



Endogenous versus Globalized

An alternative vision of
livestock development for
the poor

Discussion paper

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Endogenous Livestock
Development



LEAGUE FOR
PASTORAL PEOPLES
AND ENDOGENOUS
LIVESTOCK DEVELOPMENT

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Summary

The “discovery” of the on-going Livestock Revolution has caused a stir among mainstream organizations and researchers concerned with livestock policy in developing countries. The forecast doubling of demand for livestock products by 2020 is both a threat and an opportunity for poor livestock keepers, and represents a challenge for devising livestock policies that benefit the poor. Approaches that have been suggested for equitable livestock development include vertical coordination and biotechnology solutions, as well as strengthening livestock keepers organizationally and supporting them to form pressure groups.

The paper examines whether these approaches would achieve the goal of pro-poor livestock development. It begins by briefly examining the significance of livestock for human society, which goes far beyond the provision of food and protein. Livestock also act as savings, provide draught and manure, offer a means of exploiting harsh environments, have social-cultural meaning, and deliver environmental services. Livestock are also relatively more important for poor rural people than for the better-off.

Most avenues to developing livestock have focused on increasing their production and cash outputs. This approach had proceeded at the expense of livestock’s other functions, especially with respect to the environment. Furthermore, livestock development has often wrongly been equated with livestock *keepers’* development. The experience with vertical coordination in North America and Europe gives reason for caution. Even simple biotechnology interventions such as artificial insemination remain to be adopted in developing countries on any notable scale.

The paper then examines whether the concept of endogenous development holds promise for pro-poor livestock development. **Endogenous livestock development** would mean building on local resources, including knowledge, institutions, fodder, and animal genetic resources. A small number of projects exemplify such an approach. They share certain characteristics:

- Extensive participatory pre-project research to understand the existing system and identify weak links in the production system
- A focus on a particular community
- Enhancement of the ecological functioning of the production system by relying on existing animal genetic resources
- Creation of market linkages
- Training of livestock keepers themselves
- Organization of livestock keepers into groups.

However, these projects have not been evaluated independently, so questions about their sustainability and cost–benefit ratio remain open.

There are also more common approaches to livestock and livestock keepers’ development, which integrate certain aspects of ELD. These include community-based animal health care, community-based animal genetic resource management, trade in indigenous animal genetic resources, the “Livestock Keepers’ Rights” movement, organic animal husbandry, and supplying local rather than international demands.

The paper identifies several approaches with promise for poor livestock keepers, such as reforming veterinary curricula to give more emphasis to indigenous knowledge and participatory methods, developing livestock keepers (rather than livestock) and organizing them into pressure groups, participatory training for extension services, instituting policies that favour small producers, promotion of indigenous animal genetic resources, providing

incentives for organic or ecological animal husbandry, and exploring innovative approaches to animal health services in remote areas.

The paper concludes that following in the tracks of Northern livestock development may be disastrous for developing countries that cannot absorb rural poor into the urban labour force.

Introduction

In 1999, a discussion paper published by the International Food Policy Research Institute (IFPRI), the Food and Agriculture Organization of the United Nations (FAO) and the International Livestock Research Institute (ILRI) predicted a substantial increase in the consumption of livestock products in developing countries by 2020. It forecast that satisfying this heightened demand would require the expansion of large-scale, high-input animal production (Delgado et al., 1999). Recalling the Green Revolution, this phenomenon was baptized the “Livestock Revolution”. It triggered intense debate among development organizations about its likely impact on poor livestock keepers. There is widespread consensus that the expanding market for livestock products poses not only a threat for poor livestock keepers, but can also provide them with opportunities – *if* it is harnessed properly (Steinfeld, 2001).

There is now a challenge to create policies that will enable the poor to obtain a share in the expanding market for livestock products. Based on these considerations, FAO has set up a Pro-Poor Livestock Policy Facility Initiative. Various possibilities for the poor to enter the livestock market have been proposed. They include “overcoming asset barriers” (heifer transfer), improved extension, and contract farming (Steinfeld, 2001). A concept paper by this FAO initiative for South Asia recommends vertical integration as a possible approach (FAO, n.d.). Another notable series of papers (published by the same initiative but authored by a team of political economists) concludes that the most promising option for strengthening livestock keepers would be to help them escape long-standing patron–client relationships and build their own pressure groups (Leonard, 2004). ILRI banks heavily on biotechnology to “secure the assets of poor farmers” (ILRI, n.d.).

