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Livestock-keeping Systems and Poverty

Learning Objectives: Understanding

- The livestock-keeping systems relevant to the poor
- The role of livestock as part of integrated agricultural systems
- Family strategy of risk minimization and diversification
- The link between livestock and most vulnerable groups
- The influence of livestock on environment and climate change
- Risk and advantages of low-input livestock keeping for human health
- The potential of smallholder mixed farming and pastoralism for Millennium Development Goals (MDGs) and biodiversity conservation

For hundreds of millions of poor households, livestock remain a key asset, often meeting multiple needs and enabling livelihoods to be built in some of the world's harshest environments. Livestock make a vital contribution to food and livelihood security, and to meeting the United Nations Millennium Development Goals. It will be of increasing significance in the coming decades. Traditional livestock keepers – often in poor and marginal environments – have been the stewards of much of the animal genetic diversity and integrated production systems. We should not ignore their role or neglect their needs.

Jacques Diouf, FAO Director General
(FAO, 2007a)

Livestock-keeping Systems Relevant to the Poor

According to the FAO, 640 million smallholders and 190 million pastoralists are

raising livestock. They make up 70% of the world's poor (FAO, 2009). It is important jointly to analyse the types of animal keeping used within a family and community, before focusing on ways to support the animal husbandry system. Most livestock-dependent resource-poor families can be found in the two major systems: in the low-input smallholder farming (Fig. 5.1) and pastoralist systems.

The type of animal keeping system used within smallholder farming is primarily related to the characteristics of the family and the conditions of their surroundings. Most families combine various crops with a wide array of livestock species. Most of these species are managed under a low-input diversified livestock-keeping system.

Whenever an opportunity presents itself, the family (or one family member) may decide to specialize the keeping



Fig. 5.1. This member of a rural family in Bolivia depends on a keeping a variety of livestock species in combination with growing crops and a number of other income generating activities.

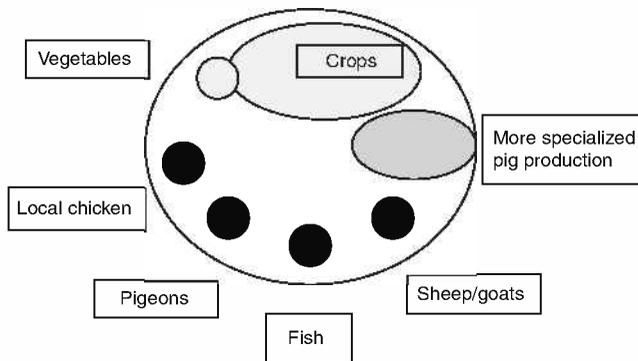


Fig. 5.2. Many livestock-keeping families combine low-input keeping of various species with more specialized keeping of one selected species, in this case pigs.

system of usually one selected species. This species is then managed under the more specialized livestock-keeping system. This will have a lower input level than the large-scale commercialized farms or ranches that are typically managed by large-scale landowners and investors, but in terms of productivity focus, these more specialized systems have adopted some characteristics of the high-input commercial farming systems. The rest of the animal species remain under the low-input conditions (Fig. 5.2).

Therefore, within the smallholder system two kinds of livestock-keeping strategies can be identified: the *diversified and low-input* livestock keeping and the *more specialized* keeping of one selected species (see also Chapter 6, Fig. 6.1).

General Household Strategies

Many families in developing countries live in risk-prone and climatically unpredictable environments. The most effective response in

these circumstances is based on productive diversification and risk minimization. Agricultural production is critical in rural strategies because it structures the relations of production around the land. Nevertheless, there are many other sources of income that can contribute to the diversification of the family economy. It is estimated, for example, that 90% of the rural families in central and southern Bolivia obtain more than 50% of their income from non-agricultural activities, including migration.

Life strategies of rural families with scarce resources are thus based on three fundamental aspects:

1. *Crop, livestock and forest production*, generally on a low-input basis mainly for family consumption and some sales at the local market. One aspect within this system, such as a crop or an animal species, may be selected for more specialized production aimed at the market and direct monetary income.

