the needs of different small-scale farmers.

Too often, recommendations and policy directions for improving small-scale agriculture do not adequately differentiate between the needs of different categories of small-scale farmers in different contexts (Vorley *et al*, 2012; Hazel and Rahman, 2014). Table 4 illustrates how differentiated policies might be targeted to different categories of small-scale farmers based on the transition strategies listed in Table 1 of stepping-up, hanging-in, moving-out, and adding an additional level of stepping-in (emergent/investor farmers).

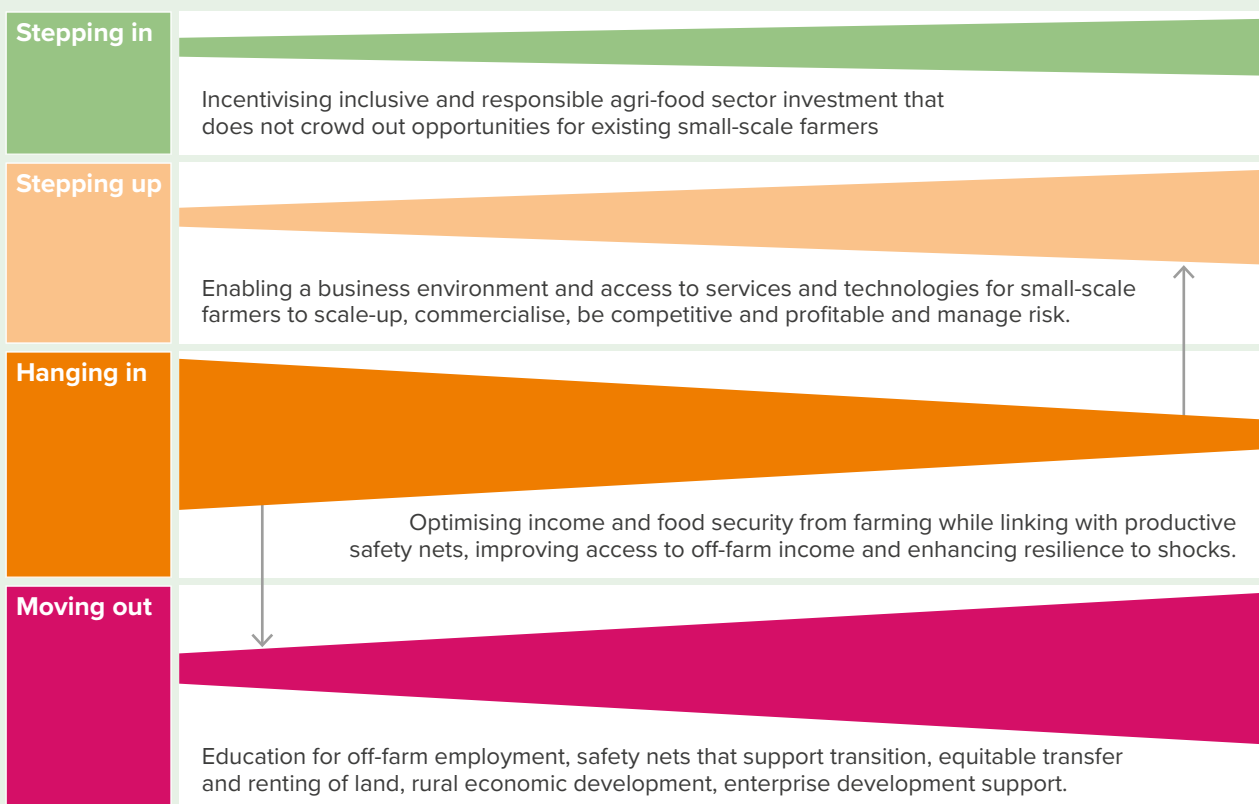
Table 4: Categorisation of Interventions. See Appendix 1 for a detailed breakdown of interventions with references.