The objectives of this paper are two-fold.

- First, it subjects some of the suggested approaches for enabling the poor to benefit from the Livestock Revolution to a critical analysis, drawing on the experience of livestock development in developing countries.
- Second, it explores alternative approaches to livestock development. In particular it examines whether the concept of endogenous development holds any promise for a positive impact on poor and marginalized livestock keepers.

Background

Significance of livestock for human society

Superficially, people use livestock mainly for food. But animal husbandry also fills several equally important roles. Sometimes these roles are even more important than the supply of animal protein. They include:

- **Draught power and manure.** More than half the farm land in developing countries is cultivated by animal draught. Manure provides more than 70% of the fertilizer.
- **Savings.** Animals are a walking savings account: one that can easily be converted to cash or goods.
- **Natural resource use.** Livestock enable people to live in, and use in a sustainable way, large parts of the world that are not suitable for crop cultivation. These include extensive drylands – about 22% of the world's land surface.
- **Employment.** Animals provide employment in a wide range of industries, including transport, trading, feed supply, and processing of meat, hides, wool and other products.
- **Social and cultural requirements.** Livestock are a vital component of many cultures. They form dowries and religious sacrifices; they provide entertainment (e.g., in racing) and enable people to show hospitality (e.g., through a shared meal) or mitigate conflicts (e.g., a gift of animals to a rival group).
- **Landscape and biodiversity management.** Grazing prevents meadows and steppes from reverting to bushland, is vital for the germination of various grassland species, and fertilizes impoverished soils.

The livestock dependent poor people can be divided into two broad categories: smallholders and pastoralists.

For **smallholders**, livestock is only one component of their livelihood or subsistence activities, and is subsidiary or complementary to crop cultivation. Livestock offer stability and security; act as a buffer in times of need and as a convertible asset (Dorward et al., 2001). Many of these households are headed by women burdened with a range of responsibilities, and for this reason they prefer robust and fertile animals that require minimum inputs.

Pastoralists are specialized livestock keepers. The whole family is usually involved in animal-related activities. Pastoralists are breeders that keep herds of female animals, which they pass on from one generation to the next. They have developed specialized knowledge about livestock keeping which is embedded in their culture and social structures.

Special significance of livestock for the poor

The rural poor are the largest group of stakeholders in livestock development. It has been pointed out that livestock keeping and aquaculture are the only significant economic activities in which poor people have a major share and which are growing rapidly (Steinfeld, 2001).

An estimated 70% of the world's rural poor rely on livestock for their livelihoods. Among them are more than 500 million people living in the arid lands of the Sahel and at high altitudes in the Himalayas and Andes, where only livestock affords a living (Livestock in Development 1999).

The largest proportion of poor livestock keepers are to be found in South Asia (45%), followed by Sub-Saharan Africa (24%), Eastern Asia (22%), and Latin America (6%).

Unfortunately, no reliable estimates are available for the proportion of poor livestock keepers of the total population in each country or region. India, Pakistan and Bangladesh have the highest density of poor livestock keepers (Thornton et al., 2002).

Number and location of poor livestock keepers

Agro-ecological zone	Millions of livestock keepers		
	Extensive graziers	Rainfed mixed farmers	Landless
Arid or semi-arid	87	336	
Temperate (including tropical highlands)	107	158	107
Humid, sub-humid and sub-tropical		192	

Source: Livestock in Development (1999)

Livestock are important for the poor. In India, the bottom 60% of rural households own 65% of the livestock. In the Indian state of Rajasthan, livestock contributes 25% of the income of small farmers, compared with 19% for medium farmers (Rangnekar, 2001). In Pakistan, livestock contributes 25% of the income of poor livestock keepers, but only 9% for rich households (Adams and He, 1991, cited in Steinfeld, 2001).

Livestock also provide the poor with items that are more difficult to quantify: draft power, manure, a savings account, social and cultural values, etc.

Part I

Mainstream approaches towards livestock development

Vertical integration and contract farming

Vertical integration and contract farming have been advanced as options for the poor to participate in the growing market for livestock products. Especially in South Asia, vertical integration has been proposed as an option for equitable, safe and clean livestock farming (FAO, n.d.).

Box 1

Definitions

Vertical coordination is how the various stages in production and marketing are synchronized, in terms of the quantity, quality, and timing of product flows.

Methods of vertical coordination range from **open production**, through **contract production**, to **vertical integration**.