2. *Non-agricultural activities* within the community that generate monetary income. For example, home production of crafts, or agricultural and livestock by-products, buying and butchering animals, transport and trading of agricultural products, opening a store, a bar or a small restaurant.

3. *Migration* and other activities that generate monetary income outside the community. There are many types of migration: permanent, seasonal, sporadic and round trip. They may include only one family member, various members of the same family or the entire family.

The relationship between these three strategies varies greatly among families. In addition, it may vary within the same family depending on the season of the year, age of the family and external circumstances. Migration has become an increasingly important strategy. This has numerous social effects.

Risk Minimization and Diversification Strategies

In the process of facing the challenges, families continue to build on their age-old risk

aversion and diversification strategies within their agricultural system. These family and community level strategies continue strong today in many parts of the world. This is expressed in the high diversity of livestock-keeping systems used.

On the one hand, this is expressed in terms of species used: unlike large-scale animal productions systems that are largely limited to three species – chickens, pigs and cattle – families can raise up to ten animal species. On the other hand, there is a large variety between families, regions and cultures in the ways each of these species are managed.

Diversification and risk management play an important role in food security and social relationships within communities, and are often based on the principles of solidarity and equitable redistribution of resources. For example, in Ethiopia, pastoralists have a conscious herd management strategy to reduce risks during lean seasons (Gebru Tegegn, 2009). In the Andes, barter (the exchange of goods) and reciprocity systems continue to be part of the way rural families and communities organize themselves (Box 5.1).

Women and Livestock Development

Recognition of the links between livestock production and hunger, gender inequality and vulnerability to debilitating diseases has helped turn the spotlight on women and livestock in development. Above all, with a view to alleviating poverty, special attention needs to be given to women (Fig. 5.3). In many cases, women are the ones primarily responsible for the livestock. There is an intimate relationship between the situation of farming women and animal husbandry that they practice (Letty and Waters-Bayer, 2008).

Limitations

- Women have many responsibilities, especially under circumstances of

Box 5.1. Reciprocity and regional exchange: the Seven Day Fair in Bolivia.

In the valleys of Bolivia, it is still very common to find barter and reciprocity, especially amongst the indigenous population. Barter is common, for example, between families that live in high-altitude zones and the valleys: exchanging cow manure from valley farms for potatoes from high altitudes, for example. This also takes place in traditional fairs, in which practices such as barter and reciprocity are mixed with a money-based market.

The Seven Fridays Fair occurs seven Fridays after Easter in the town of Sipe Sipe, located close to the city of Cochabamba in Bolivia. This period coincides with the root plant harvest on the high plains, and the maize harvest in the valleys. These products are exchanged via barter between families from the valleys and from the high plain zones. The fair is very important for the people in both regions as it contributes to food security. Moreover, it reinforces social relations between family, godparents and friends from different communities. During this fair, various rituals of thanks to nature and to the Mother Earth (Pachamama) are performed, both within and outside of the Catholic Church (Compas, 2007).



Fig. 5.3. With a view to alleviating poverty, special attention needs to be given to women. In many cases, women are the ones primarily responsible for the livestock. There is an intimate relationship between the situation of farming women and animal husbandry that they practice. Credit: Ellen Geerlings.

out-migration of family members, and dealing with the effects of HIV/AIDS.

- Women receive little or no formal education.
- The possibilities of leaving home are limited.
- The amount of land available to them is generally limited by culture or by law.
- They have little or no capital to invest.
- The possibilities of each woman depend heavily on the age of her children; a woman has fewer possibilities with small children than she does without

children or with older children that can help her.

Strategies

- Women seek diversification of the activities in order to minimize risks; for this reason, raising animals plays an important and constant role.
- Women are strong movers of family and community organization.
- Family animal husbandry headed by women is generally an activity of minimal investment with few locally available products.

- Raising animals offers a good possibility of generating monetary income for women, which is usually used for all the family's benefit.
- Working with animals is considered more pleasant than other activities that can yield similar income.
- Animals are part of the indigenous culinary and medicinal culture, intimately tied to the responsibilities of women.
- Many women prefer to have animals around the house as part of their daily environment and for their affective relationship with them.
- Teaching from mothers to daughters is done orally and through the participation in daily activities.

