7. Conclusions for pro-poor livestock sector development

Over the last two generations, poverty reduction has advanced significantly around world, but it is still very much work in progress. The global incidence of extreme poverty (< $1.25/day) in developing countries has declined significantly, from 42 percent in 1990 to 26 percent in 2005. However, the absolute number of extremely poor people is still an alarming 1.4 billion (down from 1.8 billion in 1990), and it is estimated that about 2.6 billion people are living on less than $2/day. In spite of declining poverty incidence throughout the developing world, in some regions – notably South Asia, sub-Saharan Africa and the Near East and North Africa – the number of extremely poor increased between 1990 and 2005.

A disproportionate 70 percent of the world's extremely poor and 60 percent of the poor live in South Asia and sub-Saharan Africa, where much of the land is in arid and semi-arid agro-ecological zones. Poverty is closely related to malnutrition, and in 2004 significant majorities of the world's protein-energy malnourishment (72 percent), vitamin A deficiency (75 percent) and iron-deficiency anaemia (58 percent) were recorded in these two regions, although together they represent only about a third (40 percent) of humanity. Efforts to reduce poverty and improve nutrition should therefore focus closely, but not exclusively, on South Asia and sub-Saharan Africa.

Because of their many contributions to nutrition and economic survival in developing countries, livestock can play an essential role in improving poor people's livelihoods everywhere, particularly in rural areas, where most of the world's poor reside. This chapter summarizes findings regarding how to facilitate livestock policy in ways that confer benefits to poor people. This apparently simple question has many answers, because policies must be adapted to the multitude of complex challenges and opportunities facing the world's poor. Nevertheless, some general lessons can guide progress towards more effective poverty reduction, while local realities inform policies for achieving more inclusive and lasting benefits.

AGRICULTURE AND THE RURAL NON-FARM ECONOMY

Poverty and food insecurity are more prevalent in rural than urban areas, and about three-quarters of those classified as extremely poor or destitute live in rural areas. Significant majorities of the populations of both sub-Saharan Africa (70 percent) and South Asia (65 percent) were classified as rural in 2005, while 58 and 50 percent respectively of these region's total populations were classified as agricultural (FAOSTAT, 2010). Rural populations are thus predominantly agricultural, and agriculture is the most important sector affecting poor people's livelihoods in most developing countries.

Typically, agriculture accounts for 40 to 60 percent of rural households' total income, while the remainder is derived from the rural non-farm economy (RNFE) and remittances.

This raises important questions regarding the roles of agriculture and the RNFE in rural poverty alleviation.[30] In their review of non-farm income diversification, Barrett, Reardon and Webb (2001) conclude that for the poorest, diversification is "desperation-led" and results in portfolios with low marginal returns, while the extremely poor face substantial barriers to high-return niches in the RNFE. Promotion of the RNFE is thus likely, at least initially, to increase rural wealth disparities until the benefits of rapid growth among the better off trickle down to the poorer subpopulations through demand for hired labour. Wiggins and Proctor (2001) caution against overly optimistic expectations for rural industrialization, suggesting that "rural areas may have comparative advantage only in primary activities based on immobile natural resources and closely related activities", and the oft-cited expansion of the RNFE is in many cases triggered by agriculture-led growth (Hazell *et al.*, 2010; Start, 2001; Thirtle *et al.*, 2001) and requires supporting infrastructure (Byerlee, Diao and Jackson, 2005). Improvements in agriculture are thus the "best bet" for broad-based and rapid rural growth and poverty reduction in low-income, agriculture-based countries (Kydd and Dorward, 2001).

While the poor derive about half of their income from agriculture, at least half of total expenditure by low-income households goes on food, often without attaining satisfactory levels of nutrition. As many agricultural households are food-insecure, some degree of income diversification is often pursued as a strategy for stabilizing income flows and consumption (Barrett, Reardon and Webb, 2001). Improving food production and markets should therefore benefit both producers and consumers, a distinction that can be somewhat fluid in rural areas, where households may be net sellers during the harvest period and net buyers later in the year (Barrett, 2008; Irz *et al.,* 2001). Given the relatively high cost of transporting food, and the pervasiveness of rural food insecurity, it makes economic sense to promote the production of food close to where it is needed.

