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by
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Preface

Millions of small-scale producers constitute the backbone of the economies of many low- and middle-income countries. This, however, often goes unrecognized. A consequence of this lack of recognition is that small-scale producers are habitually deprived of the support, in terms of physical, social and financial resources, that they merit. Despite being a crucial component of sustainable agricultural production, and providing employment and livelihoods for many neglected groups, including women, the young and Indigenous Peoples, small-scale producers are often unable to compete successfully with well-resourced large-scale producers. This has resulted in agrifood systems that harbour substantial social, environmental and economic inequalities. This review looks in detail at these issues with a view to highlighting the precarious situation of small-scale producers and how they might play an important role in securing sustainable agrifood systems, and in transforming agricultural production so that it meets the expectations of the 2030 Agenda.

This review provides information that helps to improve understanding of small-scale producers and the contribution they make to social systems and agricultural economies. The review also provides a thorough account of the constraints experienced by small-scale producers and how those constraints might be overcome to maximize the contributions small-scale production can make to improved welfare and well-being of rural populations around the globe. Recommendations and suggestions are made for realizing the largely untapped potential of small-scale producers to contribute to sustainable agrifood systems transformation. Moreover, this review illustrates the benefits of moving small-scale production from a marginal to a central position, and how small-scale producers can be instrumental in transforming the prevailing industrial agriculture paradigm into one which ensures food security and nutrition for all.

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Key messages

➜ There is consensus that current agrifood systems are not sufficiently fit for purpose. The industrial agriculture paradigm has resulted in systems with substantial social, environmental and economic inequalities. The increasing specialization and simplification of agrifood systems and concentration of decision-making power among a few actors is unlikely to coincide with resolving these challenges. Addressing them requires urgent and bold transformation, with a central focus on the millions of small-scale producers around the world.

➜ It is increasingly recognized that the uneven distribution of the costs and benefits of food production, including the failure to achieve food security and nutrition for all, are determined by what food is produced, from where, how, by whom and for whom. Small-scale production systems around the world have demonstrated their potential to reconcile the social, economic and environmental dimensions of sustainable agrifood systems. A focus on small-scale production can facilitate the shift towards agrifood systems that are better connected to the ecologies and needs of specific localities and are more agile in response to disruptions and change. Small-scale producers will be key to the sustainable transformation of agrifood systems and to achieve 2030 Agenda expectations.

➜ Small-scale producers play a critical role in provisioning food security and nutrition. A disproportionate share of the world's food derives from small-scale production. Small-scale production can be highly productive. Such systems sustain dietary and nutrient diversities and local small-scale production plays a key role in ensuring food security for many populations, especially in the Global South.

➜ Small-scale producers in many contexts engage in food production that contributes less but is also more resilient to global climate and environmental change. The nature of small-scale production allows it to accommodate ecologically restorative production in many ways. Small-scale production systems are key repositories of agrobiodiversity and diverse knowledge systems. However, this does not mean that all small-scale producers should be considered intrinsic 'sustainability stewards'.

➜ The labour-intensive nature of small-scale production enables it to be an important creator of employment, and small-scale production systems such as fisheries and livestock rearing are particularly significant for poorer households. Small-scale production has the potential to stimulate the creation and distribution of wealth in rural areas, and economic growth linked to small-scale production can have an important role to play in national efforts to reduce poverty.

➜ The diversity of small-scale producers must be recognized and acknowledged. It encompasses a wide range of production methods, such as crop and livestock production and fisheries and forestry. It comprises different social groups, including women, young people and Indigenous Peoples. A smallholding is considered small as a relative and context specific measure. Most small-scale production units are characterized by a reliance on mostly (or solely) family labour.

➜ Small-scale farms have a particularly prominent presence in low- and middle-income countries. Despite the importance of small-scale producers, cropland managed on a small scale decreases as average national income levels rise and land becomes more concentrated among larger farms. However, these trajectories are not inevitable. An expanded role for small-scale production can be a part of more socioeconomically equitable and ecologically sustainable development models.

➜ Most investments in small-scale production are by the households themselves in the form of labour, augmented by personal savings and remittances. Many small-scale producer households combine work across the farming and non-farming sectors and in the rural-urban continuum. The close integration between the production and domestic sides of small-scale producer households has unique implications for how small-scale producers can respond to shocks and uncertainties.

➜ Small-scale producers face several interrelated constraints, many with strong and multidimensional linkages to poverty and social exclusions. Small-scale production is practised under agrifood system paradigms designed to promote larger, industrial modes of production that do not offer adequate support for sustained and adequate livelihood building by small-scale producers. Small-scale producers operate under conditions of power

asymmetries in economic and political relations, including a lack of recognition of their human rights and their voice in policies and investment decisions and limited negotiation capacities. These challenges are further intensified for groups such as women and young people.

➜ A principal constraint to small-scale production is limited and unequal access, in individual and collective forms, to productive natural assets such as land and water resources, forests and fisheries. This is further exacerbated by vulnerability to climate and environmental change.

➜ In general, the market position of small-scale producers is weak, and is not always conducive for generating fair incomes. The ongoing consolidation of global agrifood supply chains further shapes the positioning of small-scale producers as market agents. While small-scale producers in many countries are particularly active in territorial markets, they have not received adequate public support. Small-scale producers often lack access to affordable financial services that suit their circumstances.

➜ Small-scale production is not sufficiently supported by appropriate advisory services or agricultural research and formal educational programmes. There is a need to democratize power asymmetries in knowledge provision, and to legitimize the diverse forms of local knowledge of small-scale producers. Digital technologies have shown promise in resolving some of these challenges. However, digital divides persist, alongside concerns related to the distribution of costs and benefits to small-scale producers in the types of agrifood systems fostered by digital innovations.

➜ Expanding the potential of small-scale producers for sustainable agrifood systems transformation requires policies, institutions, legislation and investments that aim to maximize the synergies created by small-scale production and minimize trade-offs between the social, economic and environmental dimensions of agrifood systems.

➜ In supporting small-scale producers for sustainable agrifood systems transformation, the multifunctionality of small-scale production should be adequately recognized and remunerated. Agrifood systems should be able to ensure decent work and rewarding and dignified livelihoods that support the human well-being development of small-scale producers.

➜ Reimagining an active small-scale producer sector will require addressing the marginalization of small-scale producer priorities under agrifood system and national development agendas. Small-scale producers, in all their diversity, must be able to participate as co-creators of sustainability transition pathways. The rights, equal voice and agency of the diverse groups of small-scale producers individually and collectively must be recognized and ensured.

Based on these principles, this review recommends coordinated action by states, small-scale producers and their organizations, non-governmental organizations, academic and research institutions, and the private sector across the following areas:

- Create an enabling environment to support the multifunctionality of small-scale production.
- Address the economic and social marginalization of small-scale producers.
- Ensure the political voice and participation of small-scale producers in agrifood systems governance.
- Increase access of small-scale producers to natural and productive resources.
- Improve access to financial services.
- Improve the market positioning of small-scale producers.
- Support the co-creation and exchange of knowledge and innovation for sustainable small-scale production.

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Chapter 1

SMALL-SCALE PRODUCERS IN SUSTAINABLE AGRIFOOD SYSTEMS TRANSFORMATION

> *Small-scale producers have a critical role to play in the sustainable transformation of agrifood systems.*
>
> *Contemporary agrifood systems are not able to compensate small small-scale producers adequately for their multifunctional contributions, nor recognize them as equal and important participants.*

If the world is to transition towards agrifood systems that are more sustainable and equitable, small-scale production systems will be key to progress. Large parts of the world depend on small-scale systems for maintaining food security and nutrition (Lowder, Sánchez and Bertini, 2021; Herrero *et al.*, 2017). These systems are vital to produce food that can meet the challenge of global environmental and climatic change (Ricciardi *et al.*, 2021; HLPE, 2019). They are integral to the livelihoods of millions of people around the world, representing an important component in the fight against poverty and equitable economic development (IFAD, 2021; De Schutter, 2012).

Small-scale food production systems can be a critical force in reconciling the social, economic and environmental dimensions of sustainable agrifood systems transformation and accelerate progress towards the Sustainable Development Goals (Abraham and Pingali, 2020). Despite this centrality, neither small-scale production systems nor small-scale producers, as important and equal actors, have received due recognition under predominant agrifood systems paradigms.

The crisis of current agrifood systems

Current agrifood systems do not sustain the health and well-being of all, nor do they operate within the safe boundaries that nurture life on earth. Nearly 811 million people faced hunger in 2020, and as healthy diets become increasingly unaffordable, malnutrition and obesity have increased (FAO *et al.*, 2021a). Contemporary agrifood systems are a leading cause of climate change and biodiversity decline (IPCC, 2019; IPBES, 2019). They account for 40 percent of global land use, 70 percent of freshwater withdrawals, and are a leading cause of freshwater pollution (Willett *et al.*, 2019). Looking to the future, these challenges are expected to intensify. Agrifood systems must be transformed to be able to meet the demands of universal food security and nutrition, while being buffeted by the consequences of environmental and climatic change (Rockström *et al.*, 2020).

The wide reach of the production models collectively known as industrial production have had a disproportionate bearing on driving these impacts. The industrial production model is characterized by intensified food production on specialized farms, sustained by heavy use of chemical inputs and fossil fuels (Fakhri, 2021; IPES-Food, 2016) and an orientation towards larger farm size and hired labour (Ericksen, 2008). The focus is on a few highly

productive food sources, particularly those of high calorific value (Benton and Bailey, 2019).

The industrial food production model is premised on economic efficiencies and heightened global connectivity (Benton and Bailey, 2019). Contemporary agrifood systems tend to be characterized by complex supply chains that are highly interlinked at a global level and are driven by multilateral trade liberalization, with a preference for specialized production for export markets (van der Ploeg, 2020; Benton and Bailey, 2019). The production of emission-intensive, high calorific but nutrient-poor commodities is supported by price incentives and subsidies that account for the largest share of agricultural producer support worldwide (FAO, UNDP and UNEP, 2021b).