Open production is when the buyer purchases a commodity from a producer at a price agreed at the time of purchase. There is no prior agreement on what or how much to produce, or on its quality or timing.

Contract production is when the producer agrees to sell the commodity to a particular buyer in advance. The buyer and seller may agree on the price, timing, quantity and quality of the commodity.

In **vertical integration**, a single firm controls two or more stages in the production and marketing chain.

The food industry has typically operated through open production, but contract production and vertical integration are becoming more common.

(based on Martinez, 2002)

A **vertically integrated** livestock company may produce animal feed, breed the animals, fatten, slaughter and process them, and deliver the products to the retail level. Almost the entire poultry and pork industries in the United States are vertically integrated.

In **contract farming**, the animals remain the property of the farmer until they are sold, but the firm may provide inputs, specify delivery dates and product quality, and engage in many of the producer's decisions – in return for giving a guaranteed market and price.

The record of vertical integration in the United States has shown that it is anything but safe, clean, and equitable. Strong citizen movements in the United States against industrialized animal production have compiled comprehensive dossiers on its negative effects on employment, environment, and human health.

Effects on employment

Vertical integration creates high labour productivity but very low employment. While such systems produce outputs for a large number of urban consumers, they generate income for very few people, although jobs may be created in processing, wholesaling and retailing, as well as in inputs and services required (Sere and Steinfeld, 1996).

Due to concentration of livestock farming, the number of farms in the US fell by more than half between the 1960s and 2000. A similar development occurred in Europe, where family farms have almost disappeared in some countries. A study of the socio-economic impact of large-scale pig farming in the USA has concluded that it hinders economic growth in rural communities (Gomez, 2000).

Proponents of vertical integration argue that it will combine poverty alleviation with economies of scale (Jutzi et al., 2000). But judging from the US and European experience, it appears that vertical integration is an inappropriate means of pro-poor livestock development because it will contribute to unemployment. In countries with rapid economic growth and sufficient levels of education, the farming population may be absorbed by other branches of the economy, but in many developing countries alternative job opportunities just do not exist.

Effects on the environment

Industrialized animal production requires large amounts of feed concentrate, and the wastes are afterwards deposited on nearby land, leading to groundwater, soil and air pollution. The American Public Health Association and the National Academy of Sciences have stated that pollution from massive animal factories jeopardizes public health in rural communities across the USA (New Farm, 2004).

Cereal consumption for feed

Livestock currently consume close to 50% of the world's cereal output. It is predicted that by 2020, developing countries as a whole will raise their imports of cereals to an amount equivalent to the annual US maize crop (200 million tonnes). About half of this amount will be used for feeding animals (Delgado et al., 2001). This dependence on cereal imports renders developing countries very vulnerable, as was demonstrated during the Asian economic crisis in 1999, which led to a drastic decline in industrialized poultry production.

Water consumption

Another problem associated with industrialized livestock production is its huge consumption of water. The production of 1 kg of chicken meat requires 3500 litres of water, and the production of kg of beef an astronomical 100,000 litres. By comparison, soybeans need 2000 litres, rice 1912 litres, and potatoes a mere 500 litres per kilogram of food produced (Cornell University Science News, 1997).

Disease

Concentrating huge numbers of animals in one spot brings with it the risk of disease outbreaks. As a consequence, huge amounts of antimicrobial drugs are routinely used in industrial livestock production. It is estimated that livestock producers in the United States use over **11,000 tonnes** of antimicrobials for non-therapeutic purposes, in the absence of disease, every year. That total includes 4600 tonnes in hogs, 4700 tonnes in poultry, and 1600 tonnes in cattle. The amount would be even higher if antimicrobials used actually to treat diseases were included (Union of Concerned Scientists, 2001).

Nevertheless, some disease outbreaks can no longer be brought under control. They wreak havoc on the industry, forcing millions of animals to be culled. For instance, the swine fever epidemic in the Netherlands in 1997–98 carried a bill of US\$2.3 billion. The foot-and-mouth

disease outbreak in the UK in 2001 cost \$9.2 billion, and “mad cow” disease another \$3.8 billion. In 1997, Taiwan had to spend \$6.6 billion to control foot-and-mouth disease.

Biotechnology

Research institutes such as ILRI are banking heavily on biotechnology to provide solutions for pro-poor livestock development. Biotechnology is held to allow poor livestock keepers secure their assets, for instance by developing vaccines and mapping genetic traits (ILRI, n.d.). Yet the benefits of biotechnology in developing countries have so far been meagre.

