

Who will feed the world? The production challenge

LUCIA WEGNER and GINE ZWART

This article focuses on the production challenge contained within the ambitious question of 'Who will feed the world?' By looking at the different players in developing countries' agricultural systems: small-scale and large-scale producers and systems of production – LEI, low external input agriculture and HEI, high external input' agriculture – it aims at exploring how to achieve sustainable agricultural growth, allowing for: food security, poverty reduction, and environmental protection.

The article argues that debates which polarize small-scale versus large-scale models, or LEI versus HEI, have obscured the potential of building on complementarities. Drawing from case studies and a review of the current literature, the article calls for a four-pronged approach: supporting subsistence farmers; empowering small investor farmers; making large investments pro-poor; and building on complementarities between large and small farms. A variety of institutional arrangements could be used to combine the assets related to large-scale farms – capital, technology, and markets – with those of small-holder producers – land, labour, and local knowledge – to build sustainable food value chains.

Keywords: agricultural productivity, food security, outgrower schemes, sustainable food value chains.

IS THE AGRICULTURAL SYSTEM READY to feed the world in 2030? The answer to this question is clearly, no. Against a background of increasing food insecurity, agriculture in developing countries must undergo a significant transformation in order to increase production and respond to climate change.

The number of undernourished people remains unacceptably high and is growing. The Food and Agriculture Organization of the United Nations (FAO) estimates that 925 million people are currently undernourished worldwide (FAO/WFP, 2010). Feeding 8.2 billion people – an additional 1.4 billion – in 2030 would require raising overall food production by some 50 per cent between 2005 and 2030 (de Janvry, 2009). Feeding a larger urban population in a context of increasing scarcity of land and water, while also adopting more sustainable production methods, is a daunting challenge. In Africa, where it is

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predicted that population levels will double during the same period, the challenge will be even more acute.

In addition, land acquisition is on a steep rise. Uncertainty concerning future food supplies has propelled a growing number of investors and finance companies to acquire large parcels of productive land in many developing countries, particularly in Africa, for the purposes of commercial production, long-term investment, or speculation. Investors expressed interest in 42 million ha of land globally in 2009 – of which 75 per cent was in sub-Saharan Africa. A conservative estimate is that at least 6 million ha of additional land will be brought into production each year up to 2030 (World Bank, 2010).

However, studies show that increasing productivity on existing farmland would have a much bigger impact on output and welfare for the poorest groups than simply expanding the land area at current yields. Indeed, productivity gaps in existing farmland remain huge. At present, sub-Saharan Africa's agricultural productivity is the lowest in the world; it has stagnated over the past 30 years while it has increased in most high-income countries.

Farmers in Mozambique and Madagascar achieve less than 25 per cent of potential yields, and area cultivated per rural inhabitant remains well below 1 ha, owing to deficiencies in technology, capital markets, infrastructure, supportive policy framework, and public institutions, including property rights, in turn all reflecting long-standing under-investment in agriculture (Grosskurth, 2010).

What is the best model to drive sustainable agricultural growth and improve food security?

In order to understand how small- and large-scale farming can contribute to achieving a sustainable global food system, we should first look at their specific features. Depending on their access to assets and on the production environment (Berdegue and Escobar, 2002) in which they operate, there are: subsistence farmers; small investor farmers; and large-scale farmers.

Subsistence (family) farmers (context- and asset-constrained; see Figure 1) are households including fisherfolk, pastoralists, and smallholders, as well as landless labourers and households requiring social assistance, for whom food security is the main concern. These are among the most disadvantaged and vulnerable rural groups. As indicated in Figure 1, subsistence farmers have very little land (e.g. less than a hectare), lack most types of asset apart from unskilled labour, and, at the same time, operate in unfavourable environments.

Small investor farmers (market-oriented/asset-constrained; see Figure 1) are rural households and small agricultural firms engaged in farming as a business. They hold cultivated land for both commercial and

Small investor farmers exhibit high production efficiency but their assets are limited

Evidence suggests that many large investment projects failed to benefit local populations

subsistence agriculture and produce for the market. To cope with price and climatic shocks, they diversify production (maize, soya, vegetables, poultry, cattle, pigs, etc.). Evidence shows that they contribute to food security, to poverty reduction and climate change adaptation. They exhibit high production efficiency with labour-intensive technologies, and have good knowledge of local context, but their assets are limited; constraints of capacity, legal status, marketing, infrastructure, and capital hinder their growth and full participation in the market.

Large-scale farmers (market-driven; see Figure 1) are medium to large firms engaged in high-value, export-oriented agriculture. They account for a very small percentage of rural farmers in developing countries. In addition to their land and other holdings, firms in this category have direct access to the finance, modern risk-management instruments, information, and infrastructure necessary to remain competitive in their business operations. They can produce indirect effects on poverty reduction: high adoption rates result in rapid improvements in productivity, driving food prices down on a global scale, and they can create employment.