Agriculture thus retains a critical role in reducing poverty and enhancing food and nutrition security because it is central to rural livelihoods and no other activities have the same potential for supporting broad-based pro-poor growth (e.g., Irz *et al.,* 2001; Kydd *et al.*, 2002).[31] In addition to its direct benefits, bottom-up agricultural growth also has powerful leverage effects on the rest of the economy, especially in the early stages of economic transformation, when consumption linkages prevail (Irz *et al.*, 2001; Hazell and Diao, 2005). This does not mean that development efforts should focus exclusively on agriculture, but that policy-makers and donors should be more aware of the pro-poor bias of agricultural growth and should not discount agriculture as obsolete when considering how and where to invest development resources. Policy-makers and donors should pay more attention to the complementarities and synergies among different investment options rather than regarding these options as mutually exclusive.

LIVESTOCK AND CROPS

For agriculture to realize its poverty-reducing potential, it is essential that agricultural growth outpaces growth of the agricultural population, which in turn requires that

[30] The diversification of rural households is not a recent phenomenon. In 1975, for instance, Kenyan smallholders already derived half or more of their incomes from non-farm sources (Hazell and Diao, 2005).

[31] In Africa, for instance, industry employs only about 10 to 15 percent of the labour force, and its employment elasticity is low compared with that of agriculture (Hazell and Diao, 2005).

agricultural productivity be increased (Irz *et al.,* 2001; Thirtle *et al*., 2001). Only then will agriculture make lasting contributions to food security, offering sufficient income to producers, while improving poor consumers' real incomes by reducing food prices. This double-dividend poverty-reducing impact of agricultural productivity growth can be substantial, and empirical estimates show that each 1 percent increase in yields leads to a reduction of between 0.6 and 1.2 percentage points in the proportion of people living in extreme poverty.[32]

In economies that remain heavily dependent on agriculture, livestock form an integral part of predominantly smallholder diversified farming systems. In these settings – which remain the norm across the low-income world, especially where poverty rates are highest – the majority of rural households keep some farm animals, and poor households are even more likely to do so (Pica-Ciamarra *et al.,* 2011). At the global scale, the livestock sector is the second most important contributor to the agricultural economy, superseded only by large-scale staple crops. However, smallholders generally have no comparative/competitive advantage in the production of staples, and limited participation in staples markets, often as net buyers (Barrett, 2008), while the same does not hold for labour-intensive high(er)-value horticultural and livestock products. In addition, demand for high-value agricultural commodities grows more rapidly than that for staples, so high-value commodities offer superior income prospects for smallholders. Raising livestock productivity and production, which results in higher value creation per unit of labour and/or land, would thus appear to be a promising avenue for accelerating rural poverty reduction. In the context of smallholder milk production in India, for example, Mellor (2003) argues that "if the domestic livestock industry meets the demand growth, it will double in size every ten years, will soon account for over half of agricultural GDP and bring about rapid growth in overall agricultural production and incomes". Tiffin (2003) and Burke *et al*. (2007) note that in Senegal and Kenya investments by respectively the middle-income and better-off segments of the farming community are directed towards livestock rather than crops, and in Senegal a market for crop residues (as animal feed) has developed, with higher prices for groundnut and cowpea hay than for grain.

Although livestock generally have lower total output value than staple crops, productivity growth in the livestock sector can have significant poverty reduction impacts, both directly and through multiplier effects. The direct role of livestock in poverty reduction has been empirically documented in Kenya by Burke *et al.* (2007). By exploiting the close linkages between crops and livestock in most smallholder systems, a strategy for combined productivity growth in livestock and staple and cash crops[33] would have the strongest income multipliers and poverty reduction benefits.[34] According to Poulton, Kydd and Dorward (2006), agriculture development planning should therefore focus on promoting horticultural and livestock production and marketing activities.

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[32] Minten and Barrett (2008) elaborate this relationship using a comprehensive, spatially explicit dataset from Madagascar.

[33] For example, expanding production of organically grown fruits and vegetables in developing countries is increasing the demand for animal manure (Bradford, 1999).

[34] Where feasible, smallholders have been found to increase their income share from livestock and exploit crop-livestock synergies (e.g., Faye and Fall, 2000; Tiffin, 2003).