By far the most widely promoted biotechnology is artificial insemination – a tool that has enormous potential for genetic progress by spreading the genetic material of highly productive male animals very quickly. But it has been successfully adopted only in a few pockets of the developing world, characterized by comparatively high levels of literacy and a favourable environment. In Africa, its use is very limited. Apart from South Africa, only Kenya and Zimbabwe have national insemination services incorporating progeny testing schemes, and even these have collapsed or degenerated at times (Rege, 1996). Another recent evaluation concludes that artificial insemination has impacted on national animal production in only a few developing countries, notably India and China (Jutzi et al., 2000), but even this may be a very optimistic assessment, since in India too, demand remains low. In the absence of telephones and other rural infrastructure, the logistical problems are insurmountable. Furthermore, farmers usually receive no information about the bull whose semen is being used, and so the use of artificial insemination equals an act of blind faith. In countries such as China, India, and Bangladesh, farmers normally have no choice over the breed of the sire, and progeny testing is the exception. In Bangladesh, the semen offered one day may be from Jersey, and the next from Brown Swiss. The farmer has no choice.

A recent conference on reproductive biotechnologies concluded that artificial insemination is the only technology that has many any inroads at all. FAO has cautioned that modern biotechnology options are likely to be picked up only by industrial production systems, and that this will heighten the existing dichotomy with the small scale sector. (Jutzi et al. 2000)

Export standards

Achieving international standards for being able to compete in the export market is another proposed option. But if domestic demand for livestock products is booming, why should developing countries emphasize exports? It would make much more sense to concentrate on meeting domestic demand. It would also appear that complying with international standards for exports could be used as a pretext for supporting industrialized production and eliminating small-scale producers for fear of epidemics. Experiences with the avian influenza epidemic give us a warning in this respect. Small- and medium-scale poultry producers are being eliminated because they can not comply with bio-security standards. In some countries, backyard poultry keeping is being curbed within the vicinity of industrial production systems (Mathias, 2006).

Extension

More intensive extension is suggested as another avenue for supporting poor farmers. However, an in-depth analysis of extension practices in three countries (Burkina Faso, Kenya, India) concluded that there were serious problems relaying new research findings to livestock producers, and that there were no examples for the successful transmission of information to crop-livestock farmers (Morton, et al., 1997). The reason would seem to lie in extension messages that are inappropriate for small-scale livestock keepers, as well as in a

lack of participatory techniques. Without entirely revamping veterinary education to include training in participatory methods and the whole approach to extension services, increased extension *per se* is not going to be of benefit to livestock keepers.

Conclusions

A comprehensive review of 800 livestock projects concluded that they have had disappointing results in terms of poverty alleviation (Livestock in Development, 1999). It confirmed that the diffusion and adoption of the livestock technologies promoted by governments and non-government organizations so far has been very limited, and that very often they have not helped the poor. The report attributed this lack of success to the poor quality of the organizations that have been involved in livestock development, as well as to lack of a specific poverty focus. In most cases, the technologies offered were not appropriate. They were foisted upon people in a top-down manner, without mobilizing the people's own strengths and resources, and without regard for existing indigenous or traditional knowledge and institutions. These remained invisible due to the lack of participatory approaches.

We can conclude that livestock development as it has been practised in developing countries has consisted largely of the promotion of the approaches and concepts that have been developed in the West. This starts with the university training of veterinary and animal husbandry professionals being based on the western curriculum. It continues with the promotion of high-performance breeds originally developed in the West and the accompanying technology of artificial insemination. Finally, it encompasses the "productivity paradigm". Increased productivity is thought to hold the key to improving livestock keepers' livelihoods, although raising productivity may not be feasible under low-input conditions and poor livestock keepers might be served better with measures that reduce their vulnerability (Dorward et al., 2001). The underlying tenet is that the developing countries need to catch up with the developed countries in terms of individual animal productivity and adoption of technologies, and that the resulting agricultural growth will be to everybody's benefit (c.f. Birthal and Rao, 2002).

This approach fails to realize the multi-functional role of livestock for human society and ignores its role for employment, ecosystem services, insurance, as well as its social and cultural dimensions. All these functions are important for sustainable rural livelihoods (Anderson et al., 2002; Dorward et al., 2001). Unfortunately the options now suggested by mainstream organizations to support poor people to benefit from the Livestock Revolution represent "more of the same". They fail to distinguish between "livestock development" and "livestock **keepers'** development".