However, the evidence of several new ventures in Africa (World Bank, 2010) suggests that many large investment projects, particularly recent ones, were socially, technically, or financially not viable and in

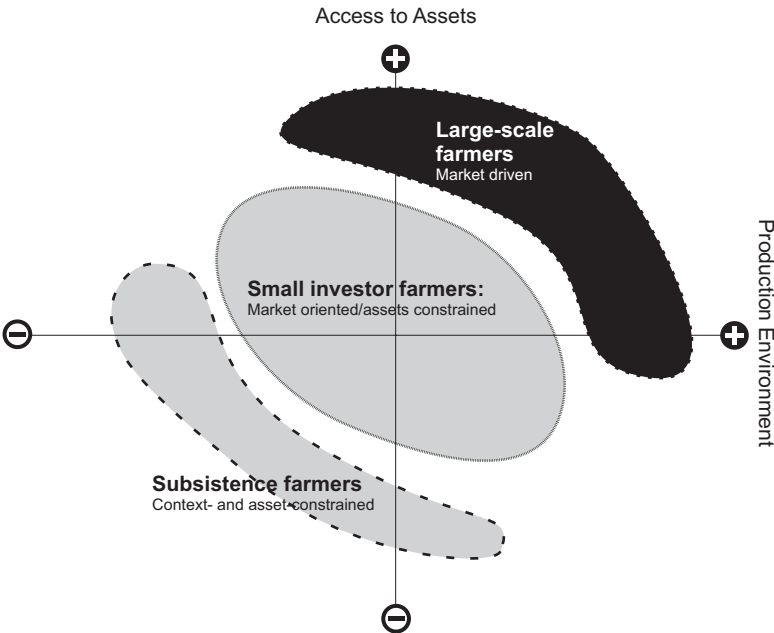


Figure 1. Models of farming systems
Notes: Assets: land distribution, access to credit, training, education and health programmes, strong community organizations. Production environment: roads, irrigation, good local government capacity, efficient markets.
Source: Berdegue and Escobar (2002)

Institutions were not well equipped to handle an upsurge in investor interest

turn failed to provide benefits to the local populations. Many attempts to jump-start agricultural growth through large-scale farming, as in Sudan, Tanzania, Cambodia, and Zambia, were largely unsuccessful. This happened in particular because the new wave of investment had been implemented in environments where capacity was weak, property rights were ill-defined, infrastructure and institutions were not well-equipped to handle an upsurge in investor interest, and weak protection of land rights led not only to uncompensated land loss but also to land being given away well below its true social value.

LEI and HEI agriculture: pros and cons

Small and large farms operate across a variety of ecosystems and encompass very diverse production patterns. In Africa alone, there are at least 20 major farming systems combining a variety of agricultural approaches, be they LEI (low external input) agriculture or HEI (high external input) agriculture. In general terms, HEI agriculture refers to industrial agriculture, a system of production that is characterized by high inputs of capital and intensive usage of modern technologies, machinery, and chemicals per land area, without taking into account environmental externalities. Conversely, LEI agriculture is associated with sustainable production methods (e.g. agroforestry, conservation agriculture, integrated pest management). It involves a relatively low input of capital, is more labour-intensive, relative to the area of land farmed, and focuses on maintaining the long-term ecological health of farmland (Grosskurth, 2010).

Adopting agriculture intensification of the Green Revolution is not applicable in today's Africa

In many cases, large-scale farming is associated with industrial agriculture. It should be noted, however, that the adoption of LEI or HEI practices is not necessarily dependent on scale (Brussaard et al., 2010). Indeed, in Brazil there are large-scale farms using LEI practices and the Green Revolution in Thailand was driven by small farmers adopting HEI methods. Proponents of the HEI approach, citing the success of the Green Revolution, argue that increased efficiencies in the use of light, water, and nutrients, together with mechanization, will double world food production. Nevertheless, adopting an agriculture intensification approach of the sort that spread the Green Revolution is not applicable in today's Africa, given wide diversities in agro-ecological conditions, institutions, and technologies (World Bank, 2008a); but also because the Green Revolution was not free of environmental costs, such as water contamination and soil degradation, and exploitation of natural resources which simply cannot be repeated today.

The mounting pressures to increase food security, respond to climate change challenges, and halt biodiversity decline have prompted an intense debate on which approach to production could bring better results. However, evidence shows that it makes no sense to bet on one

No single configuration of technologies, inputs, and ecological management is likely to be widely applicable

Any technology that improves productivity and doesn't harm the environment is likely to have sustainability benefits

model only. There are many pathways towards agricultural sustainability, and no single configuration of technologies, inputs, and ecological management is more likely to be widely applicable than another. This is the case in Africa, where soils are highly variable and may require biological techniques as well as increased fertilizer use, given that its use on the continent remains extremely low.