SMALLHOLDER LIVESTOCK PRODUCERS AND POOR LIVESTOCK KEEPERS

Agricultural populations in developing countries continue to expand, and more than two-thirds of the world's 3 billion rural people reside on farms of less than 2 ha[35] (IFPRI, 2005). In many developing countries, average farm sizes are declining (Hazell *et al.,* 2010), and small farms will continue to dominate the agricultural landscape in the developing world for at least another 20 years, especially in Africa and Asia (Nagayets, 2005). Compared with average farm sizes of 121 ha in North America, 76 ha in Latin America and the Caribbean, and 27 ha in Western Europe, the corresponding value for Africa and Asia is 1.6 ha (Nagayets, 2005). Averages mask distributions of landownership, but farms of more than 10 ha are extremely rare in sub-Saharan Africa and Asia, and the average size of farms in the top quartile of a sample of five sub-Saharan countries ranged from 1.8 to 5.9 ha (Jayne, Mather and Mghenyi, 2010). Thus, in sub-Saharan Africa and Asia relatively "large" farms become "small" when compared with their counterparts in the rest of the world. Nevertheless, even in this universe of small farms, the average farm size in the top quartile was five to 15 times as large as that in the bottom quartile, with at least one-quarter of the farm households in the surveys quoted by Jayne, Mather and Mghenyi (2010) approaching landlessness. For most households in the bottom landholding quartile, even a doubling of crop income would have little impact on their absolute level of income or poverty rate. A pragmatic aspect of rural development is that increased smallholder market participation and productivity growth must go hand-in-hand with increased migration of smallholders out of agriculture (Barrett, 2008).

Although livestock keeping has a direct positive impact on the incomes of poor livestock producers, and although livestock ownership and income from livestock are more evenly distributed than landownership and crop income (Mellor, 2003; Zezza *et al.,* 2011), the observations of Jayne, Mather and Mghenyi (2010) that increased agricultural output brings minimal improvement to the welfare of marginal agricultural households also hold for livestock keepers. Significant direct impacts on household incomes through improved livestock production are likely to be felt only by households for which livestock already constitute an important enterprise (e.g., Garcia *et al*., 2006), while other households are more likely to benefit indirectly through growth linkages and enhanced nutrition security. To trigger this initial growth impulse, livestock development policies and related interventions should probably target a subset of the most eligible farmers – "upper" smallholder livestock keepers – who have the minimum asset base for engaging sustainably in market-oriented livestock production, rather than focusing on marginal livestock keepers, who have insufficient assets to produce a regular surplus from their livestock. While upper (e.g., top quintile) smallholders do not use natural resources any more efficiently than lower (e.g., bottom quintile) smallholders do,[36] they achieve higher returns on farm labour (e.g., Garcia *et al*., 2006; see also Chapter 3). Increased labour productivity is essential for linking smallholder production to poverty reduction (Collier and Dercon, 2009) and requires larger

[35] The World Bank (2003) defines smallholders as farmers with a low asset base operating on less than 2 ha of cropland.

[36] An "inverse productivity" relationship, in which yields per hectare are higher on smaller farms, is found across a wide variety of contexts. Explanations include that the economies of scale large farms may enjoy are outweighed by labour supervision costs or market imperfections (e.g., Eswaran and Kotwal, 1986; Barrett, 1996).

farm/herd sizes, investment in mechanization, and diversification into higher-value products.[37] As instable food prices and high marketing margins encourage poor producers to prioritize staple food production for own consumption before diversifying into higher-value commodities for sale (Poulton, Kydd and Dorward, 2006), increasing smallholder productivity involves the development of supply chains that serve small-scale farmers and provide them with the necessary links to suppliers and consumers (Diao, Hazell and Thurlow, 2010).

This does not mean that very poor or marginal livestock keepers should be abandoned, but reductions in the numbers of the very poor are likely to be faster if "more eligible" smallholder livestock producers are encouraged to expand production for the market through investments that enhance productivity. This group can also offer important leadership in technology adoption/diffusion, and provide a basis for local spill-overs of network externalities. To take advantage of economies of scale in processing and marketing, development efforts should also facilitate vertical linkages between market-oriented livestock producers and commercial or cooperative companies. Similar to promotion of the RNFE, this strategy is likely to increase rural wealth disparities, at least initially, and may therefore need to be complemented with safety net programmes to support the most vulnerable until the increased income from agriculture generates employment in local non-tradable goods and services. Identifying the smallholder (livestock) producers most likely to respond to market incentives, and finding the right mix of interventions to exploit the complementarities among various actors in livestock production and marketing are complicated tasks that require highly context-specific approaches. Self-selection mechanisms, such as enterprise credit and a wide array of public goods and services that facilitate productivity growth and market access, can reduce this complexity. The social costs of prematurely dismissing smallholders as unproductive and uncompetitive, as well as those of unselectively promoting smallholder production irrespective of initial endowments are likely to be very high, as either approach will lead to large rural majorities being trapped in low-income subsistence activities.