Together, these policies and trends, typified in Asia and South America by the Green Revolution, resulted in a marked increase in food production and a decline in the percentage of hungry people globally (IPES-Food, 2016). However, the singular focus on food supply has been accompanied by significant environmental degradation, even as healthy diets continue to be out of reach for nearly three billion people (FAO *et al.*, 2021a).

The advances in efficiency and productivity have also resulted in the homogenization and simplification of agrifood systems. The expansion of the industrial production model has disrupted localized forms of food production adapted to specific ecologies (Hendrickson, 2015). The complexities in the socio-ecological relations that structure agrifood systems have decreased the diversity of scale, form and organization of food production (Niewolny, 2021; Hendrickson, 2015). Global dietary diversities have diminished from nearly 4 200 species of plants and animals to about 150 (DeClerck *et al.*, 2021).

It is now understood that the uneven distribution of the costs and benefits of food production, including the failure to achieve food security and nutrition for all, is determined by what food is produced, from where, how, by whom and for whom (IPES-Food, 2016). Under contemporary agrifood systems, increasingly fewer corporate actors can have a high degree of influence on agrifood governance (Clapp, 2021; Fakhri, 2021). This includes companies involved in the farm inputs, food processing and retail markets, as well as investors interested in the speculative dimension of agrifood systems, where agricultural products and natural resources are treated as financial assets (Clapp, 2021; De Schutter, 2011). Growing numbers of companies have merged food provisioning and financing operations (Isakson, 2014). Through shaping the connections that link different aspects of food production, processing and distribution, these actors can determine specific patterns of inclusion and exclusion, with far reaching implications for the functioning of markets, technology and innovation agendas and policy and governance (Clapp, 2021).

The millions of small-scale producers around the world are largely marginalized as food systems actors, with their livelihoods characterized by poverty and vulnerability (van der Ploeg, 2020). Following structural adjustment programmes in many countries in the 1980s, public agricultural policies have mostly focused on larger enterprises oriented towards agricultural exports, overlooking support for small-scale producers providing mainly for domestic markets (HLPE, 2013). The expectation for the private sector, particularly the larger entities, to provide the necessary support for small-scale producers has materialized in some places but not most, and frequently not to the advantage of small-scale producers (HLPE, 2013).

For many small-scale producers, while yields increased with the adoption of intensive food production methods, economic gains are precarious (IPES-Food, 2016). The orientation of agriculture towards global markets has increased exposure to disruptions, price shocks and 'commodity-induced international poverty traps' (IPES-Food, 2016 pp. 25). For many others, the pathway to farming offered by large-scale industrial agriculture, remains unviable. It has been noted that the expansion of Green Revolution practices was not scale-neutral and accentuated local inequalities (Dawson, Martin and Sikor, 2016; Patel, 2013).

Some of the vulnerabilities of current agrifood systems have been highlighted by the COVID-19 pandemic (Clapp and Moseley, 2020). Lost incomes and uneven food prices have impacted people's ability to buy food, while the livelihoods of food producers have been put at risk due to the drop in demand and disruptions to global food supply chains. The pandemic has underscored the urgent need for responses that insulate agrifood systems against future crises, including the anticipated consequences of climate change (Clapp and Moseley, 2020).

Small-scale producers as a critical force for sustainable agrifood systems

An exhaustive rethinking is needed of how agrifood systems operate. With the power imbalances inherent in the current dominant paradigm, it is unlikely that market forces, when left to themselves, will lead to a resolution of these challenges (HLPE, 2019). Addressing this issue requires urgent and bold transformation, and the millions of small-scale producers have the potential to be a critical component of the diverse and complex pathways that will have to underpin the transformation.

HLPE (2020a) defines sustainable food systems as those that are productive and prosperous (ensuring the availability of sufficient food), equitable and inclusive (ensuring access for all people to food and to livelihoods within that system), respectful and empowering (ensuring the agency for all people and groups to make choices and exercise a voice in shaping that system), resilient (ensuring stability in the face of shocks and crises), regenerative (ensuring sustainability in all its dimensions) and healthy and nutritious (ensuring nutrient uptake and utilization). Transitioning towards this goal will require the diversification of agrifood systems, the recognition and strengthening of inter-system linkages, nurturing of positive synergies, and the flexibility to fit the specificity of each context (HLPE, 2020b). These fundamental changes will not be possible without an equitable distribution of resources and power and the recognition of the rights, equity and agency of all agrifood system actors (HLPE, 2021).

Small-scale production systems around the world have demonstrated their potential in strengthening the positive relationships among the social, economic and environmental dimensions of sustainable agrifood systems (Ricciardi *et al.*, 2021; Herrero *et al.*, 2017; De Schutter, 2012). Due to their rootedness in a particular place, they are better able to adapt and respond to the needs of specific localities and their communities (Hendrickson, 2015). This decentralization, together with the diversity of organizational forms and the scale they represent, with overlapping systems that can reinforce each other during times of disruption, also confers small-scale production agility and latitude to be resilient to crises and change (van der Ploeg, 2020; Hendrickson, 2015).

Agrifood systems are also intimately connected to any effort to mitigate poverty and equitably distribute economic opportunity (IFAD, 2021). Poverty continues to be prevalent in rural areas (Castañeda *et al.*, 2016). Nearly 3.2 billion rural people depend to some degree on agriculture and agrifood systems for their livelihoods (IFAD, 2021), including many of the world's poorest and most marginalized. Agrifood systems are the largest employer of young people in the Global South, a demographic that tends to be over-represented in indices of unemployment and vulnerable employment (HLPE, 2021). At the same time, these jobs are also associated with some of the incidence of informality, casual labour, underemployment, working poverty and the violation of fundamental labour rights, and have among the lowest rates of access to social protection.

Ensuring that agrifood systems can provide decent work and dignified and rewarding livelihoods for small-scale producers is therefore a goal to be realized by itself. Despite the essential roles small-scale producers play in agrifood systems, there is not enough evidence for equivalent gains in their incomes (Ricciardi *et al.*, 2021). Realizing the potential of small-scale production to drive transformation of sustainable agrifood systems rests on policies, institutional choices and investment decisions that adequately compensate small-scale producers for their multifunctional roles. They should incentivize small-scale producers to participate in sustainable forms of food production in ways that enable them to secure fair incomes and human well-being outcomes through their participation. They should also ensure the agency and equal voice of all small-scale producers in all their diversity to be able to participate in shaping the future of agrifood systems.

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Chapter 2

UNDERSTANDING SMALL-SCALE PRODUCERS

> *Small-scale production is characterized by diversity and can most usefully be understood as a relative and context specific measure. Understanding small-scale producer livelihoods is important to design supportive policies and investments.*
>
> *The negative social and environmental consequences that have accompanied classical development trajectories call for a reappraisal of the significance of small-scale production in achieving sustainable and equitable development.*

In enabling and supporting small-scale producer livelihoods, the diversity associated with the term small-scale producer must be recognized and acknowledged. This diversity can reflect the ecosystems that small-scale producers work in, the geographies they live in, and the development trajectories of countries (Abraham and Pingali, 2020). Small-scale producers can be variously positioned in intersecting and uneven social relations, such as those based on gender, generation, class, caste and ethnicity. While most are primarily based in rural geographies, small-scale production can also extend to urban areas (IFAD and UNEP, 2013).

'Small-scale producer' is used in this review and not its equivalent term 'smallholder', to be more inclusive of different forms of production, including crop and livestock production, forestry, fisheries and aquaculture production. A significant proportion of studies on small-scale production is based on cropping systems, which is reflected in this review, although much of its analysis is also applicable to other production systems.

The heterogeneity of small-scale production means that the term does not fall into an easily defined category. Understanding small-scale production is not a trivial exercise and can have consequences for how policies and investments are directed and how they impact small-scale producer livelihoods. The term small-scale producer can be understood in several ways, and there are important implications for not applying the term interchangeably with categories such as peasants and family farmers. The term peasant can signify household farming organized for simple reproduction, notably to supply its own food (Bernstein, 2010). Definitions of family farm vary, but family farms are commonly understood to be a means of organizing production that is managed and operated by a family and is predominantly reliant on family labour (FAO and IFAD, 2019). While hired labour may be used, it is exceeded by family labour (Lowder, Skoet and Raney, 2016).

Understanding small-scale producers

Most small-scale producers are family farmers, including one or more households, and based on only or mostly family labour (HLPE, 2013), although the term can also be used to encompass operations run by individuals to those run by small collectives (HLPE, 2021). The term can include the integration of different forms of production, such as various combinations of crops (including tree crops), livestock, fisheries production as well as small-scale forest use (Freed *et al.*, 2020; ILRI, 2019; FAO, 2018). Small-scale production can contribute to household incomes in many ways, including through subsistence, where households rely on their own production for food consumption (Rapsomanikis, 2015).

This review understands small-scale production to be a relative measure that is highly context specific.

According to HLPE (2013), a small-scale production unit is considered 'small' because the resource base on which its production depends, comprising human, natural, social, physical and financial capital, is scarce, and is often not fully sufficient to sustain an acceptable livelihood. At the same time, small-scale production is not synonymous with poverty. With suitable investments and support, it can become a profitable operation (HLPE, 2013).