This combination of elements explains why diversified animal husbandry, led by farm women without regard to their social origin, has existed for thousands of years and will continue to exist in spite of its apparent 'irrationality' from a technical-economic viewpoint. Rather it deals with a very profitable activity in socio-economic terms as a farm woman explains:

'I always give food to my pig. I invest a lot of effort in this and I do not care if it is economically profitable. The most important thing is that I can sell it when my children need books for their classes'

(van't Hooft, 2004)

Children also have an important role in low-input livestock systems, especially in communities where the animals are taken out to graze. When these children enrol in school, manual labour becomes scarce and has a negative impact on the workload of women. At the same time, shepherding work inhibits the children in their formal education. This affects girls especially.

Smallholder Livestock Keeping, Environment and Climate

The role and potential of livestock in influencing environment and climate change is subject to much debate. There can be major ecological problems related to raising animals, such as excess nutrients and waste, the use of large quantities of grains at the expense of crops for human consumption and the associated emission of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). Livestock had not been mentioned extensively in the climate change debate until 2006, when the FAO reported that livestock keeping produces 18% of all greenhouse gases (Steinfeld *et al.*, 2006).

In the climate change discussion about livestock, the focus is often on ruminants, and on specialized ways to maximize individual animal productivity. High-input solutions promoted to reduce the greenhouse gas emissions by ruminants include feeding ruminants with more maize and concentrates, change from keeping ruminants to pigs or poultry, change local breeds for more productive and specialized ones, build totally enclosed stables, reduce methane production in the rumen. To achieve this, it is often argued that intensification and large-scale livestock production is necessary.

However, there is a need to take into account the total environmental problems related to livestock production, including water scarcity, land degradation, loss of soil fertility and loss of biodiversity. A differentiation should be made between existing livestock-keeping systems, in terms of climate change and environmental impact, especially between high-input industrial systems and low-input systems (van't Hooft, 2009).

Box 5.2. The Women in Livestock Development (WILD) Initiative:

The WILD initiative empowers women by creating opportunities to own livestock. Heifer International provides women with cows, goats, buffalo or poultry, resources for livestock production, values-based literacy and gender-equity training to strengthen women's positions in the community. Given the opportunity, women generate and handle income for the benefit of their families and get involved in planning and analysing the outcomes of the women-focused activities. (www.heifer.org/wild)

Experiences have shown that there is also another option: the optimization of livestock-related systems as a whole, which reduce the negative effects of livestock keeping, while maintaining levels of total farm production (Sere, 2009). Small-scale mixed-production systems that combine crops with raising animals offer good possibilities for balancing food production with sustainable replacement of nutrients, and thus a better chance of maintaining the fertility of the land. The social and environmental value of small-scale livestock production systems can far outweigh the negative consequences. Similarly, there is increasing recognition that pastoralist systems may well be the most appropriate form of utilizing grazing resources under arid conditions.

Positive effects of low-input family animal husbandry on environment and climate

- *Increased soil fertility and organic matter:* The integration of crops and livestock in family production helps to preserve the fertility of the land through the recycling of nutrients. The use of manure on plants preserves the structure of the soil and its drainage capacity. The need for an integral productive system is especially necessary in the humid tropics because of its fragile ecosystem and acidic soil. Increased soil fertility and organic matter also
- *Animals generate energy:* Animals produce energy through transport, draft power and the conversion of biomass into foods. This reduces the demand for fossil fuels (Fig. 5.4). Manure is used directly for fertilizing the fields, for cooking, heating and generating electricity. In addition, manure from some species can be used to feed other species; raising fish, for example, can be done with cow manure, pig and duck manure.
- *An alternative source of income:* As an alternative to monetary income for the family, animals lessen the need to carry out other activities that cause greater ecological harm, such as cutting trees to sell charcoal or slash and burn to create farmland in tropical zones within virgin forests.
- *Animal biodiversity:* Rearing livestock that are native to a region makes sense from the standpoint of acclimatization. Long-term resident breeds and strains are adapted to weather conditions, insect pests and natural feed variations. When we pay attention to raising these animals for production, work and by-products, we take advantage of these natural characteristics. Most regions of the world have a variety of different breeds of