Agricultural sustainability implies the need to fit these factors to the specific circumstances of different agricultural systems. As Pretty argues:

The idea of agricultural sustainability does not mean ruling out any technologies or practices on ideological grounds. If a technology works to improve productivity for farmers and does not cause undue harm to the environment, then it is likely to have some sustainability benefits. (Pretty, 2006)

Evidence shows that successful agricultural sustainability initiatives and projects arise from shifts in the factors of agricultural production (e.g. from use of fertilizers to nitrogen-fixing legumes; from pesticides to emphasis on natural enemies; from ploughing to zero-tillage). The critical question centres on the 'type of intensification'. Intensification using natural, social and human capital assets, combined with the use of best available technologies and inputs (best genotypes and best ecological management) that minimize or eliminate harm to the environment, can be termed 'sustainable intensification'. (Pretty, 2008)

An interesting example of sustainable intensification is provided by the System for Rice Intensification (Box 1).

According to IAASTD (2009), the application of agroforestry practices such as nitrogen-fixing leguminous trees and shrubs can enable small-scale farmers to restore depleted soil fertility and improve crop

Box 1. System for Rice Intensification

One of the most interesting examples of LEI agriculture that has emerged in recent years is the System for Rice Intensification (SRI). SRI is a set of alternative crop-management practices, developed in the 1980s in Madagascar to benefit farmers with small landholdings. SRI increases the productivity of resources used in rice cultivation, reducing requirements for water, seed, synthetic fertilizers, pesticides, herbicides, and often labour – especially tasks performed by women. The benefits of SRI have been seen already in 40 countries, with increased production of both improved and local rice varieties. While SRI has been largely a civil-society innovation, embraced by hundreds of national and local NGOs as well as many international NGOs, the governments of Cambodia, China, India, Indonesia, and Vietnam – where more than two-thirds of the world's rice is produced – have given explicit endorsement of SRI methods in their national food-security programmes.

Source: Oxfam America (2010)

yields, at the same time reducing the use of fertilizers. Agroforestry systems in Africa have increased maize yields by 1.3 and 1.6 tons per hectare per year.

Where the debate stands

It should be noted that hunger and malnutrition are due not so much to the unavailability of food as to the inability of the poorest members of society to access it at an affordable price. Feeding the world by 2030 requires on the one hand efforts to increase food production and therefore food availability, and on the other measures to ensure that the poorest and most marginalized sectors of society have the purchasing power to access what food there is available (IFAD, 2009). Seventy-five per cent of the world's poor and undernourished people are located in rural areas and depend on agriculture directly or indirectly for their livelihoods (de Janvry and Sadoulet, 2008; see Figure 2).

Five hundred million smallholder farms worldwide are supporting around 2 billion people, or one-third of humanity (IFAD, 2009). There is an extensive literature and persuasive evidence to suggest

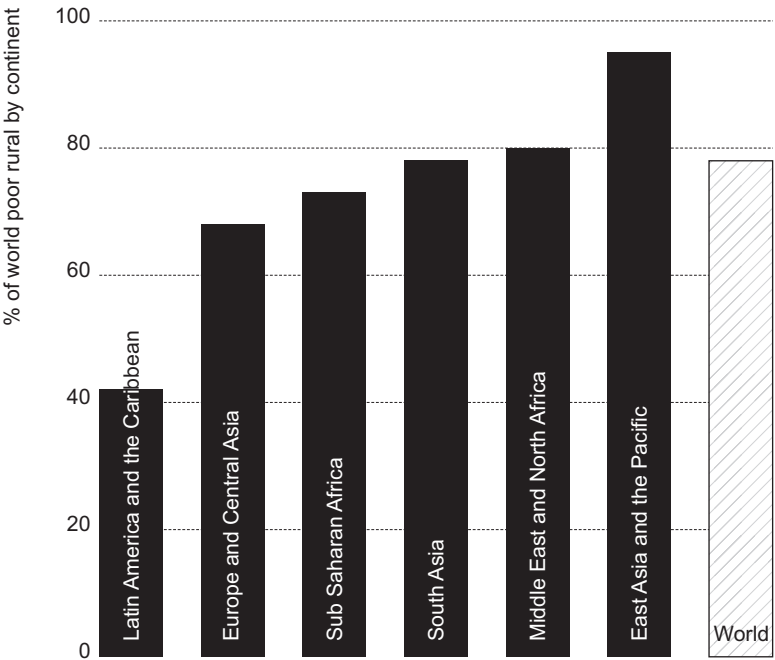


Figure 2. 75 per cent of the world's poor live in rural areas
Source: based on de Janvry (2009)

The focus on smallholders might actually be hindering large-scale poverty reduction

that measures to improve smallholder farmers' capacity to increase food production and productivity, as well as to link to markets and (inter) national value chains, will not only enhance their purchasing power but also increase wider food availability and so contribute to global food security.