In crop production, small-scale production is understood to contrast with, at one extreme, larger commercial holdings with hired labour, and at the other, landless workers (HLPE, 2013). Land is often used as a criterion to delineate 'small', although the appropriate threshold varies significantly among countries and regions. While some approaches consider small-scale to mean less than 2 ha of land (Lowder, Sánchez and Bertini, 2021; Lowder, Skoet and Raney, 2016; Lowder, Sánchez and Bertini, 2021), this definition is more applicable to some parts of the world than to others. In Asia, and especially in China and India, most small-scale producers own less than 2 ha, whereas in parts of Latin America, farms of several tens of hectares can still show characteristics of small-scale production (Bernstein, 2010). The profitability of a smallholding can depend on several factors, such as soil quality, and access to irrigation (Rapsomanikis, 2015).

Much of the investment in small-scale production is by the producers themselves, primarily through labour, but also through personal savings and remittances from rural out-migration (Rapsomanikis, 2015). In the case of small-scale family farms, family labour is a defining element of production – the production and domestic sides of the household are intimately connected. This underlies some of the risks faced by small-scale producers, where shocks and disruptions can quickly encompass production and consumption, but also their resilience, which can come from reciprocal ties through kinship and social relations (HLPE, 2013).

Pluri-activity, where farming income is combined with non-farming sources, and pluri-locality, where income generation spans multiple localities on the rural-urban continuum, are important characteristics of small-scale producer households. Diversified livelihoods offer multiple sources of income as well as a means of reducing risk and improving resilience (Rigg *et al.*, 2020).

The diversity of small-scale producers

It is estimated that globally, about 3.2 billion people mainly from low- and middle-income countries depend directly or indirectly on some form of agrifood system (IFAD, 2021). Based on data from the 2010 FAO World Programme for the Census of Agriculture (WCA), Lowder, Sánchez and Bertini (2021) estimate that there are nearly 510 million farms with land areas of less than 2 ha, accounting for 84 percent of global farms and operating on 12 percent of agricultural land. If farms of 2–5 ha are also included, this would constitute an additional 10 percent of all farms and 6 percent of agricultural land. Lowder, Sánchez and Bertini (2021) also reiterate the importance of not equating family farms with small-scale producers. When all family farms are accounted for, they include about 70–80 percent of farmland.

Other small-scale production systems are also significant sources of livelihood. At least 60 million people are engaged in the primary sector of fisheries and aquaculture as small-scale, artisanal fishers and aquaculture workers (FAO, 2020a). Small-scale fisheries account for more than 90 percent of all marine fisheries jobs worldwide (Ahern, Thilsted and Oenema, 2021). In Asia, where most of the aquaculture production is located, 90 percent is in the small-scale sector (FAO, 2018). About 1.3 billion people depend on livestock in some form, including 600 million small-scale producers practising mixed farming in South and Southeast Asia and Africa, and nearly 200 million pastoralists (HLPE, 2016). It is estimated that the livelihoods of nearly 1.2 billion people are connected to agroforestry farming systems (Chao, 2012).

Small-scale producers comprise of a wide variety of social groups. While primarily family farmers, small-scale producers are differently positioned in socioeconomic hierarchies and class relations (Bernstein, 2014). Within and beyond households, their experiences can be further shaped by other intersecting social disparities.

Female small-scale producers constitute at least 43 percent of the agricultural labour force in the Global South, although their roles differ by region and show rapid patterns of change (FAO, 2011). Some of the highest female participation rates in agriculture occur in sub-Saharan Africa, where women account for 50 percent of the labour force. The share of women in the agricultural labour force is lower in South Asia (where the average is dominated by

India) at 30 percent. In Latin America, it is lower still, at 20 percent, although the countries in that region have high overall labour participation rates (FAO, 2011). Female small-scale producers commonly experience substantial wage gaps (IFAD, 2021) and productivity gaps (FAO, 2011) in comparison with their male equivalents. In the case of fishing and aquaculture, women only make up 14 percent of the labour force involved in production (FAO, 2020a) and tend to be dominant in activities further down fish supply chains, such as processing and trading, where returns are generally lower (Weeratunge, Snyder and Sze, 2010).

Young people's participation in agrifood systems has received increasing attention in recent years, due to a perceived ageing of farming populations and the widely reported generational break in the aspirations of youth for farming futures (HLPE, 2021). However, these generalizations also mask important realities in youth livelihood patterns. The life-courses of young people today are often defined by a high degree of mobility, between localities that are rural and urban, and between sectors (Rigg *et al.*, 2020; White, 2020). Migration to non-farm work and from rural areas is rarely a permanent decision and can include a return to farming later in life (Huijsmans *et al.*, 2021). Young people who do engage with small-scale producer livelihoods face significant disparities in access to resources and opportunities (HLPE, 2021).

At least 370 million people around the world define themselves as Indigenous (Garnett *et al.*, 2018), many of whom practise different forms of small-scale production (Ghosh-Jerath *et al.*, 2021; Altieri and Toledo, 2011). Lands to which Indigenous People have tenure rights, or are managed by Indigenous People, intersect with about 40 percent of the world's terrestrial protected areas and ecologically intact landscapes (Garnett *et al.*, 2018). Many indigenous traditions practise collective rights to their lands, territories and resources. However, such rights are not always recognized and are often breached (United Nations Permanent Forum on Indigenous Issues, undated).

Trends in the global distribution of small-scale crop production

Despite their heterogeneity, the presence of large numbers of small-scale producers is a reality in all regions, including high income countries (Lowder, Sánchez and Bertini, 2021). At the same time, agricultural sector transformation, increasing urbanization and integration with global markets can determine the proportion of small-scale producer and larger operations and the diversification of rural economies. While a large share of farms (40–85 percent) is smaller than 2 ha across countries of all income levels, the land area of small farms appears to show a pattern of decrease as national average incomes increase (Lowder, Sánchez and Bertini, 2021). In low- and lower-middle income countries (located mainly in East Asia and the Pacific, South Asia and sub-Saharan Africa) nearly 80 percent of farms, on average, are smaller than 2 ha and account for 30 to 40 percent of land. In upper-middle income countries, about 90 percent of farms are less than 2 ha, although this accounts for only 10 percent of agricultural land (the data are dominated by the number of small-scale farms in China). In high income countries, farms of less than 2 ha make up 50 percent of all farms but operate on only 5 percent of farmland (Lowder, Sánchez and Bertini, 2021).

Lowder, Sánchez and Bertini (2021) show evidence for the increasing concentration of global cropland over time, suggesting that agricultural land is increasingly cultivated by large, corporate farms. Large farms of more than 50 ha, while accounting for only 1 percent of all farms, currently operate more than 70 percent of all agricultural land. Regions such as Africa and Latin America, which experienced decreasing levels of land concentration until the 1980s, are now witnessing a reversal of this trend (Anseeuw and Baldinelli, 2020).

There is widespread consideration in development thinking that such trends constitute a 'classical' or 'universal' pathway of economic development for a country, characterized by a declining share of agriculture in the national GDP and in the labour force (HLPE, 2013). Following this pathway, the overall number of small-scale farms would decrease, while the average size of those remaining would increase over time. These trajectories are not inevitable nor a matter of chance but evolve from explicit or implicit decisions, policy and institutional choices (HLPE, 2013). The technical model that has underpinned the 'classical' pathway is now being questioned, based on the negative environmental and social consequences it has generated, as well as its inadequacies to ensure food and nutrition security for all (Dorin, 2017; HLPE, 2013). This has called for alternative relationships to be established between agrifood systems and development models that offer greater prioritization for socioeconomic equity and ecological sustainability (HLPE, 2021).

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Chapter 3

CONTRIBUTIONS OF SMALL-SCALE PRODUCERS

> *The diverse roles and functions of small-scale production are essential to realizing the social, environmental and economic dimensions of sustainable agrifood systems transformation.*
>
> *Sustainable small-scale production systems can nurture positive synergies between the provision of food security and nutrition, ecologically regenerative and resilient food production and the creation of decent work and productive livelihoods.*

Small-scale production can support the sustainable transformation of agrifood systems in multiple ways. As this chapter discusses, small-scale production is responsible for a disproportionate share of global food production and supports dietary and nutritional diversity for large parts of the world, particularly the Global South. Many small-scale production systems are based on ecologically low impact cultivation practices and are key repositories of agrobiodiversity and diverse ecological knowledge systems. Small-scale production is an important source of livelihood for many of the world's poorest and can be a key component in the creation of wealth in rural areas and national efforts to foster more equitable socioeconomic development.

Achieving food security and nutrition

Small-scale producers play a critical role in provisioning food security and nutrition through three important means: small-scale production units have been shown to be more productive while allocating a greater proportion of their production to food (Lowder, Sánchez and Bertini, 2021; Ricciardi *et al.*, 2018). They form the backbone of nutritionally adequate and healthy diets (Herrero *et al.*, 2017) and local small-scale production plays a key role in ensuring food security for many populations, especially in the Global South (CFS, 2016).

A disproportionate share of the world's food derives from small-scale production. The nearly 510 million farms around the world that are less than 2 ha in area, while accounting for only 12 percent of agricultural land, produce nearly 35 percent of the world's food (Lowder, Sánchez and Bertini, 2021). This proportion is much higher in low- and middle-income countries – at 44 percent in low-income countries, 41 percent in lower-middle-income countries (including India and Nigeria) and 51 percent in upper-middle-income countries (including Brazil and China). Small-scale farms also allocate a larger proportion of their crop production to food. According to Ricciardi *et al.* (2018), farms of less than 2 ha, allocate the largest proportion of their crop production to food (nearly 55–59 percent), which in larger farms tends to be geared towards processing and feed production. Smaller farms are also less likely to waste part of their production, in contrast to larger farms, which are associated with a greater proportion of post-harvest loss.