POOR PEOPLE AND POOR REGIONS

It has often been stated that the majority of the poor live in rural areas, but the term "rural" needs to be more precisely defined. Wiggins and Proctor (2001) describe rural areas as "spaces where human settlement and infrastructure occupy only small patches of the landscape, most of which is dominated by fields and pastures, woods and forest, water, mountain, and desert". They provide a useful categorization of rural areas into "peri-urban", "middle countryside" and "remote". Although poverty incidence tends to be highest in sparsely populated remote areas, numbers of poor people are usually much higher in areas where overall (headcount share) poverty incidence is relatively low but population density is high, i.e., the majority of the rural poor live in the middle countryside, not very far from urban areas/small towns. This evidence suggests that a strategy for poverty reduction should build on urban-rural growth linkages and promote market access incrementally, radiating outwards from urban areas into the middle countryside. Focusing poverty reduction efforts on the middle countryside is likely to be more cost-effective than focusing on sparsely populated remote areas, because: i) the required per capita investments in infra-

[37] See Tiffin (2003) for an example of smallholder intensification in Nigeria using crop residues and other inputs to increase livestock income, and hiring ox-drawn equipment to apply more manure for increasing crop revenues.

structure and services will be significantly lower; and ii) the market opportunities – and hence the possibility of moving from subsistence to market integration, which is essential for poverty reduction – are much greater.

For remote areas there are few proven development strategies other than outright transfers, which poor countries can ill afford. These areas may support some subsistence farming and extensive livestock production, but smallholder agriculture is unlikely to function as a substantial driver of growth. In the longer run, these areas should perhaps be left to provide environmental and recreational services, while the best available livelihood strategy may be for some household members to migrate to urban areas and provide remittance income, with remaining family members meeting their food needs through own production. Public policy emphasis here should be on reducing vulnerability rather than increasing productivity, and on providing opportunities for building skills that can be used outside agriculture.

In contrast to the relatively bleak development prospects for remote areas, the rapid expansion of urban residents' demand for high(er)-value foods represents enormous income potential for farmers in peri-urban areas and the middle countryside. It is in the latter where agriculture can probably play the greater role in poverty reduction, because the largest share of the poor, mostly mixed crop-livestock farmers, reside in the middle countryside, and people in peri-urban areas have a far wider range of non-agricultural livelihood opportunities.[38] There is ample scope for increasing the productivity of mixed farming through better crop-livestock integration, particularly in semi-arid rainfed areas in South Asia and sub-Saharan Africa. Increasing the output of mixed farming systems is probably the most environmentally benign form of increasing agricultural production, because mixed systems are at least partially closed (Thomas *et al.*, 2002) and intensification of the livestock component of mixed farming can reduce the number of animals and the emissions per unit of animal product (Bradford, 1999). Thus, intensification of market-oriented mixed smallholder farming systems could simultaneously enhance agricultural sustainability and contribute to poverty reduction.

Unfortunately, smallholder agriculture's potential to achieve this kind of urban demand-driven poverty reduction remains largely untapped. The reasons for this are attributable to a wide array of market and institutional imperfections; the prevailing policy paradigms in developing countries, where a systematic bias towards industrialization and concentration favours large- over small-scale operators; and the underprovision of local public goods and services, the consequences of which affect the poor disproportionately.