Nevertheless, this vision does not go unchallenged. The surging investors' interest in Africa has triggered a debate over the relative advantages and disadvantages in Africa, and worldwide, of large-scale versus small-scale farming models. The debate has been further stimulated by the leading development economist Paul Collier (Collier and Dercon, 2009), who argued that much of the focus on smallholders might actually be hindering large-scale poverty reduction, and that current policies ignore one essential factor for labour-productivity growth: successful migration out of agriculture and rural areas. According to Collier, the international food system and agricultural production technology have changed in favour of larger-scale ventures. The benefit of size is that it facilitates commercialization.

Debates which polarize small-scale versus large-scale models, or, if we consider the systems of production, LEI versus HEI agriculture, have obscured the potential of building on complementarities and the existence of multiple pathways to achieve agricultural growth and sustainability. Betting on one model only and adopting a one-size-fits-all approach is unlikely to be appropriate, given the heterogeneity of institutions, agro-ecological, farming and demographic conditions across developing countries.

Adopting a one-size-fits-all approach is unlikely to be appropriate

A four-pronged approach to feed the world by 2030

Achieving the objectives of increased food production and food accessibility, and at the same time protecting the environment, requires adopting a different blend of policies, a four-pronged approach (see Figure 3), aimed at the following:

- supporting subsistence (family) farmers to cope with risks and vulnerability;
- empowering small investor farmers with the necessary capacity, finance, and regulation to increase their productivity, production, and competitiveness, and in turn to contribute to food security;
- making large investments pro-poor, by setting the correct framework;
- building on complementarities between large and small farms, when possible.

A four-pronged approach is instrumental in achieving food security by increasing production and productivity, resilience,