Part II

Endogenous development

If mainstream approaches have not made a difference to poor people, what are promising avenues for enabling the poor to benefit from the rising demand in livestock products? Here we will explore whether the concept of “endogenous development” holds promise.

Endogenous development is defined as development “from the inside”, or development based on local initiatives, knowledge, institutions and resources (Haverkort et al., 2002). Another definition is the “strengthening of local resources for the benefit of local populations” (Remmers, 1996). A key criterion for endogenous development is that it is controlled by local actors. Endogenous development does not mean the absence of external influences, but implies the ability of local actors to cope with external elements and exploit them to their advantage.

Experiences with endogenous development exist in Europe, where it has become a popular approach for developing the remote and “backward” parts of the continent that had been neglected by their administrations and had therefore retained their regional character. This preservation of their typical characters is now regarded as a competitive advantage over more modernized areas, because it is accompanied by typical local products and an internal market. One lesson from endogenous development projects is the need to strengthen local associations and to invest them with human and monetary resources to “generate a network of local agencies that provide channels for social cohesiveness and for getting local interests and alternatives on the agenda” (Remmers, 1996). This is regarded as more crucial than economic development in itself. Another recommendation concerns the urgency of participatory research into local agricultural, livestock-rearing and food-processing practices as a basis for endogenous development.

Endogenous livestock development

By definition, endogenous livestock development would build on livestock keepers’ knowledge, institutions and on locally available resources.

Local or indigenous knowledge

Local or indigenous knowledge about livestock keeping is also referred to as “ethno-animal science” (Perezgrovas, 2001). It consists of several components, including knowledge about herd management and animal behaviour, animal feeding and housing, indigenous knowledge about animal breeding, and animal health or ethnoveterinary medicine. Ethnoveterinary medicine is by far the most intensively researched aspect of knowledge about livestock (McCorkle et al. 1996). Such animal-related knowledge is deeply embedded in local cultures. Different people know different aspects of this knowledge: women may be particularly adept at keeping chickens, milking, or treating calf diseases; men may know more about fodder plants and herding methods; while healers may specialize in topics such as birthing, bone-setting or castration.

Local institutions

Livestock-keeping communities often have complex institutions in order to ensure long-term sustainable pasture management, water supply, and animal genetic resources (Homann et al., 2004 ; Rathore and Köhler-Rollefson, 2002). Among pastoralists, such local institutions also include rules and mechanisms for sharing animals within the community, ensuring that poorer relatives have enough animals to survive.

Local animal genetic resources

There is ample evidence that indigenous livestock breeds can outperform high-performance exotic breeds under low-input conditions. Small farmers may well find that keeping indigenous breeds is more profitable than switching to exotics (Ayalew, et al, 2003, Köhler-Rollefson 2004).

Local fodder resources

There are many alternatives to grain-based livestock production systems which make better use of local resources, solar energy, soil and water. The secret lies in recycling manure and urine, and creating highly productive, sustainable production systems (Preston, 2002, Lukefahr and Preston 1999). Energy crops include sugarcane, cassava, oilpalm and sugar palm. Many local trees and shrubs are suitable for sylvi-pastoral systems (Bayer and Waters-Bayer, 1998).

Examples of endogenous livestock development projects

Experiences with endogenous livestock development so far have been limited. While there is an extensive literature on farmer-led approaches to development, and numerous networks and initiatives exist, these almost exclusively pertain to crop cultivation. Participatory methods for livestock and pastoral development have been highlighted, but their application remains largely limited to non-government organizations and a few researchers. The concept of endogenous development with respect to livestock has only been promoted by a small number of organizations, such as COMPAS (Haverkort et al., 2002) and the LIFE Network (Warsi, 2002; www.lifeinitiative.net), as well as the World Herders Council (CME, 2000).

Projects which embrace the principles of endogenous livestock development have been rare and seem to have been implemented mostly by non-government organizations. Some examples are given below.

Adivasi Aseel chicken project

Selected inputs were used to strengthen the traditional production system of Aseel chickens by Adivasi communities in Andhra Pradesh. Participatory research identified Ranikhet (Newcastle disease) and salmonellosis as main causes of high mortality. Animal health workers were trained to vaccinate the birds, and women's' groups experimented with natural preventive therapies. Within a year, mortality had declined from 70% to 17%, and fell further to 6% after two more years. At the same time, *vaata*, a traditional system of sharing and asset-building was reinforced (Girijana Deepike et al., 2002).

