

# **Emerging challenges and new opportunities for addressing poverty, hunger and malnutrition through livestock research-related activities**

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### **The evolving role of livestock in poverty reduction: a moving target for policy makers**

Agriculture provides the platform for poverty reduction in rural areas of much of the impoverished developing world, where the majority of poor are found. Because of its diverse contributions, livestock has a key role to play in improving agricultural productivity, promoting pro-poor economic growth, and protecting the sustainable livelihoods<sup>1</sup> of the poor.

Most importantly, the livestock sector presents an attractive growth opportunity in many parts of the developing world, given the increasing demand for livestock products expected in the coming decades<sup>2</sup>. However, the potential for the rural poor to contribute to these market opportunities is threatened by a daunting number of pressures, which must be overcome if this opportunity is to be seized. The main threats and pressures to poor livestock keepers are:

- *Population growth and urbanisation* increase pressure on already scarce resources, leading to smaller farms, larger crop-producing areas (pushing ruminants increasingly to marginal fragile land), resource degradation, conflicts, and urban migration.
- *An increase in large-scale monogastric production* responding to changing meat consumption patterns and technological developments in livestock production (particularly in the pig and poultry sectors), compounded by policies that distort the competitiveness of smallholder production.
- *A change in the consumption patterns of livestock products resulting from economic growth*, which is increasing the demand for higher food quality and safety standards
- *Growing concerns on zoonotic diseases* with the intensification of livestock production, and closer juxtaposition of humans and animals in expanding urban slums.
- *Globalisation* means many livestock-related issues become increasingly of global concern. These include the effect of growing international markets on such diverse issues as price transmission across markets, animal disease transmission and food safety, and the greater recognition of the need to conserve valuable animal genetic resources.
- *Climate change*, resulting in increased risks for poor livestock keepers from changing disease distributions and patterns, greater variability in rangeland resources, and changes in crop production patterns affecting animal feed availability.

These broad challenges call for action by the international community, and raise major opportunities for livestock-related research that will further contribute to the CGIAR goals addressing poverty, hunger, malnutrition and environmental degradation. In this brief vision paper, we present a checklist of the major challenges and opportunities ahead for livestock-related research targeted at poverty reduction.

### **Livestock enterprises in the developing world**

- Livestock production currently accounts for some 40 percent of the gross value of world agricultural production, and its share is rising.
- It is the world's largest user of agricultural land, directly as pasture and indirectly through the production of fodder crops and other feedstuffs. In 1999 some 3 460 million ha were under permanent pasture - more than twice the area under arable and permanent crops

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<sup>1</sup> A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets, now and in the future, while not undermining the natural resource base. (DFID 1998). Livelihoods draw on five types of capital assets (natural, social, physical, human and financial), and livestock can impact each of these.

<sup>2</sup> This growing demand has been termed the "Livestock Revolution" (see Delgado et al., 1999).

- Between 1964-66 and 1997-99, *per capita* meat consumption in developing countries rose by 150 percent and that of milk and dairy products by 60 percent. By 2030, *per capita* consumption of livestock products could rise by a further 44 percent.
- Demand will grow faster than production, producing a growing trade deficit. In meat products this will rise from 1.2 million tonnes/yr in 1997-99 to 5.9 million tonnes in 2030, while in milk and dairy products the rise will be from 20 million to 39 million tonnes/yr.
- Livestock are central to the livelihoods strategies of about 600 million rural poor, over 80% of whom are found in mixed crop-livestock systems.
- Livestock contribute in many ways to the livelihoods of the poor. These include: manure to enhance soil fertility; traction to prepare land, harvest crops and transport products to markets; meat, milk and eggs for consumption, and for sale to raise cash for education and health-care; hides and skins for household use and for sale; wage employment with producers and self-employment as market agents; social-networking instruments and social security capital.
- There are vastly different roles of livestock in the world, the poor understanding of which can negatively influence livestock research funding. In the developed world (the main source of such funding), livestock provide protein in people's diets. The affluence of the West and the wide variety of dietary alternatives have led to a marked reduction in the consumption of animal protein for health and dietary preference reasons, and the western media have disseminated messages of negative effects of red meat consumption widely and effectively. Animal welfare concerns have also influenced the consumption of animal products, as have the negative environmental impacts of large-scale pigs and poultry production. In most of the developing world, the context of the issues is quite different.

### **What are the challenges and opportunities facing research on the effective use of livestock in poverty reduction?**

#### ***1. Using our understanding of how livestock can reduce poverty to better target investments in research and development***

We know that livestock play important and very varied roles in the lives of many poor people. We often state that livestock form a component of the livelihoods of 70% of the world's poor<sup>3</sup>. But what precisely does this mean? How will improvements in feeding, management, health and breeding practises, as well as new institutional arrangements and policies brought about as a result of research, affect poverty levels? And which particular intervention - targeted at which particular role of livestock - will have the greatest impact on our ultimate goal? And what will be the mechanisms involved?