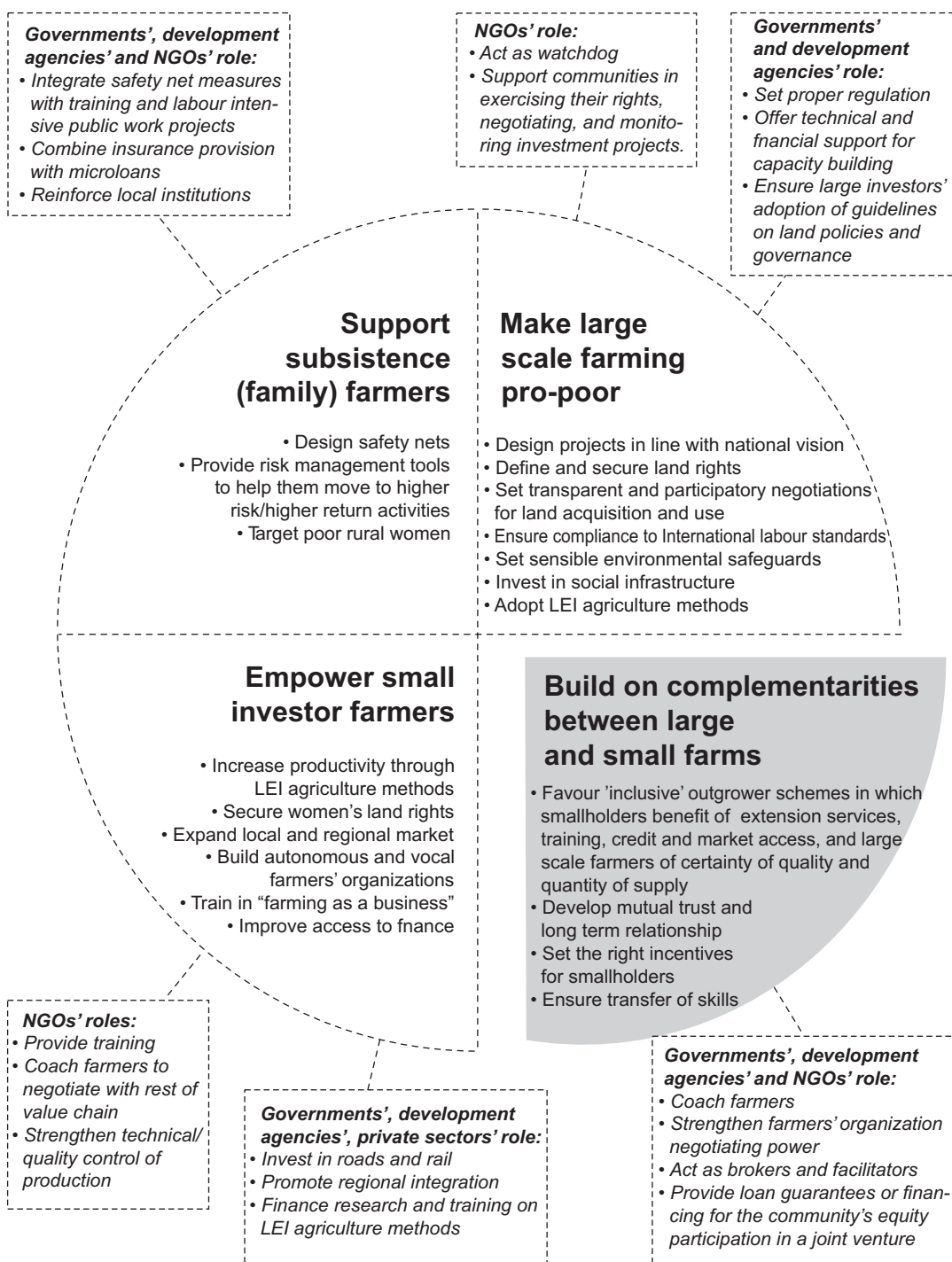


Figure 3. A four-pronged approach: What we can do

and sustainability of farming systems. Whatever mix of the four-pronged approach is adopted, a series of actions and investment by governments, international donors, NGOs, and private-sector actors, reversing the trend of under-investment of the past 20 years, will be crucial.

Support subsistence farmers

There are a series of actions needed to protect subsistence and landless farmers, 'the chronically poor' populations, to cope with risks and vulnerability and help them to move to higher-risk/higher-return activities. As illustrated by Oxfam analysis:

Investments must provide safety nets for those affected by climatic and market shocks

any strategy that exclusively emphasizes agricultural investments in favoured areas is ill-advised, particularly in countries with limited shares of high-potential land. Investments must also reach outside of agriculture entirely to provide safety nets for those affected by climatic and market shocks and who cannot engage consistently in the economy. (Oxfam International, 2009b)

Social protection programmes can take the form of transfers and risk-management programmes such as weather insurance or input subsidies. In the Horn of Africa Risk Transfer for Adaptation Project, Oxfam America has successfully implemented a comprehensive risk-management framework to female-headed households, which includes weather index insurance integrated with existing government and civil society safety-net programmes, microcredit, and training and labour-intensive public works projects (Oxfam International, 2009a).

Empower small investor farmers to exploit their full potential

In terms of prospects for developing countries' agriculture, supporting small-scale farmers would achieve the greatest impact in terms of income creation and food security, in particular when associated with LEI agriculture methods.

Provide training in new technologies and in 'farming as a business'. A major challenge confronting farmers is to increase agricultural productivity on existing farmland, both to meet growing demand for food and to offset the climate-change yield losses. In parallel with the under-investment in agriculture over the last 20 years, there has been a large deficit in training in good agricultural practices and entrepreneurship at farm level. Training in farming as a business is crucial to enable farmers to identify market opportunities for their products and gain insight into the costs and margins involved in the value chain. Links with agribusiness companies (through for example out-grower schemes) can enable a transfer of technical expertise and

Training in farming as a business is crucial to identify market opportunities, costs and margins

build smallholder capacity to participate in the supply chain. In addition, rural households should be trained in the basic skills needed to access and master new production technologies and cope with climate change. Farmers' Field Schools for accessing and evaluating new agricultural technologies represent an interesting method; originally developed and widely promoted in Asia, they enable farmers to analyse problems, conduct experiments, try out technical solutions through facilitated, hands-on sessions in fields allocated by the farming community for study (Oxfam International, 2009b), and consequently engage in policy reform. In Indonesia, Farmers' Field Schools are being used to facilitate the use of climate information in order to increase farmers' effectiveness in coping with extreme climate events, by tailoring crop management to forecast information.

Nigerian farmers
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Expand local and regional markets. Studies show that in domestic markets producers can compete with imports. High logistical costs raise prices of imported commodities and provide 'natural protection' upon which producers can capitalize. In Africa, for example, Nigerian farmers can produce and deliver soybeans to Ibadan at 62 per cent of the cost of imported soybeans (World Bank, 2009). The same high logistical costs that shield domestic producers are a significant barrier to exports. Local and regional markets therefore offer promising opportunities for expansion over the short/medium term. The combined value of domestic and regional markets for food staples within Africa – more than US\$50 bn p.a. – is considerably in excess of total international agricultural exports and will grow with both population and income over time (World Bank, 2008a). In addition, domestic markets for horticultural and livestock products are also growing strongly. To allow African producers to tap into this growing demand and substitute imports, governments should rapidly implement regional integration agreements in support of regional trade, such as banning arbitrary export restrictions, streamlining border logistics, and harmonizing standards and regulations. At the same time, major investments are needed in road and rail infrastructure, in order to reduce the farm-gate cost of fertilizers and the cost of taking domestic produce to major local and regional markets.