Small-scale farms have been documented as having higher productivity in their output per unit land area (Barrett, Bellemare and Hou, 2010). Ricciardi *et al.* (2021) show through an evidence review that the majority (nearly 80 percent) of primary studies assessing yields attest to the greater productivity of small-scale production units, and that per unit area yields decrease with increasing farm size. Part

of the inverse farm–size productivity relationship is attributed to labour markets, and the favourable incentive nature of the self-employed family farming inherent in small-scale production (Ricciardi *et al.*, 2021). Others suggest, that when assessed by other measures such as total factor productivity instead of land productivity, the relationship with farm size follows a U-shaped relationship (Helfand and Taylor, 2021). However, some contend that the productivity of small-scale production cannot be captured by single crop yield measurements and should be approached in terms of total output per production system, as in the case of the polycultures that characterize many small-scale farms (Altieri and Toledo, 2011).

Small-scale production sustains dietary and nutrient diversities. Herrero *et al.* (2017) find that most vegetables (81 percent), roots and tubers (72 percent), pulses (67 percent), fruits (66 percent), fish and livestock products (60 percent), and cereals (56 percent) are produced in diverse landscapes, with the diversity of production decreasing with increasing farm size. These patterns are also reflected in the production of vitamin A, vitamin B_{12}, zinc and calcium, which are essential micronutrients of public health interest, where diverse production systems are responsible for producing most of these micronutrients (53–81 percent) and protein (57 percent). Around 51–77 percent of these essential micronutrients are produced by farms less than 20 ha in area and 20–50 ha. Smaller farms are particularly important for the production of essential nutrients in low- and middle-income countries – farms that are up to 20 ha in size produce as much as 80 percent of essential nutrients in sub-Saharan Africa, Southeast Asia, South Asia, China, and the rest of East Asia Pacific, while farms that are under 2 ha produce more than 25 percent of the share in South Asia, Southeast Asia, sub-Saharan Africa, and East Asia Pacific, and 50 percent in China.

The dietary diversities supported by small-scale production also extend to other forms of production, such as fishing and livestock. An estimated 95 percent of the catch from inland small-scale fisheries is consumed locally (Ahern, Thilstead and Oenema, 2021). For many of the poorer communities in the Global South, such locally available small fish are an important and affordable source of micronutrients and protein in everyday diets (Kawarazuka and Béné, 2011). Small-scale livestock rearing has similar benefits, and, as in the case of fish, can be a key component of nutritional diets for infants, small children and women of reproductive age (ILRI, 2019).

Small-scale production has the potential to support food security and nutrition at multiple levels. Small-scale producers make up nearly half of food-insecure communities globally (IPES-Food, 2016), and diversified production systems and the consumption of wild species, have been associated with better nutritional outcomes for small-scale producer households and communities (Deaconu, Mercille and Batal, 2019; Powell *et al.*, 2015). Diversified production systems also provide small-scale producers with risk coping mechanisms against climate and market variability, particularly for poorer households, and can be a lucrative source of income that is not tied to a single season (Bellon *et al.*, 2020; Asfaw *et al.*, 2019; Kasem and Thapa, 2011). The share of production that small-scale producers are able to trade in various types of markets can be significant (CFS, 2016).

Small-scale producers are especially active in markets embedded in local, national and regional food systems, or 'territorial markets' (FAO, 2021; CFS, 2016). Such territorial markets, where most products, producers, retailers and consumers are from the same territory, tend to be less defined by hierarchical relationships, and are more remunerative for small-scale producers. Many are governed by small-scale producers, are easy to access and provide more control for small-scale producers over the conditions of exchange. Territorial markets can be both formal and informal and play multiple roles (van der Ploeg, 2020; CFS, 2016). They support agrifood systems adapted to local agroecologies and local wealth creation and distribution. They meet local needs for food security and food variety and sustain food provision that is agile in responding to changes and disruption.

The multifunctionality of small-scale production is supported by small-scale producers themselves, who are their biggest investors (HLPE, 2013). Such investments can also be in the form of collective action and governance rules mechanisms for the management of natural resources and productive assets for collective use (Ostrom, 1990).

Contributing to ecologically sustainable food production

Small-scale producers in many contexts engage in food production that contributes less and is more resilient to global changes in climate and environment. They often incorporate agroecological[1] and other practices for sustainable food production, including polycultures, integrated systems and rotational production as well as those more closely linked with biological and ecological processes, such as the recycling of nutrients, energy and waste, and natural pest control (HLPE, 2019). Small-scale production systems are valuable repositories of crop and animal genetic diversity and locally adapted varieties through on-farm breeding programmes (DeClerck *et al.*, 2021) as well as non-crop biodiversity (Ricciardi *et al.*, 2021). Their genetic diversity allows landraces to adapt to novel circumstances and be physiologically tolerant of a broad range of environmental conditions (Mercer, Perales and Wainwright, 2012), making them an important asset in the climate adaptation of food systems.

The nature of small-scale production allows it to accommodate ecologically restorative production in many ways. Smaller field sizes, particularly where the fields constitute heterogenous agricultural landscapes, are associated with a greater incidence of pollinator and pest control species (Martin *et al.*, 2019; Hass *et al.*, 2018). Smaller fields were also found to have greater potential than large farms for improved yields through improving pollinator services (Garibaldi *et al.*, 2016). The incorporation of agroecological practices tends to be labour and knowledge intensive (Bezner Kerr *et al.*, 2019), and is more amenable to smaller units of operation. Certain agroecological perspectives can bridge the environmental issues of food production with political economic questions, and approach agrifood production as a coupled socioecological challenge (Méndez, Bacon and Cohen, 2013).

Small-scale production across the world has co-evolved with diverse knowledge systems, embedded in specific ecosystems, cultures and spiritualities. Local knowledge can include traditional knowledge (passed down through generations), indigenous knowledge, and locally derived knowledge from contemporary learning based on local observation and experimentation (HLPE, 2019). Many forms of traditional and indigenous ecological knowledge are based on close observations and intimate relationships with nature and are adaptive and constantly evolving, and are used to monitor and manage ecosystems processes (Berkes, Colding and Folke, 2000; Pierotti and Wildcat, 2000).

Small-scale producers may incorporate agroecological principles for several reasons, including long-term soil health and fertility, sustaining yields without an over-reliance on external inputs, using water resources more efficiently, and pest, weed and disease control, as well as to maximize all available niches in production systems both spatially and temporally (Altieri and Toledo, 2011). For small-scale producers working under highly heterogenous and variable environmental conditions, cultivating multiple species and varieties can be an important means of maintaining productivity and managing risk under conditions of uncertainty (Bellon *et al.*, 2020; Di Falco and Chavas, 2009).

At the same time, not all small-scale producers should be considered to be intrinsically 'sustainability stewards'. Small-scale producers often engage in intensive production practices to maximize their asset holdings, which can include the application of synthetic fertilizers and pesticides, and intensive overgrazing and fishing (HLPE, 2013), and many small-scale producers seek to improve their access to external inputs and resources to improve their profitability (Jansen, 2015).

Supporting livelihoods and potential for poverty reduction

The labour-intensive nature of small-scale production enables it to be an important creator of employment (Nolte and Ostermeier, 2017). Its scope for income generation is expanded when integrated with activities such as processing, and when participation in local and territorial markets is included (CFS, 2016). The potential for livelihoods from other forms of small-scale production can be particularly significant for asset-poor households. Fisheries based on open-access common pool resources are an important form of support for landless populations with few other means of livelihoods (Béné and Friend, 2011; Béné, 2003). Pastoralism supports millions of livelihoods in the drylands, where intensive

1 Agroecology encompasses science, a set of practices and a social movement, based on the principles of recycling; reducing the use of inputs; soil health; animal health and welfare; biodiversity; synergy (managing interactions); economic diversification; co-creation of knowledge (embracing local knowledge and global science); social values and diets; fairness; connectivity; land and natural resource governance; and participation (HLPE, 2019).

crop cultivation is limited or not possible due to poor and erratic rainfall and poor soil fertility (ILRI, 2019). Small-scale production plays an important role as an economic refuge during times of crisis when household members lose employment in other sectors (HLPE, 2013). This was seen during the COVID-19 pandemic, where job losses forced large numbers of migrant workers to return home to rural areas, and to rural farming and non-farming economies (Lokhande and Gundimeda, 2021).

Higher incomes for small-scale production have the potential to stimulate the creation and distribution of wealth in rural areas (IFAD and UNEP, 2013; De Schutter, 2012). This can be through hiring extra local labour during peak seasons and by income expenditures on other rural small businesses. Where the right conditions are facilitated, growth in the small-scale food production sector can occur together with thriving internal markets for goods and services, local job creation, and development of both rural farm and non-farm economies, including those in rural towns. The dominance of small-scale production has also been associated with greater socioeconomic well-being among rural communities (Lobao and Stofferahn, 2008).

Economic growth linked to small-scale production can have a strong role to play in national poverty reduction efforts. With the prevalence of poverty in large sections of rural populations, GDP growth originating in agriculture can have twice the potential to reduce poverty when compared with growth outside agriculture, particularly when agricultural growth focuses on triggering higher incomes for the large numbers of small-scale producers (De Schutter, 2012). Garibaldi and Pérez-Méndez (2019) report that diversified production and smaller farms have the potential to create a higher number of jobs within agriculture, including for women, and an increase in remuneration rates. On the other hand, larger scale enterprises potentially diminish agricultural employment, which is not compensated for by other sectors of the economy. In the countries of the Global South, where a displacement of labour from agriculture cannot be effectively absorbed by the industrial and service sectors, a thriving small-scale production sector, particularly one based on the more ecologically regenerative and labour-intensive modes of production, can have an important role to play in providing decent work and rewarding and dignified livelihoods (Dorin, 2017).