Empowerment for Raika pastoralists in Rajasthan

The Raika are the traditional camel breeders of Rajasthan, in northwestern India, but have problems making a living from their hereditary profession. Action research by Lokhit Pashu-Palak Sansthan, a local NGO, identified bottlenecks in the traditional camel production system. Initial inputs focused on prophylactic treatment for trypanosomiasis, which cut the number of abortions. At the same time, the NGO documented the Raika's traditional knowledge, and facilitated the marketing of camel milk to help the camel herders earn more money. Later efforts focused on organizing the Raika to pressure corrupt forest officials and the government so they could use their traditional grazing areas (Rathore, 2001).

Tzotzil sheep project in Mexico

Tzotzil Indian women in the highlands of Chiapas have a very special relationship with their sheep, which generate 36% of their household income. They use the animals to produce wool and manure, and never kill them. In close cooperation with Tzotzil women, the Institute

of Indigenous Studies of the University of Chiapas undertook a long-term breed improvement project which resulted in a flow of genetically superior rams as well as improved understanding among veterinarians about the intricacies of indigenous women and their sheep (Perezgrovas, 2001; Gomez et al., 2001).

Llama production project in Bolivia

Llama husbandry has been the basis of the traditional livelihood of the indigenous people of the Andes, but family-owned llama herds have been shrinking as vehicles replace the animals as load-carriers, and as demand for wool declines. In addition, *Sarcocystis* parasites reduce the quality of llama meat. The Asociación de Servicios Artesanales y Rurales, an NGO, analysed the potential and limitations of llama breeding and developed a programme to improve husbandry. Interventions consisted of training community-selected livestock paratechnicians, building an abattoir, and controlling sarcocystiosis by deworming dogs and through strategic grazing programmes. The meat quality and weight of the animals have improved: between 1997 and 2000, each adult llama sold fetched an extra US\$ 9.65. A breeding programme to improve wool quality was also launched in combination with training in wool selection and spinning, and the establishment of a craft centre. These new possibilities in management and marketing have meant that llama breeding is no longer a marginal activity (Ravollo, 2002).

Best practices for endogenous livestock development projects

The projects described above share certain characteristics:

- Extensive, participatory research before the project began provided an understanding of the existing production system and identified weak links in it.
- The project focused on a particular community.
- The project relied on existing animal genetic resources (rather than exotic breeds) to enhance the ecological functioning of the production system.
- The project created market linkages to raise profitability.
- It included training for livestock keepers as an important component.
- It organized livestock keepers into groups.

Open questions about endogenous livestock development

Local institutions. In many cases local institutions have disintegrated. In other instances, they no longer serve the interests of the community, and may even hinder progress. What is the relationship between traditional institutions and new forms of organization, such as breeders' associations and producer cooperatives?

Sustainability and the cost-efficiency. Some reports of endogenous livestock development projects provide details of economic benefits to the communities. Others lack specific information. There is a lack of independent evaluations of endogenous livestock development projects.

Approaches that integrate aspects of endogenous livestock development

The projects described above are relatively small in scale. Various approaches to livestock and livestock keepers' development are more widespread, and use certain aspects of endogenous livestock development. By emphasizing indigenous knowledge, participatory

techniques, and training and mobilization, they correspond broadly to the principles of endogenous livestock development.

Community-based animal health care

Community-based animal health care is one of the few widely used approaches to livestock development that has proven potential for alleviating poverty. It was developed mainly by NGOs in response to the failure of government services to reach into remote areas. It consists of the training of community members to act as barefoot vets or paravets. It relies on a range of participatory techniques, and involves the mobilization of indigenous knowledge about disease classification and epidemiology. A review of such projects concluded that they have had an overwhelmingly positive impact on poor livestock keepers (IDL Group, 2003).

Community-based management of animal genetic resources

This combines the sustainable management of animal genetic resources with empowering the communities that developed them (Anderson et al., 2002; FAO, 2003). It also relies on participatory approaches to help people decide on their breeding goals. Most indigenous breeds are products of the management of animal genetic resources by the community, but projects focusing on this are still very rare (Köhler-Rollefson, 2000).