Fig. 5.4. Animals produce energy through packing, draft power and the conversion of biomass into foods. This reduces the demand for fossil fuels. Manure is used directly for fertilizing the fields, for cooking, heating and generating electricity. Credit: Jeet Lal Shrestha.

animals that provide this broad diversity. Finding ways to utilize these variations makes biological sense. Diversified breeds and types of animals in the production system also allow families to utilize more fully the variety of crops that grow in marginal lands. Unfortunately, many local breeds of animals – both domestic and wild – are in very low number and some are in severe risk of being lost completely. Therefore, selection of local breeds for family-level livestock production can preserve this genetic diversity and enhance local food security (FAO, 2009).

In smallholder and pastoralist systems, local breeds are commonly used (Fig. 5.5). Even though their production of traditional products (meat, milk and eggs) is relatively low, their efficiency is high, as they produce on the basis of low-quality foods and low costs. These breeds are also adapted to the existing eco-cultural factors of the zone.

- *Use of by-products:* Livestock can take advantage of many animal and plant by-products in their feeds, such as low cost and waste products from slaughterhouses and restaurants. Even chicken manure from the poultry industry and remains from the fish and fruit industries have beneficial nutritional uses. Thus, environmental contamination from these low-value remains is avoided.



Fig. 5.5. Cattle at Fulani cattle market, Cameroon. Photo credit: Ellen Geerlings.

Negative effects of low-input family animal husbandry on environment and climate

- *Overgrazing:* A main source of environmental degradation and greenhouse gas production related to livestock is related to poor land use, like soil degradation, overgrazing and deforestation. The degradation of natural grazing fields is related to poverty, overpopulation of the zone and ecological changes. As a life strategy, many rural families in these zones are forced to satisfy their immediate needs through unsustainable practices, such as overgrazing and deforestation for the sale of wood for cooking and charcoal. In zones where there are many small properties, there is the danger of degradation by a growing population. When the parcels will no longer support livestock, the fertility of the land decreases rapidly and worsens the situation of degradation. Over time, this becomes a vicious cycle of poverty and degradation. Livestock have a determined influence even though they may not have been the initial factor.
- *Slash and burn:* Increasing numbers of people in tropical forest zones are also responsible for considerable environmental damage, especially if they have migrated from other ecological zones. This is where we see large quantities of virgin forests taken down each year by smallholder farmers in search of land for producing food and cash crops.
- *Goats:* In some dry and deforested zones, many families keep large herds of goats. These are seen by outside agents as a ‘curse’ because of their foraging on the small amount of shrub vegetation in the existing grazing lands of these zones (Fig. 5.6). Yet at the same time, families consider these animals to be a blessing because they depend on them for income in their difficult life conditions. Goats (temporarily) prevent a definite out-migration of these families.



Fig. 5.6. Goats are often managed in a different way from sheep and cattle. They prefer to browse trees and bushes more than grasses.

Smallholder Livestock Keeping and Human Health

In developing countries, the majority of families' livestock keeping takes place in low-input conditions. In the cultures and strategies of these families and communities, there is an intimate relation between animals and humans, at both physical and emotional level. This way of living together with animals has a lot of consequences.

In general, the theme of the relation between animals and humans does not get much attention in agricultural curricula. Meanwhile, the diseases that pass between animals to humans (zoonoses) have serious consequences for public health, and in the majority of cases, they have not been controlled in an effective way. In communities and families, the knowledge on diseases and parasites that pass back and forth between animals and humans is also very limited. Because of this lack of information, there are many beliefs about these diseases that are not always based on reality.