Good governance and enabling business environment	Building ownership, working towards responsible governance, decentralising and devolving policy and operations, designing and implementing medium and long term strategies, implementing internal reforms, encouraging the creation of enabling environments with built-in incentives for addressing market failures.
Public services and infrastructure	Investing in public goods, services, and infrastructure in rural areas, increasing accessibility and affordability of smallholder friendly technology, providing incentives for innovation.
Market failures	Supporting access to markets and market information, promoting smallholder diversification, targeting policy interventions to correct market failures.
Financial services	Improving access to innovative financial services, expanding opportunities for risk planning for small-scale farmers, reforming financial regulations.
Research, development, and advisory services	Improving and expanding data collection on farms, investing in setting up and upgrading agricultural research and financing for technology and agricultural innovation.
Aggregation and representation	Empowering farm organisations through training, developing and modernising producer organisations through commercial and technical skills.
Sector development and value chains	Promoting pro-smallholder value chains, vertical and horizontal integration, developing nascent processing sectors to increase market opportunities.
Public private partnerships	Establishing clear regulatory frameworks for linking farmers with private institutions, innovating processes of partnerships and facilitation.
Territorial/rural development	Developing policies for promoting and incentivising rural development, promoting non-farm employment, strengthening rural-urban linkages, promoting context-specific policies.
Gender	Improving access to knowledge, technology, assets, and resources to improve opportunities for employment, reduce drudgery, and empower through inclusive decision-making and policy processes.
Social protection	Establishing and maintaining social protections, supporting training and competency development, coupling productivity enhancing tools with social protection and social safety nets.
Land tenure and property rights security	Creating flexible and clear arrangements for land transfer and tenure security, establishing land agrarian reforms with active support for small-scale farmers, establishing supportive regulatory and legal frameworks for land acquisitions.

As strongly emphasised by Hazell and Rahman (2014), Wiggins (2014) and Mellor (2017), there are a core set of policies that benefit all categories of farmers and the wider rural economy including infrastructure, enabling business environment, education and health services, and access to finance. An endlessly repeated message from economists is that, by and large, public resources should be invested into these types of public goods and services, rather than into input subsidies and price support schemes which often create market inefficiencies and are hard to target to those most in need. Social protection mechanisms should then be used to target the extreme poor and food insecure.

Over the last decade or so, much attention has been given to the needs of commercialising small-scale agriculture and the linking of farmers to markets (see Woodhill 2016). While unquestioningly necessary, this has arguably drawn attention away from the needs of the very large group of (semi-)subsistence farmers who, while often selling surplus into informal local markets, will never become commercial. For this group, who are mostly poor to extremely poor, there is a need to optimise what productive and income earning opportunities and capacities they do have while also ensuring their food and nutrition security. This calls for creative thinking about synergistically linking social protection, rural development and agricultural policies.

Figure 10: Living income: getting the policy mix right



Even with interventions that are needed for all categories of farmers, such as access to finance, extension services, women’s empowerment or property rights, it remains essential to tailor interventions to the specific needs of specific groups and contexts.

Processes

Systemic transformation of small-scale agriculture, as with tackling the many other challenges for human and environmental wellbeing, will require new processes of how stakeholders engage; science, policy and society connect; and decisions are made. We know that our current systems of governance are often stuck and failing to deliver on complex longer-term sustainability challenges. Governance is critical in determining the robustness of a region’s transformation (Jayne, Meyer, and Traub 2014). It is well understood that data and scientific evidence alone does not sway public opinion and policy thinking. Never-the-less, good data and science must still be a foundation for sound policy and political decisions.

The point is to focus on the process of change itself. To bring about transformation of small-scale agriculture, the technical and policy issues affecting the sector must be coupled with innovation in governance and public decision making – a challenge for the entire sustainable development agenda.



Ultimately, what is it that will drive transformational change? It might be a major crisis; it can be decisions by those who have sufficient power to impose their will; or it may be the consequences (often unintended) of technological innovation. Alternatively, change may be driven by sufficiently strong coalitions and alliances across government, business and civil society. The transformation of small-scale agriculture is a “slow burn” issue, there is unlikely to be a short-term crisis sufficiently severe to radically change the status quo. No single group has the interests or power to upend the current situation, and there are no “silver bullet” technological transformations. This makes alliances for change the only real option for driving a transformation of small-scale agriculture.

Alliances for change, in turn, hinge on being able to engage society and stakeholders in informed and meaningful dialogue that connects with people’s hearts, minds, values and interests. This requires convening multi-stakeholder forums where in open and safe spaces people can explore issues. It also requires public awareness raising, respected champions speaking out, advocacy campaigns and, in today’s world, strong social media engagement. Alliances for change are not necessarily about large-scale “agreement” but about creating enough profile around an issue that the system begins to change and adapt.