Chapter 4

CONSTRAINTS FACED BY SMALL-SCALE PRODUCERS

> *Small-scale producers face several constraints in accessing the assets, financial and knowledge services and market positioning that can support profitable livelihoods.*
>
> *Many of the constraints faced by small-scale producers are connected to the structural nature of poverty, social marginalization and lack of political power and negotiating capacity experienced by small-scale producer communities.*

While small-scale production will be a critical component of the transitions to sustainable agrifood systems, small-scale producers operate under significant constraints and risks. Many of the constraints are intimately linked to the structural nature of poverty, based on factors such as gender, class, generation, indigenous status, and ethnicity (IFAD, 2021). The same embeddedness in local contexts that make them such an important source of food and nutrient security, livelihoods and resilience in the Global South also makes them vulnerable to the same political and economic exclusions experienced by many of these communities. Small-scale production is practised under agrifood systems paradigms designed to promote larger, industrial modes of production that do not offer adequate support for sustained and adequate livelihood building by small-scale producers. Expanding the potential of small-scale producers for sustainable agrifood systems transformation requires a central focus on how the poverty and vulnerability of many small-scale producer communities, the positioning of small-scale producers in uneven power relations and the constraints and risks to small-scale production, share complex interlinkages with each other.

Constraints related to poverty and vulnerability

Poverty is overwhelmingly rural. Nearly 80 percent of the extreme poor and 75 percent of the moderately poor live in rural areas (defined as those living on less than USD 1.90 and between USD 1.90 and USD 3.10 per day in 2013) (Castañeda *et al.*, 2016). Of these numbers, around 76 percent of those considered extremely poor and 60 percent of the moderately poor depend on agriculture. Within rural areas, lower income households are more likely to be dependent on natural resource-based livelihoods (FAO, 2015). Poverty is not always distributed uniformly. Within households, poverty can be felt differently by different individuals, based on gender and generation. For small-scale producers, it can change with the seasonality inherent in food production, unless adequately complemented by other income sources (De La O Campos *et al.*, 2018). Such fluctuations can be particularly distinct when production is focused on a few outputs (HLPE, 2013).

The poverty of small-scale producers also makes the productivity of their livelihoods and household well-being highly vulnerable to risks (FAO, 2015), including the anticipated consequences of climate change. Increasing temperatures, changing precipitation patterns, and greater frequency of extreme weather events are expected to result in

declining yields of crops and livestock, the changing distribution of pollinators as well as of pests and diseases, increasing spoilage and loss of production as well as disruptions to transport networks and other infrastructure (Mbow *et al.*, 2019). The resilience of small-scale producers will depend on their capacity to use their assets and capabilities to cope and adapt (Allison, Béné and Andrew, 2011). Where small-scale producers are relegated to marginal and infertile natural resources, excluded from public services or live in remote areas, as do many minority ethnic groups, they can find it particularly difficult to develop coping mechanisms (Tran *et al.*, 2021; Chandra *et al.*, 2017).

The vulnerability of small-scale producers to shocks and uncertainties is shaped by the close integration between the production and domestic sides of small-scale producer households (FAO, 2015). For poorer families, production incomes are first used to meet basic household needs as well as repay loans and debts, diminishing what is available for investments in the livelihood. Where families have limited savings, productive assets may have to be sold during times of reduced incomes and unexpected family expenditures. An intrinsic aspect of small-scale production is the use of family labour as the chief means of investment. Thus, access to adequate food and nutrition, as well as to services such as education and health, is not only crucial for the well-being of family members but also has implications for the productivity of small-scale producer livelihoods (FAO, 2015).

The linkages between small-scale producers as food producers and consumers are complex. Many small-scale producers consume at least a part of the food they produce (Rapsomanikis, 2015). Being poor means that household budgetary allocations for food can be high, reducing budgets for other expenditures, such as health and education. Within the household, food and nutrition access of individual members can be determined by social norms and hierarchies, for example those based on gender (Harris-Fry *et al.*, 2018).

Small-scale producer households often combine work across the farming and non-farming sectors (Rigg *et al.*, 2020). The high sectoral and spatial mobility of young people particularly have been associated with diverse realities for small-scale production. On the one hand, this can provide new sources of income for the surplus labour time (Rapsomanikis, 2015) that characterizes many small-scale producer households, and helps with the infusion of additional finances as well as new information and ideas (Kapri and Ghimire, 2020; Schroth and Ruf, 2014). On the other, this has resulted in labour shortages in small-scale production units (Ariyo and Mortimore, 2012). The 'feminization of agriculture' that has taken place across Asia and Africa with rural out-migration, which has been primarily male, has created complex consequences for those who stay behind. Although this has resulted in the reconfiguration of gender roles and an increase in women's autonomy in certain contexts, it has also largely resulted in women having to engage in additional farm labour, adding to their already heavy productive and reproductive responsibilities (Spangler and Christie, 2019; Pattnaik *et al.*, 2018).

The pluri-active nature of most small-scale producer livelihoods underscores the importance of productive livelihoods across the rural-urban and farming and non-farming spectrum that individuals can move in and out of easily, and the need for a thriving rural farming and non-farming economy with opportunities for rewarding income generation. However, many small-scale producers face significant barriers to entry into the more lucrative opportunities in the rural non-farm sector (Rapsomanikis, 2015), where they do not possess the necessary investments for higher return activities, such as setting up a store. Where they may not have the appropriate skills and education, the opportunities available for small-scale producer households tend to be in low-return activities such as in wage labour on other farms.

Marginalization in institutions and policies

While poverty has a rural face, small-scale production is not synonymous with poverty. A small-scale production unit can be a profitable livelihood for the family with relevant investments (HLPE, 2013). Poverty and vulnerability often tend to be strongly determined by social exclusion (Allison, Béné and Andrew, 2011), and rural areas and small-scale production support many commonly marginalized social groups such as women, landless populations and ethnic minorities (HLPE, 2013). Indigenous populations, many of whom have experienced dispossession and forced assimilation, represent 15 percent of the world's poor, and up to one-third of the rural poor, although they account for only 5 percent of the global population (Hall

and Patrinos, 2014). Improving the profitability and stability of production requires a focus on the imbalances in economic and political power in which small-scale production is situated and how this is connected to the ability to engage productively with small-scale producer livelihoods.

Public schemes and support for small-scale producers operating mainly in domestic markets have receded in the period following structural adjustment in favour of larger enterprises oriented towards export markets (HLPE, 2013). This includes agricultural banks linked to and supported by the state, institutions, infrastructure and organizations such as marketing boards that regulate agricultural markets and support small-scale producers with their market positioning, and public spending on agricultural research and extension services. Many of these schemes were criticized as being ineffective and markets were promoted as the main mode of development in the agriculture sector. However, only a small number of small-scale producers have been able to capitalize on export-market-focused agricultural development (HLPE, 2013).

The poverty of many small-scale producer communities does not merely concern incomes and limited savings, but is multidimensional, and related to the deprivation of human rights and access to public services and social safety nets that would enable the cultivation of capital and capabilities for productive livelihoods. The human rights of small-scale producers and others living in rural areas are not readily realized, including the right to food, to adequate housing, to health and to education (Human Rights Council, 2012). Many rural areas are poorly served by health, education and other basic public services (Katiyar, 2016; Strasser, 2003). They lack functioning roads and energy, water and sanitation infrastructure and information and communication technology and broadband access (Sewell *et al.*, 2019; De La O Campos *et al.*, 2018). Public spending on many of these services and in rural areas has declined over the past few decades (Forster *et al.*, 2020; White, 2012; Ahmed and Lipton, 1997). Social protection programmes have emerged in response to some of the gaps (FAO, 2015). Social protection programmes such as cash transfers have shown promise for improved health and education outcomes, resilience capacities, credit worthiness and improved productivity of smallholder assets (FAO, 2015), while employment guarantee schemes have generated large-scale employment and improved off-farm incomes, including for marginalized groups (Drèze and Khera, 2017). However, coverage is lowest in regions where poverty incidence is high (FAO, 2015).

The multiple power imbalances in which small-scale producers are situated impacts their individual and collective voice and ability to shape policies and investments that concern them, and to participate on equal terms in decision-making spaces (HLPE, 2013; Béné and Friend, 2011). The lack of political power and negotiation capacity can be further intensified for groups such as women and young people. Organized groups of small-scale producers, such as producer organizations, cooperatives and social movements can play a critical role in defending the rights of small-scale producers, in strengthening their political representation and bargaining power so that the specific concerns of small-scale producers are included in agricultural and rural policies, regulations and institutions and in improving the overall recognition of small-scale producers in society (FAO and IFAD, 2019). However, they have not always been inclusive of all social groups, including of women (Meliá-Martí, Tormo-Carbó and Juliá-Igual, 2020; Woldu, Tadesse and Waller, 2013).

Access to assets

Food production depends on access to natural and productive resources such as land, water, forests and fisheries as well as financial, social and human assets. Limited access to these different assets is one of the biggest constraints to small-scale production (HLPE, 2013). While a limited asset base can be improved through investments, productivity-enhancing measures are often hindered by the poverty of most small-scale producer households (HLPE, 2013; IFAD and UNEP, 2013). Access to natural resource endowments is also mediated by structural inequalities and political and economic power (Anseeuw and Baldinelli, 2020; Allison, Béné and Andrew, 2011).

In most countries, land inequality is growing (Anseeuw and Baldinelli, 2020). The land available for small-scale production is characterized by decreasing plot sizes and increasing fragmentation (Jayne, Yeboah and Henry, 2017; Manjunatha *et al.*, 2013). Many small-scale producer communities reside in remote and marginal lands and farm under challenging conditions (Human Rights Council, 2012). A study across 17 countries found that the top 10

percent of rural populations captured 60 percent of agricultural land value, while the bottom 30 percent, which are more dependent on agriculture, only captured 3 percent (Anseeuw and Baldinelli, 2020).

The access of small-scale producers to land is also shaped by the increase in the large-scale acquisition of farmland around the world, driven by investments targeting the purchase or long-term lease of large areas of land by other countries, transnational agri-businesses and investors speculating on the price of agricultural land (De Schutter, 2011). These trends are associated with increasing commercial pressure on land and inaccessibility for small-scale producers, as well as closing off the commons on which many small-scale fishers, pastoralists, forestry users and Indigenous People depend. Such large-scale investments in farmland are considered to have much less potential for poverty reduction, than if access to water and land were augmented for local populations (De Schutter, 2011).