Participation
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reduce transaction
costs

Empower farmers and their organizations. There is widespread evidence that small farmers need to cooperate through organizations and clusters in order to achieve competitiveness. Participation in a farmers' organization is crucial to gain market power in contracting, to reduce transaction costs in accessing input and product markets, and to achieve a voice in policy-making at the national and international levels (Oxfam International, 2009b). Formation of producer organizations has significantly increased over the past 20 years. However,

To effectively participate in sophisticated markets and complex negotiations, organizations need trained leaders and technical personnel

organizations remain insufficiently representative and weak in their financial and technical capacities. In many developing countries, farmers' organizations have been co-opted by government and are used for political control and clientelism. A major effort needs to be made to reconstruct autonomous organizations that are owned by their members and are effective in their functions. To be effective in participating in sophisticated markets and complex negotiations, these organizations need trained leaders and technical personnel. Governments and NGOs as well as traders and other private sector actors have a key role to play in training and coaching farmers' organizations to negotiate with the rest of the value chain, to strengthen technical/quality control of production, and to conduct impact evaluation of projects and training.

Improve access to finance. Access to finance is central to help small-scale farmers to build their production capabilities to produce at a sufficient scale, to be attractive enterprises and trading partners, and to enable subsistence farms to cope with risks more effectively. Nevertheless, there has been very little progress, especially throughout most of Africa, in creating self-sustaining rural financial systems. Small farmers can rarely meet the conditions set by financial institutions, which see them as a risk because of poor guarantees and lack of information about their ability to repay loans. Non-bank financial intermediaries, such as microfinance institutions (MFIs), have proved to be a help in lending money to family farms – especially when credit is given to female-headed households – but more often than not they lack the necessary skills to develop or adopt innovative financial tools for agricultural production systems (OECD/AfDB, 2005). In general, removing the obstacles for small-scale farmers' access to finance requires close cooperation between commercial banks, MFIs, traders, community groups, and NGOs providing business-development services (Wegner, 2006). Promoting agreements between MFIs and business-development service suppliers will help to ease MFIs' capacity constraints and reduce costs by a more efficient division of labour.

Unless strong regulations secure property rights and discipline land acquisition, adverse social and environmental effects outweigh the benefits

Make large-scale farming pro-poor

In countries where labour supply constrains smallholder expansion, large-scale industrial farming can be a successful option to promote food security through a reduction in prices due to high productivity, and reduce poverty through the creation of employment. In addition, when LEI methods are applied, they minimize harm to the environment. However, the evidence so far shows that unless strong regulation is in place to secure property rights, discipline land acquisition, and ensure transparent and participatory negotiations,

adverse social and environmental effects outweigh the benefits. As indicated by the UN Special Rapporteur on the Right to Food (De Schutter, 2009a): 'It is only to the extent that investments can improve local food security by increasing productivity and serving local markets, while avoiding an increase in inequalities of incomes in rural areas, that they are justified'.

The public sector needs to put in place a supportive policy, legal, and regulatory framework to discipline land acquisition and ensure that the environmental externalities as well as the undesirable social and distributional changes within or beyond the project area are mitigated. In particular, mechanisms need to be put in place to ensure that investors' proposals are technically and economically viable, consistent with local visions, and include smallholders in the value chains (World Bank, 2009).

In many developing countries, and particularly in Africa, while efforts should be made to increase state capacity for environmental regulation, in the short- to medium-term, civil society has a crucial role to play in assisting communities in the effective exercise of their rights, in negotiating and monitoring investment projects, and to act as a watchdog. International organizations should help to integrate information on large-scale acquisition in countries' development planning and strategies, offer technical and financial support for capacity building, and support stakeholders' convergence around responsible agro-investment principles (De Schutter, 2009b).