Trade in indigenous genetic resources

Countries in southern Africa have managed to capitalize on their indigenous breeds. For example, the Damara sheep breed from Namibia is exported to Australia, and Tuli cattle from Zimbabwe are in demand by beef breeders in North America (Köhler-Rollefson, 2004). Other countries, especially those with pastoral populations, are likely to also have breeds with similar potential markets. While this capitalizes on local resources, it is likely that a few elite, well-educated farmers have captured most of the benefits.

Livestock keepers' rights

Pastoralists and small farmers cannot compete with industrialized production systems in terms of output. But they fulfil a role that is just as important for long-term food security: they conserve livestock genetic diversity. NGOs argue that they should therefore be awarded "Livestock Keepers' Rights" which are defined as the rights of communities to:

- continue to use their knowledge concerning the conservation and sustainable use of their animal genetic resources, without fears of its appropriation
- participate democratically in making decisions on matters related to the conservation and sustainable use of animal genetic resources
- access, save, use, exchange, sell their animal genetic resources, unrestricted by Intellectual Property Rights and [modification through] genetic engineering technologies that will disrupt the integrity of these genetic resources
- have their breeds recognized as products of their communities and Indigenous Knowledge and therefore remain in the public domain
- benefit equitably from the use of animal genetic resources in their own communities and by others.

Those who advocate Livestock Keepers Rights seek to empower indigenous livestock breeders by ensuring they are recognized for their role as guardians of domestic animal diversity (Köhler-Rollefson and Wanyama, 2003).

"Organic" animal husbandry

While organic agriculture is regarded as a potential strategy to increase rural employment as well as enhance livelihood options for rural families (ESCAP, 2002), the scope for organic animal husbandry has not been fully explored. A study concluded that the potential for exporting organic meat would be very limited due to problems of meeting sanitary standards.

It would also be a very risky business, since permission would be withdrawn in case of a disease outbreak (Harris et al., 2003).

However, possibilities for marketing under an "organic" label may exist closer to home. In India for instance, ghee (clarified butter fat) is an important component of the diet, and has cultural and ritual importance. Urban consumers are developing reservations about the quality of ghee, since there have been several incidents of heavy adulteration. Buffaloes in peri-urban milk sheds are routinely given oxytocin before milking to induce milk letdown. Village women, on the other hand, produce ghee according to standards which can be considered "ecological". An NGO in Uttaranchal, in northern India, is supporting Gujjar pastoralists to market their milk as natural, to distinguish it from "synthetic" milk, which is causing scandals because it contains a high concentration of urea. In the Philippines, another NGO is supporting village-level organic poultry production (Barsomo, 2002).

Meeting local rather than international demands

The importance of local food economies is increasingly recognized. With the freeing of trade, farmers are integrating into the global economy, and have to compete with others on the opposite side of the world operating under totally different conditions. They experience pressure from both input suppliers and from produce buyers. Small fluctuations in price may devastate their livelihoods (Norberg-Hodge, 2003).

For farmers it is often more beneficial to market their products locally and to cater to specific culturally conditioned local preferences for certain food items. For instance in India, ghee has cult status, as have sweets (*mitai*, *gulab jamun*) that are acknowledged to taste better when they are made from the milk from local breeds. Because of its higher fat content and better taste, the milk of indigenous cows is at a premium with consumers, who scoff at the milk from crossbred cows. In parts of Rajasthan, the much smaller eggs of local chickens sell for more than double the price of commercially produced eggs, because it is believed that they have medicinal properties. Even dung cakes from indigenous cows grazing on local pasturage are more popular than those of hybrid cows fed with concentrate.

Recommendations for pro-poor interventions

Reform veterinary education

The foundation for mainstreaming holistic approaches to livestock development must be laid at universities and other training institutions. At the conceptual level, the role of livestock has been reduced to food production, so technological interventions that raise productivity are seen as solutions for poor livestock keepers. This belief in technological fixes is instilled into animal science and veterinary students during their training, and does not prepare them for the complexities of real-world livestock raising (van't Hooft, 2002). Many never develop an appreciation for the wider role of livestock for human society, nor understand how deeply animal husbandry and livestock are embedded into local cultures. Veterinary education needs to be broadened so that vets are enabled to go beyond just treating diseases and can facilitate the adaptation of livestock keepers to the changing scenarios of livestock keeping.