Small-scale producers can also be excluded from accessing natural resources in other ways. Many forest-dependent communities have lost their access to forest resources and livelihoods due to the creation of forest reserves and mining by the coal and mineral industries (Human Rights Council, 2012). In the case of fisher communities, their livelihoods and ecological needs are frequently considered to be incompatible with the construction of large-scale water control infrastructure such as hydropower dams (Béné and Friend, 2011).

Access to land as well as to other productive resources is also hindered by gender gaps (FAO, 2011) and other forms of structural inequalities. In the case of land rights for women, even where formal laws have been reformed to facilitate equal access, this may not materialize in practice when customary legal systems prescribe otherwise, and young women do not have the necessary knowledge, financial resources and confidence to ensure this right is exercised (FAO, CTA and IFAD, 2014). In India, despite land distribution policies following colonial rule, scheduled castes and tribes continue to be less likely to own land (Desai and Dubey, 2012). Where intergenerational transfers are the main mechanism of access to land, fisheries resources and livestock, young people may face specific constraints to access, including in the case of land, the non-viability of production because of fragmentation (HLPE, 2021).

The importance of the responsible governance of tenure of land, fisheries and forests is recognized by the Committee on World Food Security (CFS) of the United Nations Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, for "the realization of human rights, food security, poverty eradication, sustainable livelihoods, social stability, housing security, rural development, and social and economic growth" (FAO, 2012, p. 6). Land and other natural resource tenure can take different forms, including public, private, communal, collective, indigenous and customary (FAO, 2012). However, customary and collective forms of tenure are not always accorded legal recognition by states. For instance, the tradition of collective rights to lands and resources of many Indigenous communities that contrasts with more dominant paradigms of individual ownership and privatization (The United Nations Permanent Forum on Indigenous Issues, undated).

Weak tenure rights are widely considered to be an important deterrent for small-scale producers' ability to access credit and to invest in long-term productivity-enhancing measures (IFAD and UNEP, 2013). At the same time, De Schutter (2011) noted the importance of distinguishing between two concepts of tenure security – one that is oriented towards marketability (often associated with formal titling schemes and a market for property rights), and the other which seeks to broaden the entitlements of those who depend on land (and other natural resources), in order to ensure more secure livelihoods (p. 271), and for targets of food security and poverty reduction.

Access to markets

Small-scale producers participate in different types and forms of markets. Markets for small-scale producer outputs can include local markets, urban markets and export markets. Small-scale producers also participate in upstream markets for inputs, technologies and services to support production, labour markets, land markets to buy, sell or rent land and both formal and informal financial markets (CFS, 2016; HLPE, 2013). The transactions across these markets can be monetary and non-monetary. The conditions of exchange can entail ownership and rental, formal contracts and informal agreements and can be between two parties or regulated by governmental or international standards (CFS, 2016).

In general, the market position of small-scale producers is weak, and is not always conducive for generating fair incomes (HLPE, 2013). The terms of exchange can be unfavourable because of the small quantities small-scale producers are able to sell, their limited bargaining power and urgent cash needs (CFS, 2016). They can be constrained by asymmetric access to information and high transaction costs due to the diseconomies of scale inherent in transport, storage and processing costs as well as infrastructure connectivity (CFS, 2016; Rapsomanikis, 2015). Most small-scale producers also operate amid market failures as well as missing markets (HLPE, 2013). How small-scale producers are integrated into input markets can affect their positioning in specific output markets (HLPE, 2013). Female small-scale producers can face additional challenges related to market access, including time constraints, the responsibility for unpaid reproductive work and travel related challenges (FAO, 2011).

While small-scale producers trade a significant share of their production in informal and local markets, such markets are often considered 'inefficient' (CFS, 2016). They are neglected by public policies due to information gaps about the markets, and public sector support for their development has largely been lacking (FAO, 2021).

The accelerating globalization and interconnectedness of food supply chains leave small-scale producers vulnerable to price volatility in national and international markets (UNEP and IFAD, 2013). Small-scale producers can be at a higher risk of negative price shocks when their production is oriented towards one or few outputs for external markets, as most would not have the means for hedging against uncertainty (Bellon *et al.*, 2020; Guido *et al.*, 2020). The increasing integration of financial capital with food supply chains further impacts this unpredictability. Where speculation distorts market signals, small-scale producers are at risk of producing too much or too little based on artificial price movements (Isakson, 2014). At the same time, for many small-scale producers, their participation in specialized production for global commodity markets is viewed as an important means of emerging out of poverty and marginalization (Jansen, 2015; Ramamurthy, 2011).

The ongoing consolidation of global agrifood supply chains by corporate actors (Clapp, 2021) shapes the positioning of small-scale producers as market agents. The intensification of production systems has made small-scale producers increasingly dependent on the seeds and agrochemicals of a few of agri-input companies that are able to control the price of the inputs (Fakhri, 2021). In many contexts, farmers are legally prohibited from saving and replanting the seeds purchased from agribusinesses (Peschard and Randeria, 2020). The seed legislation of some countries can result in the outlawing of native seed varieties produced and exchanged by farmers, unless they comply with formal standards (Wattnem, 2016). This can threaten the usage of native seed varieties, seed exchange networks and seed saving practices that are prevalent in most of the Global South, and are important for agrobiodiversity, food security and farmer livelihoods and autonomy. Kloppenburg (2010) calls for the development of alternative spaces which allow the free exchange of genetic material from landraces and other agricultural biodiversity cultivated by farmers and proposes 'biological open source' arrangements that could serve as a protected commons for farmers and breeders to freely access, share and modify agricultural genetic resources.

Contemporary procurement systems have progressively shifted from traditional wholesale markets to vertically coordinated supply chains, expanding the power of food retailers in supply chains (Isakson, 2014). The increasingly ubiquitous supermarket industry tends to favour larger operations that can meet the requirements for continuous supply and quality standards, as well as economies of scale (Rapsomainikis, 2015).

Contract farming has been promoted as a means of supporting small-scale producers with their positioning in globalized supply chains (Fakhri, 2021). There is some evidence that contract farming can improve incomes for small-scale producers (Ogutu, Ochieng and Quaim, 2020; Herrmann and Grote, 2015), while others suggest that such income increases are not systematic and tend to benefit better-off small-scale producers (Ton *et al.*, 2018). Making the benefits of contract farming more accessible to small-scale producers would require addressing the power imbalances and uneven distribution of risk that can be inherent in contract farming arrangements (De Schutter, 2011). Cooperatives and other producer organizations can be important means for helping small-scale producers develop a stronger position in such

arrangements and in market access in general, for collective bargaining, access to finance and technology and economies of scale, even during times of crises (FAO, 2020b; De Schutter, 2011), although concerns over inclusivity remain, as discussed earlier.

Access to financial services

Small-scale production can require considerable financial investment, to access land, purchase and maintain tools, machinery, farming or fishing equipment, processing and post-harvest equipment and livestock. Accordingly, food producers require adapted and flexible financial services, including financial instruments that can respond to shocks and disasters. However, obtaining formal credit is impossible for many small-scale producers due to high interest rates and stringent collateral requirements (UNDESA, 2021) and unwillingness on the part of banks to lend due to the risks inherent in small-scale production (Ijioma and Osondu, 2015). Women and youth may face additional constraints, including legal and regulatory barriers, a lack of financial experience and literacy and low levels of asset ownership, in accessing credit and other financial services (FAO, 2011). Informal credit in rural areas can be accompanied by exorbitant interest rates (Basole and Basu, 2011).

Access to knowledge and the expanding role of digitalization

Another important consequence of the withdrawal of public resources supporting small-scale food production has been the lack of access to appropriate extension and advisory services by small-scale producers, particularly in the Global South (HLPE, 2013). Currently, nearly three-quarters of the investments in agricultural research are realized in countries of the G20 (HLPE, 2019). Agricultural research is increasingly private and is tailored towards the needs of larger farms (Rapsomanikis, 2015). Many formal education programmes are based on narrowly defined disciplines, a limited range of objectives and the problem-solving of compartmentalized single issues (Valley *et al.*, 2018), and do not equip students with the knowledge, skills and dispositions for holistic and interconnected perspectives in careers in agrifood systems research.

Traditional modes of extension and advisory service provision can propagate linear modes of knowledge and technology transfer that are uniform across contexts (Thai, Neef and Hoffmann, 2011; Aeberhard and Rist, 2009). There is increased awareness, particularly from the agroecological tradition, for the need to democratize power asymmetries that are considered legitimate knowledge generators and providers, where the local knowledge of small-scale producers rooted in long-term observation and learning is recognized alongside formal scientific approaches (HLPE, 2019). Such co-production of knowledge can better enable innovation that is adapted to the specific agroecologies and needs for specific contexts.

Access to extension and advisory services can be constrained based on gender and generation as well as geographic location (HLPE, 2021; FAO, 2011). Digital technologies have shown promise in closing this gap, and proven to be cost effective, and have expanded reach (IFAD, 2021). ICT has also allowed for research production and exchange to be democratized and collaborative in many ways, including the facilitation of farmer-to-farmer exchanges (HLPE, 2021). However, resource-poor farmers are among those most underserved by digital technologies and digital infrastructure; only 24–37 percent of farms less than 1 ha in size have access to third generation (3G) or 4G internet services, while the equivalent coverage for farms of more than 200 ha is 74–80 percent, and the cost of data remains prohibitive (Mehrabi *et al.*, 2020). While young people as a demographic are widely considered to be active participants in and consumers of online media, these opportunities are not equally accessible to all young people, with the risk of digital divides further exacerbating inequalities (Lombana-Bermudez *et al.*, 2020).