The more that stakeholder engagement and dialogue can be well informed, the better. This requires good research and data, synthesis science that makes system-wide implications clear, and visually engaging communication of data and scientific understanding.

Foresight and scenario analysis processes are ways of helping to connect these elements. They bring people together into informed dialogue and help to create alliances for change. Creative use of data, modelling and visualisation can help actors explore future scenarios and the consequences of different courses of action.

Underpinning such processes of transformational change must be an appreciation of the principles of how complex (human and ecological) systems change. A full explanation of this is beyond our scope here, however, three ideas are important. First, change happens because of the individual actions of many different actors, so the question is how to create system wide incentives that nudge behaviour change at scale. Second, systems adapt in response to feedback loops. Strengthening feedback through informed cross-sector stakeholder engagement linked to wider communication strategies is critical. Third, interventions to change systems need to involve numerous adaptive experiments, where failure is expected but where adaptation can be quick. This is very different to how most policy processes currently function.

This might all sound difficult, complex and too idealistic. But what is the alternative? Fortunately, we do see emerging examples of the type of transformation process outlined here.

How to move forward? We make six suggestions:

- 1. Convene a global learning platform on small-scale agriculture transformation.** Global agenda setting on the future of small-scale agriculture appears to have lost focus over recent years. There is a need for more coordinated efforts across international agencies, donors, development organisations, regional organisations and business to keep the understanding of small-scale agriculture up-to-date, learn lessons from development interventions and shape a future agenda that aligns with the emerging attention on food systems.
- 2. Invest in research, data, and synthesis.** Data on small-scale agriculture is weak and fragmented and there has been insufficient meta-analysis and synthesis of what individual pieces of research have concluded. There also remains a meta-analysis gap about what scale of impact market-driven approaches to small-scale agriculture transformation have had, both in terms of numbers of farmer benefiting and the degree of improvement in livelihoods.
- 3. Undertake and collate case studies.** Greater insight could be gained through case studies that assess large-scale and autonomous changes, and examples of positive deviance in small-scale agriculture. Such examples assessed against a background of different contexts and policy settings could help to drive greater evidence-based policy innovation.
- 4. Develop country level small-scale agriculture portraits.** These would provide a much clearer and more nuanced categorisation of small-scale farmers in terms of their context and characteristics to enable tracking of trends and targeting of interventions.
- 5. Public policy and investment options.** While there is a long list of interventions to improve small-scale agriculture as illustrated in Table 4 and the Appendix, country specific options and scenarios need developing. Such frameworks could help to drive greater policy innovation.
- 6. Develop national level small-scale agriculture transformation strategies based on food systems foresight and scenario analysis.** Ultimately, countries will need to develop more integrated strategies to guide small-scale transformation that enable appropriate interventions to be integrated across sectors. These need to include realistic prospects for the numbers of farmers achieving viable commercialisation, numbers leaving agriculture and numbers who need to be supported in a transition phase



7 CONCLUSION

This report set out to explore what the future holds for small-scale farmers in changing food systems. At the heart of our analysis is what we have called the small-scale farmer dualism. The reality is that most of the food produced by small-scale agriculture is produced by a small proportion of the 558.2 million farms of less than 20 ha. In orders of magnitude, using the latest available data, we estimate that 30% of small-scale farms under 20 hectares produce 70% all food produced by small-scale agriculture in middle- and low-income countries (acknowledging differences across countries and different commodities). It is critical to recognise that 410 million farms or 72% of all farms are less than one hectare. With urbanisation and changing food markets, this dualism is likely to become more extreme, which has significant implications for the transformation of small-scale agriculture.

The implication is that the large bulk of small-scale farmers are not as important to feeding the world as is often claimed – but this does not mean that small-scale agriculture is not important. Small-scale agriculture remains critical to the livelihoods and food and nutrition security of some two to three billion people, a quarter to a third of the world's population. It is amongst this group along with the rural landless that we find the highest levels of poverty, hunger and malnutrition.

Economic theory might predict a dramatic decline in the proportion of the workforce employed in agriculture as economies develop. Yet, current trends show increasing rather than decreasing absolute numbers of small-scale farmers. The existence of very large numbers of marginal and poor farmers is going to be a reality for the foreseeable future. From the perspectives of poverty, inequality, gender, food and nutrition security, environmental sustainability, and social stability, tackling this reality must be a development priority.