Design projects for livestock keepers rather than livestock

All "livestock projects" should be preceded by a thorough analysis of the existing situation and especially the locally available resources. Donors should avoid proposals for technical interventions that do not include an analysis of the beneficiaries' existing knowledge and institutions. Projects should address the needs of the livestock keepers, rather than that of their animals. This is likely to increase the amount of "soft" inputs such as training, social organization and marketing, compared with the "hard", purely technological interventions

Organize livestock keepers and build pressure groups

Livestock keepers should be actors rather than recipients, so in addition to training, there must be emphasis on organizing pressure groups and on projecting lessons at the grassroots to the policy level. A recent FAO paper draws attention to the fact that small-scale livestock producers are often locked into deeply ingrained patron-client relationships with more powerful social groups. They are therefore liable to sacrifice collective interests for individual gains, meaning that they pursue their personal goals through submissive behaviour with their superiors, instead of collectively pressing for their rights. An important role for NGOs is to assist livestock keepers with organizing into interest groups that can lobby for their rights and press for supportive policies (Leonard, 2004).

Promote participatory extension

Livestock extension, if it exists, usually promotes artificial insemination, crossbreeding, urea blocks and other options that have proven unattractive for small-scale livestock keepers. Extension messages need to change to address livestock keepers' needs based on their individual situations. In addition, extension agents need to be well-trained in participatory methods, need to have the ability to listen, appreciate the cultural contexts of livestock keeping, and engage in joint problem-solving.

Institute policies that favour small producers

Animal industries must be made to pay for their externalities, so should be taxed accordingly. Already there are calls to make them compensate for pollution; this should be extended to include genetic erosion. On the other hand, it is important to avoid excessive regulation that makes it difficult for small producers to participate. While consumer safety is a key concern, in Europe tight regulations have contributed to the death of family farms.

Promote indigenous genetic resources by building breeders' capacity

Locally developed animal genetic resources are the basis for endogenous development. There may be scope to improve them through community-based selection programmes and by developing speciality products such as wool, cheese or milk-based sweets.

Provide incentives for "ecological" or "organic" production systems

A range of incentives can be provided for ecological production methods. The objective should not be to emulate western standards, but to highlight products that have been generated according to ecological principles. For instance, meat from pastoral livestock production could be labelled as "range-fed" to distinguish it from industrial products (Buntzel-Cano, 2002).

Explore innovative approaches to animal health services in remote areas

In remote areas, private animal health services are not economical for the practitioner. Alternatives include community-based animal services and subsidies to private veterinarians for the services they provide.

Conclusions

The rising demand for animal products in developing countries holds enormous opportunities to generate rural employment. In theory, the expanding market for livestock products can indeed create income opportunities for the rural poor and slow down rural–urban migration. However, many of the approaches so far proposed for directing benefits to the poor follow in the tracks of western livestock development.

This comes at a time when problems in the livestock sector in the global North have become very obvious and are responsible for dissatisfaction among both livestock producers and consumers. Intensification, industrialization and concentration in livestock farming in North America and large parts of Europe have eliminated rural employment, and continue to do so. Furthermore, they proceed at substantial costs to the environment, animal welfare, consumer health, and genetic diversity.

When searching for development models for the global South, we should try to avoid the mistakes made in the North, where livestock research and development have conceptualized livestock largely as source of meat, milk, and eggs, so have focused on improving outputs of these products. Livestock development has overwhelmingly been directed towards increasing the productivity of livestock, raising outputs of cash products, and rationalizing labour inputs.

Repeating this approach will be disastrous in developing countries, where in many instances, rural people have no alternative income options and are not likely to be absorbed into the urban labour force. Successful models for livestock development must consider the many functions of livestock that go beyond the production of food and animal protein – the provision of rural employment, social and cultural significance, the sustainable utilization of drylands and highlands unsuitable for crops, and the supply of draught power and manure. A new function that has emerged in Europe in recent years is landscape and biodiversity management, and this aspect should begin to be taken into account in developing countries as well.

Besides striving for more holistic approaches to livestock development, we must not equate the development of **livestock** (improving genetics, feed, medicine and housing that increase productivity) with **livestock keepers'** development (where the livestock keeper is the focus of attention). As past experiences show, only those projects and programmes that mobilize the innate strengths of livestock keepers are likely to be successful.

In order to capitalize on the potential of livestock to generate income and contribute to poverty alleviation, a two-pronged approach is necessary: On one hand, livestock keepers need to be strengthened organizationally and be given a chance to develop endogenously. At the same time, industrialized animal production must be regulated and taxed to pay for its environmental costs and its effect on genetic diversity, so that a level playing field is created.

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