Digital technologies are now widely used in agrifood systems, beyond knowledge production and exchange, including enabling better market linkages (IFAD, 2021). At the more advanced end of the spectrum, digital technologies are used along the food supply chain as precision agriculture equipment, farm robotics, farm management platforms, data-based agronomy advice and information, innovative financial technologies for credit evaluation and payment, automated warehouses and tools for commodity chain traceability, and there are many other applications (Prause, Hackfort and Lingren, 2020).

While digital technologies have significant potential to improve the lives of small-scale producers

and the sustainability of agrifood systems (World Bank, 2019), it is also important to consider "what is being attempted through the use of digital technologies, by whom, and what kinds of future food systems are being fostered through their application?" and how they impact democratic governance and agency in food systems (HLPE, 2019; p. 17). The digital transformation of agrifood systems is largely dominated by agrifood companies and the technology sector (Prause *et al.*, 2020). This trend is associated with concerns that digital technologies can increase the dependence of small-scale producers on a few companies, locking them into path dependencies and particular ways of producing food while excluding other ways that do not align with industry goals (Higgins *et al.*, 2017; Bronson and Knezevic, 2016). The collection and usage of large amounts of data or 'big data' in food production has potential consequences for small-scale producers, data stewardship and data sovereignty and is associated with important questions over who accrues the relative benefits of big data applications (Prause *et al.*, 2020; Fraser, 2019). Some digital technologies are associated with high costs and are more suited for larger and more capital-intensive modes of production, excluding many forms of small-scale production and large numbers of resource-constrained small-scale producers (Fraser, 2019; Van der Burg, Bogaart and Wolfert, 2019).

Chapter 5

RECOMMENDATIONS FOR EXPANDING THE POTENTIAL OF SMALL-SCALE PRODUCERS FOR SUSTAINABLE AGRIFOOD SYSTEMS TRANSFORMATION

> *Expanding the role of small-scale producers for the sustainable transformation of agrifood systems requires reimagining the importance of small-scale production not only in agrifood systems but also in national development visions.*
>
> *Realizing this potential rests on guaranteeing the rights, agency and equal voice of small-scale producers and their ability to construct dignified and rewarding livelihoods from agrifood systems.*

An alternative vision for small-scale production

This review has discussed how small-scale production represents a vital force in transitioning into more equitable and sustainable agrifood systems. This chapter presents recommendations for the urgent action required to facilitate this difficult but necessary transformation.

Facilitating the multifunctional contributions that small-scale production can bring to sustainable agrifood systems cannot be expected to rely on the same assumptions that have shaped contemporary agrifood systems. Under the 'classical' pathways that have underpinned the evolution of contemporary agrifood systems, the anticipated fate of small-scale production was to shrink in size and importance as national economies grew. We now know that these trajectories are neither universal nor inevitable. Expanding the role of small-scale producers in agrifood systems requires reimagining the importance of small-scale production not only for agrifood systems but also for alternative visions of equitable and ecologically balanced development beyond a sole focus on economic growth.

An expanded role should not mean that all small-scale producers are romanticized as 'sustainability stewards' or instrumentalized for their role in the sustainable transformation of agrifood systems. While the environmental and social functions of small-scale producer livelihoods are inextricably linked to cultural and spiritual values and social identity, it must be recognized that many of these contributions are also 'the other side' of the constraints faced by small-scale producers, linked to limited entitlements and multidimensional poverty. The diversified, low-input production and labour-intensive cultivation that characterize many small-scale production systems, can also be in response to an inaccessibility to the specialized crop markets that are viewed as lucrative opportunities and limited prospects for labour deployment and income-earning opportunities elsewhere.

Thus, enabling and enhancing the multifunctionality of small-scale production to thrive requires that the roles played by small-scale production in meeting food security and nutrition for all, livelihood provision and regenerative cultivation are recognized and adequately rewarded. Small-scale producers should be able to earn fair incomes and build livelihoods that support human well-being development while operating within sustainable agrifood systems paradigms. Facilitating this will require a reassessment of the values and priorities underlying contemporary agrifood systems and to develop alternative approaches to the national and international policies, institutions, legislation and investments that reflect these values and priorities.

This will not be a simple process, and will require working against complex path dependencies, lock-ins and conflicts of interest (HLPE, 2019).

Reimagining an active small-scale producer sector will require addressing power asymmetries and the marginalization of small-scale producer priorities and voices under agrifood system and national development agendas. Small-scale producers, in all their diversity, must be able to participate as co-creators of sustainability transition pathways. This implies that small-scale producers must be able to exercise agency in their participation in agrifood systems – "The capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within food systems, and their ability to engage in processes that shape food system policies and governance" (HLPE, 2020a, p. 8).

This review recommends an expanded role for small-scale producers under sustainable agrifood systems based on the following underlying principles:

- Maximize synergies by small-scale production and minimize trade-offs among the social, economic and environmental dimensions of sustainable agrifood systems.
- Ensure decent work and rewarding and dignified livelihoods for small-scale producers as key actors in sustainable agrifood systems.
- Recognize and ensure the rights, equal voice and agency of the diverse groups of small-scale producers individually and collectively, in the transformation to sustainable agrifood systems.

Based on these principles, the recommendations[2] proposed in this review will require coordinated action by states, small-scale producers and their organizations, non-governmental organizations, academic and research institutions, and the private sector to come together to:

1. Create an enabling environment to support the multifunctionality of small-scale production

Shift and increase coordination among public policies, institutions, regulations and investments so that the diverse and integrated roles small-scale producers play in sustainable agrifood systems can be facilitated. This will require the state to play a key role and the commitment of state and non-state actors.

Recognize the multifunctionality of small-scale production through an integrated approach:

I. Measures of performance: Develop alternative measures for agrifood systems performance to recognize the integrated and multi-layered contributions of small-scale production to the social, economic and environmental dimensions of sustainable agrifood systems. This will require a shift from classical measures of productivity, focused primarily on yields, volumes and incomes to measuring and monitoring metrics and frameworks based on a vision for agrifood systems that are productive and prosperous, equitable and inclusive, respectful and empowering, resilient, regenerative and healthy and nutritious.[3]

II. Integrated planning: Planning that links the small-scale producer unit, territorial and agrifood systems levels. Ensure connectivity and the management of synergies and trade-offs at the landscape level among diversified small-scale production practices, ecosystem services and natural and human-use land mosaics. Planning for sustainable agrifood systems across sectors related to environmental conservation, rural development, health and nutrition, trade, industry and economic development.

III. Policy coherence: Enable better coherence among policies, legislation, ministries and budgets to facilitate multifunctional small-scale production. Enhance coordination between different levels of government and increase local government bodies' legislative authority and financial resources to implement necessary interventions.

IV. Positioning in global multilateral dialogue: Strengthen small-scale production as a key component of global multilateral policies and agreements, including on climate change, biodiversity conservation, trade, food production and human health.

V. Improving public support: Increase public awareness and unite diverse constituencies across the rural-urban continuum on the urgent need for sustainable agrifood systems and the critical role of small-scale producers, including through the judicious use of media.

2 The recommendations from this review also draw from FAO and IFAD (2019); IPES-Food & ETC Group, 2021; IPES-Food, 2016; HLPE (2021); HLPE (2020); HLPE (2019); HLPE (2013); HLPE (2020a); HLPE (2020b); CFS (2016)

3 (HLPE, 2020a)

Remove constraints and expand support for multifunctional small-scale agrifood production:

Redirect policies, regulations and financing that account for negative externalities from agrifood production and the marginalization of small-scale production under contemporary agrifood production systems towards incentivizing and remunerating sustainable production systems and small-scale producers. Other recommendations for support structures are discussed in the subsequent sections.

I. Incentives and support: Reconsider agricultural subsidies as well as import tariffs, quotas, and other trade protections that support the dominance of intensive and industrial scale food production. Repurpose subsidies to reward food production aligned with sustainable agrifood systems transition pathways and the multifunctional contributions of small-scale producers.
II. Create a level playing field: Address the increasing influence of agribusiness and other corporate actors and financial investors in agrifood systems and agrifood system decision-making through, as appropriate, regulatory reform, anti-competition policies, fair taxation and other accountability measures.

2. Address the economic and social marginalization of small-scale producers

Reduce poverty and ensure the well-being of small-scale producers. Address the economic and social inequalities of small-scale producer communities and those characteristic of rural areas.

I. State obligations: Take bold action by states to honour their obligations and duties to recognize, respect, protect and fulfil the rights of small-scale producers and guarantee freedom from discrimination. This includes the rights to food, adequate housing, health, water and sanitation and education, the rights of women, the rights of children, the right to work and the rights of peasants and people working in rural areas
II. Public investments: Invest to ensure access to public services and coverage in rural and remote areas. Improve the availability and accessibility of health services, and services to meet nutrition needs,[4] including of women, children and adolescents, education access, road networks, electricity and internet coverage, water and sanitation, and facilitate equitable access, irrespective of factors such as gender, generation, socioeconomic status, ethnicity, caste and indigenous status.
III. Improve resilience to shocks and crises: Ensure access of small-scale producer households to social protection, including cash transfers and insurance as well as employment guarantee schemes, which can also be an important source of off-season employment. Improve disaster risk management through early warning systems, community-based surveillance systems, vulnerability reduction measures and adequate emergency preparedness for small-scale producers.
IV. Target specific needs based on gender and generation: Consider mechanisms for legitimizing and valuing care work and other forms of labour that are not adequately compensated. Facilitate access to appropriate and low-cost technologies that are time and labour saving, and reduce the drudgery involved in small-scale production, particularly for female producers.
V. Rural development: Diversify income generation opportunities and retention in small-scale producer localities. Support thriving non-farm sectors and economic diversification in rural areas, to support the pluri-activity of small-scale producer households, and to boost territorial development.