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investment projects

Build on complementarities between small and large farms

The key question is whether large and small farms can build on complementarities, instead of one displacing the other. The need for investment in technology, infrastructure, market access, and institutions suggests that private investment could contribute in many ways that do not involve large-scale land acquisitions. On the contrary, a variety of institutional arrangements can be used to combine the assets of investors – capital, technology, and markets – with those of local communities and small farmers – land, labour, and local knowledge. Greater opportunities and important economies of scale for private domestic or foreign investors can be achieved in terms of input provision, output processing, packaging, and marketing, rather than in production. These forms of support include a wide range of more collaborative arrangements between large-scale investors and local small-scale farmers and communities, such as diverse types of contract farming schemes (out-grower schemes), joint ventures, and management contracts (Vermeulen and Cotula, 2010). There are pros and cons in all these different approaches, and the conditions for success or failure are very context-specific and contingent on a

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Out-grower
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for buyers

Box 2. Out-grower schemes: pros and cons

Out-grower schemes involve pre-agreed supply agreements between farmers and buyers. Usually, small-scale farmers grow and deliver agricultural produce of a specified quantity and quality at an agreed date. In exchange, the company provides up-front inputs, such as credit, seeds, fertilizers, pesticides, and technical advice, all of which may be charged against the final purchase price; and agrees to buy the produce supplied, usually at a specified price. The mechanism can be a way of assuring a market for farmers and assuring quality and quantity of supply for buyers. Theoretically, the arrangement should reduce the risk to both parties. However, the negotiating power of large-scale investors, farmers and farmers' organizations, and the way in which the contract is designed, are key to determine the outcome. Out-grower schemes may be a vehicle for providing support and improving market access for smallholders, or an exploitative relationship where smallholders are effectively providers of cheap labour and are expected to carry production risks. Better-resourced farmers may capture the contracts, while poorer farmers work as labourers on the contracted farms. In India, issues raised about contract farming at a recent consultation facilitated by Oxfam included delayed payments for outputs, provision of faulty seeds, lack of formal contracts, and non-delivery of technical assistance. An additional risk identified from experience of past out-grower schemes is that, in the longer term, land access may shift from women, who cultivated subsistence crops, to men who are more likely to sign contracts for cash crops with agribusiness. Shifts in land access may also favour local elites that are better positioned to make the most of the new market opportunities created by out-grower schemes.

Source: Vermeulen and Cotula (2010)

country's institutions, and considerations of tenure, policy, culture, and demography.

Private investment through out-grower schemes (see Box 2) can promote diversification into high-value and export market production and directly support smallholder productivity and their inclusion in the value chain. Especially in places with the potential for higher-value crops and access to expanding markets, small and large farmers can complement each other.

Out-grower schemes work only when there is long-term business interest and the development of mutual trust. Indeed, the imperative for large-scale investors lies in making business inclusive: tackling yields, quality, skills development and supply-chain linkages simultaneously, as advocated by the World Business Council for Sustainable Development. An important aspect is the capacity and negotiating power of smallholders in their relations with large investors. Strong producers' organizations are crucial in this respect, as is the security of local land rights. Only a level playing field between different actors can build trust. In addition, long-term relations and trust can reduce the problems of side selling (selling to firms other than the original input provider) (Oxfam International, 2009a), motivated by farmers'

Long-term
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selling

need for an immediate income. As documented by an evaluation of an out-grower scheme supported by Cordaid in Tanzania,

gaining access to finance is key. Indeed, farmers aren't selling their produce to local traders because the price offered is attractive but because they need cash immediately to cover other needs... Contracts alone do not work and other incentives are needed to get the commitment of farmers.

In the organic market, there are innovative ways and incentives put in place by out-grower schemes to build an inclusive business model (see Box 3).

Box 3. Elephant Pepper: Improving food security while protecting wildlife

Started by an Australian businessman in 2003, the Elephant Pepper project aimed at the establishment of trade opportunities for marginalized communities in Zambia and Mozambique, where ecological conflict – in this case with elephants – was undermining food security and ecological sustainability. Elephant Pepper has trained more than 6,000 farmers and many partner organizations in the use of chilli-based deterrents: fields of chillies were cultivated around food crops, keeping crops and people safe from elephants, and the elephants safe from farmers.

The next phase of the business was the manufacture and sale of chilli sauces and other branded products (Tabasco Mash), using chillies grown by the small-scale farmers. This model is attractive, as the out-grower networks enable Elephant Pepper Mozambique to increase overall production, volumes, and ultimately turnover without significantly increasing its own costs. Out-growers benefit from a guaranteed market and price, providing a clear incentive to invest in capabilities and achieving the highest yields possible. Elephant Pepper is also facilitating skill transfers: with the support of local NGOs, it provides training in basic agriculture practices that can be applied to other types of high-value crop. This project has a very positive impact on women's labour participation: 90 per cent of the pickers are women. Elephant Pepper promotes women where possible into management positions because of their reliability and general work attitude.

One of the most important impacts of the model is the disposable income for farmers. For example, farmers confirmed that the project has significantly improved their living standards, enabling them to pay school fees, obtain medical treatment, and purchase groceries. People now have access to savings and knowledge on savings. The increased buying power of the farmers has benefited the local traders in small village shops.