Advantages of low-input family animal husbandry on human health

There are numerous advantages to keeping animals, which explains how we can find this activity in most parts of the world; among rich and poor people and in rural and urban areas. Animals are related to the

well-being of families in the following ways:

- *Optimization of agricultural production and farm efficiency:* Within the strategies of the rural families, agriculture production is intimately related to livestock, so that the animals take over the draft power and transportation needs of the family. They save on physical efforts of the family. In many cases, manure is the most important way to fertilize agricultural fields; moreover, the animals use the agricultural by-products.
- *Income possibilities:* Families sell animals or their products in moments of necessity or emergency. With this money, they can pay for a visit to the doctor; buy school materials or other products (bread, clothes, medicines, cover funeral costs). These elements are directly related to the well-being of the family.
- *Animals provide food for the family:* The production of food products (milk, meat, eggs, honey and fish) is an important reason to keep animals. Independent of direct nutritional benefits, foodstuffs increase physical health of the family. The diseases, parasites and other elements that cause physical stress affect less if the physical body is well nourished.
- *Use of household organic waste:* Several animal species, such as chickens, pigs, guinea

pigs, rabbits, dogs and cats eat leftover food and help to control rats, mice and insects. In this way, they contribute to the physical cleanliness of the household environment.

- *Physical protection*: Animals such as dogs, geese and guinea fowl play a role in protection of the family, both during the day and in the night, so the family can sleep without worry. The wool and fibre of different species also serves as protection against the cold.
- *Emotional and spiritual comfort*: Animals form a part of many cultural festivities, ceremonies, rites and social events: This is important for cultural identity, which influences emotional stability, both at the individual and community level. Moreover, animals provide companionship and are part of everyday life and contentment.

Disadvantages of low-input family animal husbandry on human health

There are also disadvantages of keeping animals. It is necessary to understand them in order to decrease the risk.

- *Social problems*: Problems can arise with neighbours related to the theft of animals or over animals that are noisy or left to run loose and that disrupt crop production. This can create tension and disagreements between families.
- *Hygiene*: Where animals are kept and where milk, meat and animal feeds are stored, there is more humidity and odours which attracts flies, cockroaches, rats and other vermin that feed on scraps. To this, we must add that when animals are loose and in the house, they may defecate in the house. Animal waste can attract additional pests.
- *Medicinal residues in milk and meat*: In family livestock keeping, medicinal compounds such as antibiotics and hormones are often used. Product labels specify proper use and withholding times from consumption of milk, meat

or eggs. In order to avoid residues in human foods, these label instructions must be followed carefully. Often this is not the case and as good control is lacking, milk and meat are often contaminated with toxic residues. A side-effect is that microbes and other disease-causing agents can develop resistance against the antibiotics. This results in so-called multi-resistant strains of microbes in both animals and humans. In cases of disease with these strains, no antibiotic treatment will be effective.

- *Zoonoses*: Zoonoses are diseases or parasites that pass between animals and people. They represent a problem between animal husbandry and human health, especially in places where animals and people live physically close together.

Low-input Livestock Systems and the Millennium Development Goals

As shown in the various parts of this chapter, low-input livestock-keeping systems have a role to play in most elements of livestock keepers' lives. They are thus also related to most of the eight MDGs, but mostly in the following (FAO, 2007b; Heifer International, 2010):

MDG 1: reducing hunger and poverty

It is increasingly recognized that livestock in integrated systems can contribute positively to reducing hunger and poverty, thus addressing MDG 1. Since agriculture is the livelihood source for the majority of the rural resource-poor, investing in this sector will reduce extreme poverty and hunger. Because livestock provide diverse goods – including food, draft power, organic fertilizer, and economic and social security – to smallholder farmers, investment priorities should consider livestock-based agriculture within ecologically sound systems.

MDG 3: Reducing gender inequality

Experience has shown that improvements and low-cost investments in small-scale livestock keeping – a dairy cow, a few goats, a few chickens or guinea pigs – offer opportunities for women not only to increase household income but also to control a larger portion of it, thus reducing gender inequality.

MDG 6: Reducing impact of HIV/AIDS

Improved livestock-keeping practices and production, both for home consumption and the market, diversification in income sources from livestock and a stronger position of

women as livestock owners help to reduce their families' vulnerability to the impacts of HIV/AIDS and other diseases, thus contributing to MDG 6.

MDG 7: Ensure environmental sustainability

To catalyse environmental stewardship, secured access and ownership of land and productive assets is critical. Insecurities in tenure and access arrangements can aggravate resource over-exploitation. Special attention needs to be paid to gender-differentiated resource management priorities. Climate change adaptation and mitigation strategies must also focus on the needs and capabilities of the resource-poor.

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