THE PUBLIC AND PRIVATE SECTORS

Growth in food demand is concentrated in urban centres, and this has several implications. First, meeting this demand requires the development of physical communications, transport and marketing infrastructure to link rural producing areas to the towns. There is need for public sector investment in this area, because the transaction costs associated with weak

[38] In peri-urban settings the production of high-value, perishable agricultural products such as milk is already highly profitable, and the main agricultural policy emphasis should be on avoiding the pollution and managing the human health risks that arise from intensive livestock production in close proximity to large human populations.

infrastructure are a substantial deterrent to agricultural producers generally and smallholders in particular. However, physical infrastructure alone is not sufficient to stimulate broad-based agricultural intensification. Poverty-reducing agricultural intensification involves the development of supply chains around smallholder farmers with "simultaneous and complementary investments in all links in the supply chain" (Poulton, Kydd and Dorward, 2006). The need for complementary investments from several different market participants makes each individual investment highly risky, as its success depends on the investment decisions of other players. These circumstances create a low investment equilibrium trap, in which all the actors (usually low-income) along the supply chain are denied the benefits of growth and higher incomes because of coordination failure. Transaction costs and risks thus inhibit competitive private sector market activities at critical stages in agricultural transformation, and pure competition is not always the best form of market development (Dorward *et al*., 2004b).

To overcome these obstacles, where market mechanisms fail to deliver private agency, public leadership is needed, such as "pump-priming investments" (Poulton, Kydd and Dorward, 2006), which lower individual investor costs and/or perceived risks. These "big push" commitments support complementary decision-making by different actors along a supply chain, and help bring economic activity to a critical threshold at which economic growth is self-sustaining. Historical evidence shows that State interventions have been important in supporting critical stages of agricultural market development (Dorward *et al.* 2004b), but also that the most essential public expenditures for supporting agriculture do not necessarily lie in the agriculture sector itself (Foster, Brown and Naschold, 2001). For public agencies mandated to support agriculture, the most important role does not concern public expenditure, but policy-making, regulation and provision of services that the private sector will not provide (Foster, Brown and Naschold, 2001).

Agricultural development requires coordinated interventions across sectors, and policy priority must be given to providing an enabling rural environment for commercial activities (Burke *et al.,* 2007). Such an enabling environment requires mechanisms for overcoming the entry barriers to high-return activities, and institutional arrangements that reduce transaction costs and risks. A key challenge to the development of agriculture in areas dominated by smallholder farmers is the establishment of coordination systems involving combinations of government agencies, civil society, farmers' and other professional organizations, and agribusiness firms. This requires drawing on local knowledge and not presuming that outside answers are best; trial and error experimentation; and rigorous independent evaluation (Easterly, 2008b). There is no universal blueprint for agricultural development and poverty reduction, and it is vital that donors support experimentation and learning rather than imposing generic development models.

CONCLUSIONS

For accelerated reduction of poverty and associated food insecurity at the global level, development efforts need to focus on regions and countries at early stages of economic development – sub-Saharan Africa and the poorer regions of South and Southeast Asia. The following are some lessons learned and recommendations for these regions:

- Experience suggests that – partly by default – agriculture remains one of the most important sectors for rural poverty alleviation, but that increases in productivity, particularly of labour, are necessary for agriculture to realize its poverty-reducing potential.
- Agriculture is dominated by smallholders, who are seen as part of the problem, but need to be regarded as part of the solution.
- An important way of increasing labour productivity in smallholder agriculture is diversification into high(er)-value agricultural products (horticulture, aquaculture, livestock), but diversification into livestock is constrained by a multitude of entry barriers, which are substantial for most low-income households and which include investment, technology and market access.
- Increased income from agriculture generates employment in local non-tradable goods and services, and a strong case can be made for agriculture-induced poverty reduction through secondary employment creation.
- Agricultural intensification may bring more rapid gains in poverty reduction if policy interventions focus on the most eligible "upper" smallholders in favoured areas (who are still predominantly poor, even though they are not the poorest of the poor), while less endowed households will benefit indirectly through spill-overs such as technology diffusion and increased demand for non-tradable, local goods and (especially labour) services.
- For the less favoured agricultural households, livestock do not provide many growth opportunities, but act as important safety nets. Policy emphasis here should be directed to reducing vulnerability, for example by protecting livestock assets.
- Agriculture is heterogeneous, highly complex and affects a large set of stakeholders. Agricultural development therefore requires approaches that are carefully adapted to initial local conditions, and large-scale blueprint planning is likely to fail. Experimentation with modest but targeted interventions, and continuous learning from the results are more likely to lead to the desired outcome of poverty eradication.
- Transaction costs and the risks of coordination failure are high in agriculture, and public leadership is needed to promote lower-income agrifood supply chains. For public agencies mandated to support agriculture the most important role is policy-making, coordination, regulation and the provision of services that the private sector will not provide.