Farmers and the communities have a more considerate relationship with their environment and thus are more able to protect it or use it in an ecological and sustainable way. Elephant Pepper guarantees to buy 100 per cent of the chillies available, but farmers are free to sell to other buyers. Elephant Pepper competes for this business in a market-driven environment. Farmers attract the attention of other buyers and NGOs that provide market-linkage training. Elephant Pepper does not discourage this interaction.

Source: Elephant Pepper (2010)

Out-grower
networks enabled
Elephant Pepper
to increase
production without
significantly
increasing its costs,
and...

...out-growers
benefit from
guaranteed
markets and
prices, providing
incentives to invest
and achieve highest
possible yields

The fund has benefited 3000 small-scale honey, horticultural, and dairy producers and is already self-sustaining

Box 4. Zambia Agribusiness Fund

In order to foster links between small-scale producers and commercial agribusiness, USAID launched the Zambia Agribusiness Technical Assistance Centre. Addressed in particular to farmers who produce all-year-round crops, the centre provides technical assistance and supervises an investment fund that extends credit lines to farmers to buy irrigation equipment. Big commercial agribusinesses buy the crops (at a price net of the cost of the loan) and pay back the loan to the fund. Highly successful, this pre-financing export facility extends credits in US dollars, applying an interest rate averaging 8–10 per cent, compared with that in local currency of 35–40 per cent, and presents the advantage of ensuring the predictability of funds and repayment. The US\$1 m fund has benefited about 3,000 small-scale honey, horticultural, and dairy producers, and it is already self-sustaining. The next step envisaged would be to convert credits into equities. In parallel, USAID and other donors are financing local NGOs or technical-assistance business associations, such as the Zambia Chamber of Small and Medium Business Associations, in charge of providing business development services, to create market linkages between farmers, agribusiness, and urban consumers, and ensure training in business skills.

Source: OECD/AfDB (2005)

Governments, development agencies, and civil society can play an important role in building inclusive models, for instance in providing loan guarantees or financing for the community's equity participation in a joint venture, or more generally acting as brokers and facilitators (see Box 4).

Increasingly, large-scale farmers are subcontracting organized smallholders to meet supermarket demands

Increasingly, large-scale farmers are subcontracting organized smallholders to meet supermarket demands. According to previous analysis by Oxfam (Oxfam International, 2009a), where small-scale farmers do participate in these markets, they tend to earn higher incomes than non-participating farmers.

Nevertheless, important obstacles remain: supermarkets also exercise enormous buyer power and may offload price pressures and demand fluctuations on to their suppliers through abusive buying practices. These are passed on along the supply chain, ultimately being borne by the weakest actors, small farmers and agricultural labourers, most often women. Governments can put in place a number of policies to help retailers to contribute to the development of an inclusive business model. These include, for instance, enforcing appropriate regulations in the supermarket sector, such as policies to promote competition in oligopolistic chains such as those found in Latin America; upgrading the infrastructure and services provided to retailers and farmers in wholesale markets; helping farmers to organize to become suppliers to supermarkets; implementing and enforcing internationally accepted labour standards; and sharing costs of becoming compliant with standards and certification schemes.

Conclusions

Develop a country-led, long-term vision

National policies
should discipline
investments
and ensure their
contribution to
food security,
environmental
protection, and
poverty reduction

As emerged above, there are multiple pathways to ensure food security, poverty reduction, and protection of the environment. Technologies and institutional innovations must be tailored to the local context and involve broad consultations among the large number of players involved. It is crucial to develop a shared vision and a long-term strategy to identify the proper balance between the state, the market, and civil society. Broad consultations with empowered farmers' organizations, civil society, and private investors are essential to set up clear strategies, with a definition of investment priorities. National policy frameworks, rules, and regulations are essential to discipline investments in order to make sure that they contribute to reducing poverty, ensuring food security, and protecting the environment.

Need for renewed commitments by governments and international donors

To sum up, in order to ensure that food availability and accessibility keep pace with population growth, while enhancing resilience and achieving sustainability, national and international donor agriculture policies must include the following measures:

- support subsistence farmers to cope with risks and vulnerability;
- empower smallholder farmers, especially women, with capacity, finance, and a regulatory framework that encourages organization and enhances productivity;
- regulate agro-industrial operations to enhance social benefits and good environmental stewardship;
- promote synergies between smallholder and agro-industrial operations, building on complementarities and linkages wherever possible.

Whatever mix of the four-pronged approach is adopted, major commitment and investment by governments, international donors, and private-sector actors, reversing the trend of the past 20 years, will be crucial. Much of the failure of agriculture to achieve its potential is institutional: support by the state has been unresponsive to the needs of the poor, and inefficient in marketing producers' output, sometimes preventing the natural development of markets for producers. Public institutions need to be strengthened in their capacity to develop an appropriate blend of policies, regulatory frameworks, and investments to re-launch the agricultural sector.

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