Over the last several decades, there has been a very strong donor/development focus on the commercialisation of small-scale agriculture and value chain development. This has been driven by a narrative around growth in demand for food, that small-scale farmers provide 70% of food in lower- and middle-income countries, and the potential of market driven approaches to development.

There are two problems with this focus. First, by and large it does not help the bulk of small-scale farmers who have marginal commercial opportunities at best. Second, the trends of the “quiet” market revolution and emergent investment suggests that where there are economic opportunities these are being exploited by endogenous economic development processes that may have little to do with development interventions.

A desirable transformation of small-scale agriculture that that can respond to the wider challenges facing food systems and simultaneously tackle rural poverty and malnutrition is going to require a more nuanced and sophisticated understanding of small-scale agriculture, and more integrated and targeted public policies and investments.

While food production, processing, distribution and retailing is a private sector enterprise, there are huge market externalities related to health, the environment and poverty. The longer-term public costs of not tackling the necessary transformation of small-scale agriculture and food systems are huge. More thought is needed about the balance of public and private responsibilities, and the role of public policy and investment to tackle market externalities. The historical debate about whether to tackle rural poverty through investment in agriculture or other sectors has lost meaning. It is increasingly clear that a balanced mix of investments across agriculture, food systems, rural development, and the wider economy is needed.

For many decades the focus for agricultural development was on increasing productivity through technology. Then emerged a greater focus on brokering market and private sector linkages. Both are important; however, the future requires attention for a more progressive set of policies, incentive structures and supporting institutions. This is politically challenging. It requires providing leaders and policy makers with politically feasible options and/or working to change the political context so that logically desirable directions for small-scale agriculture become feasible. This hinges at least in part on well-informed multi-stakeholder dialogue and creating new coalitions for change.

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9 APPENDIX: DETAILED CATEGORISATION OF INTERVENTIONS

Good governance and enabling business environment:

Governance challenges like political-economic instability, corruption, limited accountability and transparency, and low capacity to intervene hamper progress towards development. As national states are responsible for creating enabling environments for development, good governance is essential before relevant policies and partnerships can be put in place.

- Building ownership and working towards responsible governance by international and regional organisations on issues like land titling and environmental stewardship (The World Bank 2008; Wegner and Zwart 2011).
- Decentralising and devolving policy and operations to local/regional/provincial levels and allocating resources by local needs and building human capacity at decentralised levels (The World Bank 2008; Hazell *et al.* 2010; Wegner and Zwart 2011; IFAD 2016; Poole 2017; Mellor 2017).
- Design and implement medium-and long-term strategies with accompanying policies and budgets (HLPE 2013).
- Internal reforms of public administration to improve coordination, accountability, and regulation (The World Bank 2008; AGRA 2018).
- Encourage the creation of enabling environments with incentives for companies and public goods to address market failure and remunerate smallholders (IFAD 2014; CFS 2016; AGRA 2017).

Public services & infrastructure:

A critical need for small-scale farmers is to have improved access to housing, education, clean water, sanitation, and health services. These protect and improve the quality and quantity of the family labour force to further participate in food production and non-farm activities. Infrastructure in the form of roads, electrification, telephone access, and technology is critical to rural social well-being, developing and maintaining market linkages, and providing opportunities for off-farm income. Shifting public spending to focus on infrastructure development and public services benefits agricultural growth, and development in other sectors.

- Provide and invest in public goods and services to rural areas including roads, health services, clean water, and schools; invest in agricultural research and extension (The World Bank 2007; Hazell *et al.* 2010; Wiggins, Kirsten, and Llambi 2010; HLPE 2013; CFS 2016; IFAD 2016; FAO 2017b).
- Investing in infrastructure (roads, electrification, cell-phone access, irrigation, marketing and market spaces) in agriculturally responsive areas (The World Bank 2008; Mellor 2017; AGRA 2017; AGRA 2018; IFAD 2016; Gneiting and Sonenshine 2018) targeted at smallholders (CFS 2016).
- Promoting and developing accessible and affordable smallholder friendly technology (The World Bank 2008; Wegner and Zwart 2011; CFS 2016; Poole 2017).
- Providing incentives for innovation through competitive funds for co-finance and testing (The World Bank 2008; AGRA 2017).