In addition to the need to understand how livestock contribute to poverty reduction is the need to understand how major changes in the world, such as population growth, globalisation, climate change and market diversification, will affect these mechanisms.

The challenges are associated with three specific poverty reduction pathways<sup>4</sup>. The pathways out of poverty relate to three major groupings of contributions that livestock research might make to poverty reduction<sup>5</sup>. These are:

- Secure the capital assets (natural, social, physical, human, financial) of poor people who keep livestock, who consume livestock products, market livestock and livestock products, and who work as wage labourers with livestock, by reducing the risks they face through constraints in feeding, management, breeding and health issues. In some settings, this may be not so much a pathway out of poverty, but rather a buffering mechanism to prevent decline into greater poverty.

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<sup>3</sup> See LID, 1999

<sup>4</sup> See Perry et al., 2002.

<sup>5</sup> Livestock: A pathway out of poverty. ILRI's strategy to 2010. [www.cgiar.org/ilri/strategic/toc.htm](http://www.cgiar.org/ilri/strategic/toc.htm)

- Reduce the constraints experienced by the poor to the intensification of agricultural systems in which livestock play a key role.
- Enhance the opportunities of the poor to participate in livestock-related markets.

Within each pathway, research opportunities can be clustered according to three general contributions to the innovation process. These are:

- Adoption of research products, including existing knowledge, technologies and policies
- Improvement or adaptation of existing tools, methods and approaches to make them better or more applicable to the particular circumstances of poor livestock keepers
- Development of new technologies, tools and approaches

The major opportunities for international research to better target research are:

- The characterisation and quantification of linkages between livestock development and poverty reduction through strategic studies in target production systems;
- The application of predictive output-orientated studies to evaluate the effects of poverty reduction interventions that exploit these linkages;
- The development of *ex ante* impact assessment models to determine the effect on these linkages and interventions of extraneous factors such as climate change and urbanisation;
- The use of research products to inform research and development policies and investments.

The impact of such research is aimed largely at influencing research agendas and policy considerations of partners. The CGIAR has a track record of identifying and promoting new research agendas in agricultural research for development.

## **2. *Making livestock do more to protect the livelihood assets of the poor***

The livestock of the poor are important assets that provide a built-in safety net for the poor. There are two important challenges to the assets of the poor that livestock provide. Firstly, poor livestock keepers are increasingly under threat from factors such as population growth (affecting availability to, and quality of land), HIV/AIDs (affecting the human and financial capital invested in livestock), and access to services and inputs. These extraneous influences will yet further erode their limited assets, sending them even deeper into poverty. The second challenge is that the very production systems on which they depend are increasingly threatened by segments of society, which view them as unproductive and damaging to the environment (and therefore not merit-worthy of investment), and by commercially orientated livestock producers who will increasingly marginalize them.

The opportunities to address these challenges lie in research into the role that livestock play in a) providing a buffer against a further decline in livelihood assets, and b) in protecting and enhancing specific livestock assets of exceptional value to livelihoods.

Important examples of research outputs include a better understanding of how livestock contribute to the capital assets of the poor and the development of policies for the conservation of indigenous livestock and crop genetic resources that provide robust support to capital assets. Other research opportunities include the development of a broader and more sophisticated understanding of the input, output and integration options for systems with limited market orientation, as well as the development and deployment of health and genetic technologies to reduce the devastating effects of animal diseases.

## **3. *Developing policies, institutions and technologies to support intensification in smallholder systems with livestock***

To meet the increasing demand for livestock products, a progressive process of intensification of production systems is predicted. This is occurring in many parts of the developing world in the pig and poultry sectors, particularly in Asia and Latin America. While it is likely that commercial systems will increasingly respond to this demand, the challenge will be to avoid

the marginalisation of smallholder livestock keepers in this process. The major constraints to intensification in smallholder systems are the lack of appropriate inputs, such as improved genetic resources, vaccines and feeds, which will improve system efficiency, but there is also a need for stronger institutions that understand and facilitate the smallholder intensification processes. Research opportunities include the need for improving food-feed crops, which not only meet the need for human foods, but also serve as effective fodder crops for livestock, that can cope with climatic stresses during critical dry seasons and droughts. Other research opportunities lie in scientific developments in genetics and genomics. These make concepts such as combining the hardiness and disease resistance qualities of many indigenous breeds of livestock with the productivity traits of many exogenous breeds, and the use of single vaccines to protect against multiple pathogens, likely realities by the year 2020.

#### ***4. Increasing access by the poor to markets in livestock products.***

There is an extraordinary variety of livestock products produced by the poor, and the potential to improve their quantity, quality, range and dissemination is a major opportunity for poverty reduction at all levels. However, the ability of the poor to exploit these diverse marketing opportunities is in many cases limited by transaction costs. These arise from, among other causes, lack of knowledge, business contacts and capital, small volumes of products of variable quality, restricted access to credit, poor local infrastructure, competition from large-scale producers (who also have advantages conferred by economies of scale), and an inability to comply with animal disease control measures and public health legislation.