3. Ensure the political voice and participation of small-scale producers in agrifood systems governance

Ensure the ability of all small-scale producers, individually and collectively, formally and informally, and as key actors, to shape decisions impacting agrifood systems as well as national development trajectories. Foster democratic spaces that all agrifood systems actors can participate in and negotiate on national and international level decisions on agrifood systems on equal terms, taking care to address power imbalances between dominant and marginalized voices in agrifood systems governance. Ensure the active voice and equal participation of diverse groups of small-scale producers, including those based on gender, generation, ethnicity, caste and indigenous status.

4 These recommendations do not address the integrated challenges of small-scale producers as also being consumers of food.

I. Inclusive governance:

- Establish inclusive formal governance mechanisms. Increase the representation and negotiating ability of small-scale producer organizations, including through legislation, in all tiers of government. Improve the transparency and inclusivity of global institutions, including global trade organizations and international financial institutions and the participation of small-scale producer organizations in their negotiation fora.
- Provide space for social movements advocating for small-scale producer livelihoods and sustainable agrifood systems, by small-scale producer networks, alliances, civil society and other groups with shared interests for environmental and social change.

II. Strengthen small-scale producer organizations:

- Strengthen the self-organization and social networks of small-scale producers' organizations on the rural-urban continuum. Incentivize the participation of small-scale producer organizations in sustainable agrifood system transition pathways. Ensure legal recognition of cooperatives and other small-scale producer associations, financial and other forms of support to improve collective access to agricultural resources and services (natural and productive assets, tools and machinery, equipment for preservation and processing, market information, credit, knowledge and extension), non-agricultural resources and services, overcome power asymmetries in market positioning and to reinforce bargaining power in political negotiations. Pay special attention to the inclusion of women, young people and other marginalized groups, and where necessary, facilitate separate avenues, such as women producer cooperatives.

4. Increase access to natural and productive resources

Increase the rights and equity of small-scale producers to access and use resources and generate value from their asset base:

Ensure the individual and collective ability of small-scale producers in all their diversity to access, control and manage, land, water, seeds, fisheries, forests, grazing grounds, and other natural resources, through formal, informal and customary means. This includes public policies, legislative frameworks and support to:

I. Recognize, enforce and expand rights to natural resources: Guarantee tenure security with the objective of broadening the entitlements of small-scale producers, recognizing that tenure security to improve marketability through formal titling schemes is not a prerequisite for productivity investments by small-scale producers. Recognize and respect the legitimate tenure rights of indigenous and customary ownership. Provide support for the sustainable management of common pool resources, including the recognition of informal institutions for collective action. Extend legal education and access to legal mechanisms and aid for small-scale producers for conflict resolution over resource rights.

II. Address inequities in resource distribution: Implement agrarian reform through market and non-market avenues, including redistributive mechanisms as appropriate, with the careful consideration, and moratoria where necessary, of large-scale acquisition of land and other resources.

III. Dynamic management of biodiversity: Support the rights of small-scale producers to conserve, dynamically manage and exchange agrobiodiversity, including native seeds and breeds, and neglected and underutilized species. Revise where necessary, intellectual property protection and seed legislation to protect the rights of small-scale producers to save, use, exchange and sell seeds and other genetic resources from traditional and genetically heterogeneous varieties. Provide support for fora that enable the free access and sharing of agricultural genetic resources and for participatory breeding programmes that enable the active involvement of small-scale producers

IV. Address gender and generational equality: Target the specific needs of women and girls to equal rights of access and control to natural and productive assets, independent of their civil and marital status. Develop legal frameworks and financial support to facilitate the intergenerational transfer of resources to support youth small-scale producers.

Assist small-scale producers with improving the productivity of their asset holdings and to capture a larger share of the value-added post-production:

I. Facilitate sustainable production: Support the transition to and strengthening of production practices for regenerative, and resilient agrifood systems, and assist with compensation and support with any short-term reduction in profitability.

II. Inclusive community investments: Investment decisions made in consultation with small-scale producer communities, to increase productivity as well as technology and infrastructure for processing, value addition and to prevent post-harvest loss, with a particular focus on female producers. The latter can be in conjunction with rural development strategies that contribute to retaining greater value at the small-scale producer and territorial levels. Land and water management schemes at a larger scale, such as for irrigation, water harvesting, flood control and afforestation can be successfully implemented together with social protection programmes such as employment guarantee schemes.

5. Improve access to financial services

Promote the development and dissemination of financial services that are accessible to all small-scale producers, including those that specifically cover sustainable small-scale production:

I. Inclusive financial services: Ensure financial services that meet the specific circumstances of small-scale producers. Extend coverage to affordable and inclusive financial services, including lending at favourable interest rates, savings schemes as well as start-up capital and insurance, backed by advisory services. Support and partner with small-scale producer associations, including savings-and-loan associations and self-help groups. Target the specific needs of young people and women, such as those having limited collateral for borrowing.

II. Extend access: The state has an important role to play in expanding the coverage of public and private financial institutions in rural and remote areas and extending credit beyond support for staple crops to cover agroecological and other innovative approaches for sustainable agrifood systems. The digitization of financial services, though mobile channels, can be an important mechanism for reducing transaction costs. The state must also play an active role in the regulation of finance service providers.

6. Improve the market positioning of small-scale producers

Support markets that are more inclusive of small-scale producers and that can account for the multifunctionality of sustainable small-scale production, including through interventions for structured and mediated markets. Supporting the market positioning of small-scale producers may also require interventions to stabilize market volatilities, particularly during times of crisis.

I. Promote diversified distribution networks: Improve market infrastructure for diversified and agile food distribution networks, with a particular focus on short supply chains, local and territorial markets and alternative markets:

- Boost territorial markets through investments, and where relevant, institute tax-breaks. Provide support for zoning and regulation, feeder roads, shared facilities for storage and distribution, physical spaces and mobile food markets. Provide timely and locally relevant market information through digital tools.
- Strengthen short circuits and direct linkages. Support ways of directly linking small-scale producers to consumers, in rural and urban areas, including connections based on shared commitments to sustainability, through online marketing platforms, linkages between producer and consumer cooperatives and other means.

II. Create predictable and structured demand: Support small-scale producers engaging in agroecological and other innovative approaches for sustainable agrifood systems, by creating a predictable source of revenue, including through institutional procurement programmes. Public procurement programmes can be at the municipality, city and country level, and operate through purchasing for school feeding programmes, hospitals, government canteens and food reserve authorities. They can also be through non-governmental organizations for food aid and relief. Mechanisms for procurement need to be transparent, flexible, and accessible to different groups of small-scale producers.

III. Inclusive food regulation and certification: Ensure that food laws, phytosanitary and other regulations and standards do not exclude and are accommodative of the diverse forms of small-scale production. Support certification and labelling schemes for agroecological, organic, fair trade, denomination of origin products. For small-scale producers, participatory guarantee schemes which are collectively designed and operated by small-scale producers, consumers, rural advisors and public officials can represent a more accessible alternative to third party certifications.

7. Support the co-creation and exchange of knowledge and innovation for sustainable small-scale production

Provide support with the transition costs involved in new models for innovation, knowledge generation and exchange for sustainable small-scale production. Agroecological and other approaches for sustainable agrifood systems can be knowledge intensive, requiring an active role for the state in research and extension support. Provide support for digital technologies that allow for new ways of knowledge generation and knowledge transfer, and digital innovation that is inclusive of the needs of small-scale producers.

I. The co-creation of knowledge and innovation: Support the co-creation of knowledge and innovation that allow small-scale producer systems to adapt to change and to the complexities of sustainability transition pathways. Support the reconfiguring of the relationship and power asymmetries between formal science and indigenous and traditional forms of knowledge and learning and the experiential knowledge of small-scale producers, to enable the co-generation of knowledge and innovation that is based on the social and cultural context and agroecologies of particular localities.

II. Horizontal sharing of knowledge and innovation: Support where relevant, self-organizing initiatives for small-scale producer-managed experimentation and learning and innovation groups and networks. Small-scale producer-to-producer learning can take place through farmer field schools, innovation centres and farmer movements. Support the specific needs of young people through initiatives for the intergenerational (and intragenerational) transfer of knowledge, including through apprenticeship, mentorship and peer-to-peer engagement.

III. School curricula: Support educational curriculum revisions to incorporate food literacy and other practices to equip young people to play an active role in agrifood systems transformation, and to equip and entice young people in food production livelihoods as dignified and rewarding career options.

IV. Integrated research and education: Support holistic, integrated and transdisciplinary approaches to agrifood systems challenges and solutions in research and education agendas. Close gaps in research and knowledge on the potential for agroecological and other innovative approaches to facilitate sustainable agrifood systems transformation.

V. Access to extension services: Invest in extension services, including through mobile and internet applications, that can facilitate sustainable small-scale production and are inclusive of the needs of different groups of small-scale producers such as women and young people and those living in remote areas.

VI. Digital technologies and innovation: Ensure that digital innovations and digital models in agrifood systems are inclusive of small-scale producers and enhance their equitable participation in sustainable agrifood systems transformation. Ensure appropriate and affordable digital technologies that meet the specific needs of the diversity of small-scale production practices and groups, including women. Support improving the digital literacies and digital access of all small-scale producers, including women. Support co-innovation with the participation of small-scale producers in developing digital solutions such as through free and open-source alternatives. Ensure appropriate regulation that guarantees the rights, free, prior and informed consent and fair benefit sharing, in small-scale producer participation in the digitalization of agrifood systems, including in the extraction, privatization and use of data and in the application of patents and intellectual property rights related to small-scale producer resources, such as genetic material and knowledge. Ensure the equal and active participation of small-scale producers in the adaptive governance of the digitalization of agrifood systems.

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