Market failures:

The dominance of the private sector in providing inputs, financial services, and technological innovations have worsened market failures. This is a greater problem for small farmers because of increasing transaction costs of markets and needing to find new ways of meeting the demands of value chains, and interacting effectively with input and service suppliers. A key challenge is to improve the functioning of markets in supplying these inputs and services.

- Support access to markets and market information (Fan *et al.* 2013; HLPE 2013; CFS 2016; FAO 2017; Oxfam 2018).
- Private investment through 'inclusive' out-grower schemes can promote smallholder diversification into high-value and export-market crops and support productivity gains (Wegner and Zwart 2011).
- Targeted policy interventions to correct underlying market failures and reduce barriers to market participation (Hazell *et al.* 2010; IFAD 2013; AGRA 2017; Dillon and Barrett 2018).

Financial services:

Smallholders face significant costs of financial constraints. Inadequacies and inequality of rural financial markets demonstrate real risks and barriers to food system development.

- Improving access to innovative financial services (credit and savings products, transfer services, insurance, etc.) will expand opportunities for smallholders and allow for improved planning for risk (World Bank Group 2008; Wegner and Zwart 2011; HLPE 2013; Fan *et al.* 2013; IFAD 2016; CFS 2016; AGRA 2017; Mellor 2017; Poole 2017; Sheahan and Barrett 2018; Nikoloski, Christiaensen, and Hill 2018) and create opportunities for new forms of commercialisation (Collier and Dercon 2014).
- Reform financial regulations, public agricultural banks, improve financial infrastructure, and formally define property and land-use rights to act as collateral for loans to benefit small, high-risk, rural populations (HLPE 2013; Fan *et al.* 2013; AGRA 2017; Poole 2017).

Research, development, and advisory services:

Agricultural research and development over the past few decades has been largely reactive and focused on improving productivity gains. In combination with uneven distribution of technological development, the gains from research and development have been unequally distributed globally. Small-scale farmers need to have equitable and transparent access to data, knowledge, services, and technology that can improve their production in a sustainable and healthy manner.

- Improved and expanded data collection on farms, growth of farms, farming households, progress of interventions to SDGs, rural entrepreneurship, indigenous peoples, and natural resource management to inform policy making (Wiggins, Kirsten, and Llambi 2010; IFAD 2016; CFS 2016; Jayne *et al.* 2016; Lowder, Skoet, and Raney 2016; Herrero *et al.* 2017; Ricciardi *et al.* 2018; Nagler and Naude 2018).
- Investment in setting up, upgrading, and financing agricultural research and extension and smallholder-friendly climate-smart technologies (Fan *et al.* 2013; HLPE 2013; Poole 2017).

Aggregation and representation:

Concentration of buying power and vertical integration is being seen globally. Large-scale buyers aim to purchase large amounts of commodities from fewer suppliers as compared to large numbers of small producers.

- Empower farmers' organisations through training and strengthening quality and control of production (Wegner and Zwart 2011; HLPE 2013).
- Develop and modernise producer organisations with enhanced commercial and technical skills (HLPE 2013; AGRA 2017).

Sector development and value chains:

Integrating small-scale producers into global value-chains and sectors dominated by large agribusinesses and corporations will help in improving rural incomes and reducing rural poverty. Increasing productivity and improving competitiveness will improve engagement with these complex value-chains and contribute towards a rebalancing of embedded power imbalances.

- Promote pro-smallholder value chains through an enabling and innovative policy and investment environment (Fan *et al.* 2013; HLPE 2013; CFS 2016; IFAD 2016; AGRA 2017).
- Vertical and horizontal integration and/or coordination to meet the safety, quality, and quantity standards of commodities (Fan *et al.* 2013; AGRA 2017; Gneiting and Sonenshine 2018).
- Developing nascent agricultural processing sectors (especially staple foods) to provide more opportunities for farmers to enter or increase their market participation (AGRA 2017).

Public Private Partnerships:

Given the role of government in providing public goods and services, and the role of the private sector in developing value-chains and innovative R&D, public-private partnerships are critical in sustaining agricultural growth and creating opportunities for smallholders. Such partnerships are successful for multiple beneficiaries if governments have provided an enabling operational environment.