The challenges to, and opportunities for, improving the access of the poor to markets in livestock products are very much inter-twined. On the one hand, it is predicted that economic growth, population growth and urbanisation are increasing the demand for livestock products<sup>6</sup>. Thus in theory, globalisation could help developing nations respond to the call for increased livestock production and marketing in different regions of the world. At the same time, higher prices obtained from access to export markets are likely to be transmitted to the domestic markets, benefiting smallholder producers. But there are significant challenges to this, falling into the broad categories of policy, technical and infrastructural issues.

High on the list are the sanitary and phytosanitary (SPS) standards that govern trade in livestock products, affecting local, regional and international markets. The policies and regulations of bodies such as the World Trade Organization (WTO) may result in higher transaction costs. And the dynamic nature of these regulations makes it difficult for the poor to keep abreast of their developments.

Over and above the technical constraints facing developing countries are the agricultural policies of the developed countries and regions with which developing country nations wish to trade and compete. While progress has been made, many still subsidise agricultural enterprises, making it very difficult for nations that cannot afford such policies to compete.

But the challenges are not just related to levelling the playing fields for international trade. There is a further significant threat that with the progressive opening of international markets, the major challenge will be keeping smallholder producers in business, as larger producers seek these lucrative markets, and also seek ways of reducing the health risks to their enterprises that their smallholder neighbours present.

There are opportunities for research that seeks to understand how poor countries, and the poor within them can take advantage of the predicted increased demand for meat, milk and other products, and how policies can support this. Specific research areas include technology development to enhance food safety. We believe that encouraging participation by the poor, particularly by women, in livestock-related markets offers a route to better livelihoods,

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<sup>6</sup> See Delgado et al. 1999.

coupled with an opportunity to benefit from the predicted increase in demand for livestock products. The challenge is to strike a balance between market opportunities and the non-financial roles that livestock play in the lives of the poor.

#### ***5. Coping with the externalities of expanded livestock production***

The global pressures of a growing human population and urbanisation will push many production systems and environments to their limits. Evidence of this is already seen in water pollution from high-density livestock enterprises, in natural resource and soil degradation associated with inappropriate agricultural practices, in disproportionately high usage of water for fodder crop production, and in outbreaks of zoonotic diseases in high density urban settings. A formidable challenge will be to avoid the growth of these undesirable environmental and human health impacts, given the weak monitoring and management public infrastructures available to deal with them, and to enhance the capacity, tools and processes needed to enable evaluation and mitigation of such externalities in different systems.

#### ***6. Facilitating functional innovation systems for livestock research and development***

The last half-century has seen the creation of much new information (from the science side on how to improve various aspects of livestock productivity, and from the producer side on which aspects need improving most), but somehow this information has not had the impact it deserved. The same is also true with technologies, many of which “sit forgotten on shelves” as people do not know about them, or cannot afford them, or there are no service mechanisms to put them into action. A major challenge is to respond to this lack of success by putting what we do know works into practice. The opportunity comes from the sophisticated communications and interaction technologies that the world now possesses, linked to an innovation system perspective that engages all stakeholders. At the same time, research must continue to improve the mechanisms and processes used to identify key constraints and potential solutions through participatory innovation partnerships with relevant stakeholders.

#### ***7. Enhancing appropriate and effective public and private sector investments in livestock***

Livestock services to poor households were traditionally the remit of the public sector for much of the 20<sup>th</sup> Century in most of the developing world. This was built on a need to protect developing commercial livestock sectors, and serve the needs of the disadvantaged sectors of society. Over the last 30 years, many such services declined, due to a lack of adequately trained staff, and declining national economies that correspondingly shrunk the size of public sector services. The structural adjustment programmes that followed virtually obliterated what remained of livestock services in many countries. Their impact is still widely felt, and the private sector has not been able to respond, as was naively expected, for a variety of reasons. The challenge is to fill the gap, and develop a sound understanding of the different roles and obligations of the public sector, and the multiple levels of private sectors, and how these theoretical obligations can be translated into practice. The answer is not simply for the private sector to assume many of the responsibilities, as continued public sector involvement is critical to ensure appropriate support to smallholder engagement in the intensification and marketing processes. The key research opportunities are to determine where public sector investment needs to be positioned, and how the public sector infrastructures of the developing world can be effectively strengthened to respond to this demand. Developments in Intellectual Property, largely shaped by the international AIDs therapy debate, open up new opportunities for fruitful private-public partnerships in this area.

#### ***8. The role of partnerships in the transition from research to implementation***

The major impacts of research, through scaling up and scaling out, will depend on sound partnerships with an increasing variety of stakeholders at various levels, and the CGIAR can play a key role in catalysing these processes. Beyond the catalytic role of CG centres is the function of bringing empirically based evaluations of key issues, developed through partnerships, to the broader international forums of global governance.

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