- Establish clear regulatory framework for linking smallholders with private institutions (Fan *et al.* 2013).
- Innovations In how private companies, ministries of agriculture, other public agencies, and NGOs work jointly and take on new facilitating roles (Hazell *et al.* 2010).

Territorial/rural development:

Recognising spatial and social heterogeneities, rural and territorial development approaches provide a more specific and realistic approach for targeting interventions and policies, instead of a 'one-size-fits-all' value chain approach. The approaches help policymakers respond to the realities of diverse livelihoods in different areas, while still emphasising market linkages and the importance of rural institutions.

- Develop public policies to promote and incentivise agricultural and rural development (FAO, IFAD, and WFP 2015; Cervantes-Godoy 2015).
- Promote rural non-farm employment in secondary towns and strengthening rural-urban linkages, with investments in infrastructure, education, and skills (World Bank 2008; Cervantes-Godoy 2015).
- Promote context-specific policies and interventions (Fan *et al.* 2013; World Bank 2008).

Social protection:

Small-scale farmers need targeted productive social protection policies to benefit them in the short term, and viable strategies to exit agriculture, or transform into viable and sustainable businesses. Such policies offer cushions against livelihood shocks, improve households' food and nutrition security, and provide opportunities to diversify outputs, and to escape the poverty trap.

- Establish, maintain, and enforce vital protections for small-scale farmers and provide incentives for sustainable and healthy food production (World Bank 2008; Fan *et al.* 2013; IFAD 2016; AGRA 2017; Herrero *et al.* 2017; Mellor 2017; Oxfam 2018; Nagler and Naude 2018; Nikoloski, Christiaensen, and Hill 2018).
- Support in training, and competency and skill development (especially for youth) (CFS 2016; Nagler and Naude 2018) and provide strategies and protections to aid smallholders in transitioning out of agriculture (AGRA 2017).
- Coupling productivity-enhancing tools with social protection and social safety nets such as conditional cash transfers tied to household participation in schooling and health services (Fan *et al.* 2013).

Gender:

Women farmers make up a significant proportion of the global food system workforce. The challenges facing small-scale farmers and the global food system are set to exacerbate existing gender inequalities, particularly with climate change and natural resource constraints. Policies and interventions need to be developed with the intention of rectifying systemic inequalities creating an enabling environment that provides equitable access to resources and assets for women.

- Develop and deliver strategies focused on developing technical, business, and entrepreneurial skills and assets in off-farm activities (AGRA 2017).
- Improve access to land, rural labour markets, financial services, social capital, and technology (World Bank 2008; FAO 2011; HLPE 2013; Fan *et al.* 2013; AGRA 2017; Poole 2017).
- Collect sex-disaggregated data to gain more nuanced understandings of women's and men's roles in food system activities (Slavcheska *et al.* 2016; Doss *et al.* 2018).
- Investments in rural infrastructure and labour-saving technologies, to increase productivity, improve participation in economic activities, reduce drudgery, and provide access to decent employment opportunities (HLPE 2013; IFAD 2016; Oxfam 2017).
- Fostering women's participation and leadership in community and rural organisations (IFAD 2016).
- Ensuring that gender-related policies across scales are implemented and strengthened, with appropriate mechanisms for addressing structural inequality (World Bank 2008; Slavcheska *et al.* 2016; IFAD 2016).

Land tenure and property rights security:

Access to land is critical for producing food in rural areas. Inequalities in the distribution of productive land are key constraints in promoting rural development and ensuring food and nutrition security. Given land's economic, cultural and political importance, issues of tenure security are critical to the development, livelihood, and food security agenda.

- Flexible and clear arrangements for land transfer and tenure security (Wegner and Zwart 2011; HLPE 2013; Fan *et al.* 2013).
- Establish redistributive land and agrarian reforms accompanied with active support for small-scale farmers and active state and civil society interventions (FAO 2015; IFAD 2016).
- Establish supportive policy, legal and regulatory frameworks to discipline land acquisition and mitigate environmental externalities (Wegner and Zwart 2011; IFAD 2013; Collier and Dercon 2014).



ABOUT FORESIGHT4FOOD

Foresight4Food is a collaborative global initiative of science institutions, international agencies, platforms and coalitions, and development organisations working to transform food systems. They all recognise the need to strengthen local, national and global capabilities for food systems foresight and scenario analysis and the benefits of working together to do so.

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