Livestock: industrial or integrated?

Editorial

Livestock production is important for the majority of farmers in developing countries, especially for small farmers in more marginal conditions where land cannot be used for other purposes. Smallholders keep livestock for food, fibre, fertiliser, fuel, draught power, as a buffer in case of crop failure, and also for social and cultural functions. Increasingly, livestock is also produced for cash, which is the main objective of specialised livestock production systems. This type of livestock production strongly depends on the dynamics of the global markets.

A team of researchers of the International Food Policy Research Institute (IFPRI) and the Food and Agricultural Organisation (FAO) produced an extensive report called: 'Livestock to 2020: The next Food Revolution' (see Garcés p.7). 'Livestock Revolution' was the term they used to describe the expected massive increase in livestock production in developing countries due to doubling of the demand for livestock products, especially in the North, over the next 20 years. Like the 'Green Revolution', this 'Livestock Revolution' involves the large-scale transformation and growth of production along the same lines as it has already taken place in many 'developed' countries. What will be the consequences of this development?

Painful experiences in the North teach us that this development towards 'factory farming' will put enormous pressure on natural resources, food safety, animal diversity and welfare, as well as threaten the income generating possibilities of small farmers. In reality these systems are very inefficient and the hidden environmental and social costs of the livestock industry are enormous (Garcés p.7). Also, to meet food needs in 2050 it is necessary to increase human food production considerably. But, the 'Livestock Revolution' will compete strongly with human food production. Presently, livestock already consumes almost 50% of world cereal grain supplies. It is therefore very important to develop livestock production systems, which do not depend on cereal grain (Preston p.26). The Animal Welfare Review in 1998, therefore, raised the all-important question: *"should this type of intensive livestock production continue to be encouraged globally, or should alternatives be sought?"*

Even without the 'Livestock Revolution', livestock keepers already have enough ecological problems, for example, due to overgrazing and burning. Research has developed technologies mainly for intensive and industrialised livestock production systems. But, many modern technologies do not fit the reality of low-input livestock systems (van 't Hooft p.10).

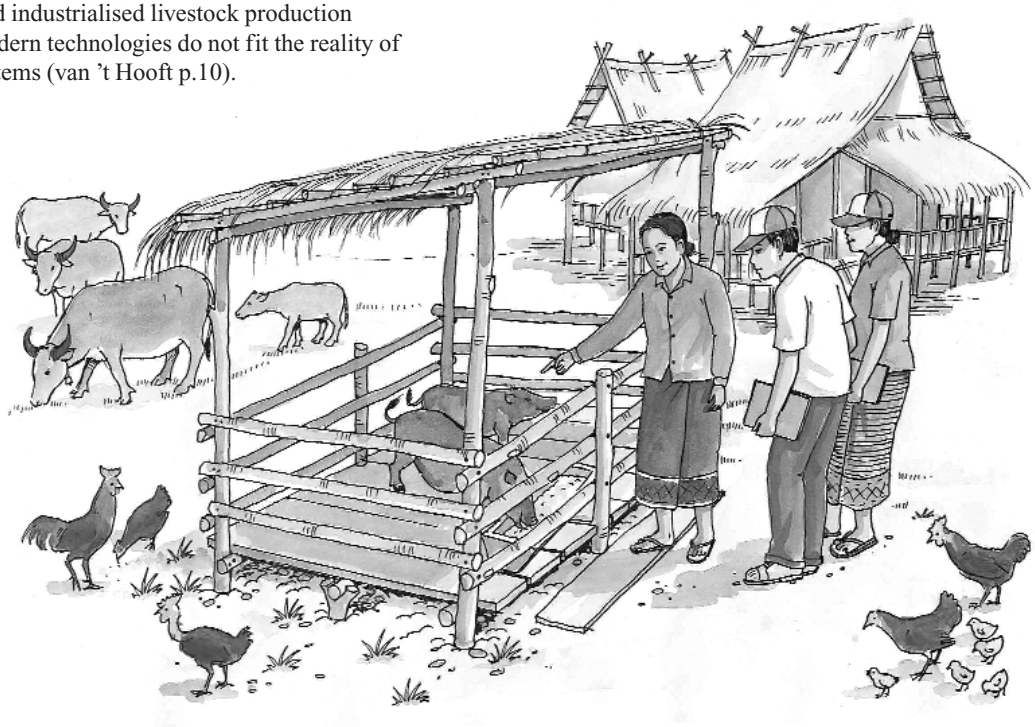
But what alternatives are available to farmers? The articles in this issue present some useful insights, practical suggestions and ways to achieve them.

Enhancing the quality of the whole system

To optimise the performance of farming, it is important that management practices enhance the ecological functioning of the 'web' of all living organisms within the production system by influencing the interactions between climate, soil, vegetation, animals and farmers (Primavesi and Primavesi p.12).

Traditional farmers often have mixed systems in which the production of crops, animals and natural resources are integrated, products are of multiple-use, and waste products of one sub-system are used as inputs in other sub-systems. Within this integrated system, depending on needs, opportunities and risks, farmers may follow different strategies: keep many different animal species under low-input management system, or combine this with the intensive production of one specific species (van 't Hooft p.10). Traditional systems can be relatively productive, while making optimal use of the available natural and human resources. Presently, influenced by modernisation and globalisation, most of these traditional systems are loosing their economic and social coherence.

The awareness that agro-ecological systems are complex and integrated, and that the quality of all parts of the system, including its social and cultural dimensions, is important to optimise the performance of the whole system, has been lost in more modern agriculture. Intensive livestock production in The Netherlands, for example, strongly focused on high input / high output relations and profit making and forgot about the environment. Two environmental associations of dairy farmers, rediscovered the importance of the quality of the whole system. They found that the quality of the cow manure influences the quality of the soil, which, determines the quality and quantity of the pasture and fodder crops, the feed for the animals, which is important for animal health and the quality and quantity of their products (see Figure 1 on p.24). They have developed a new way of feeding their milk cattle with lower protein and higher fibre contents by using less concentrates and fertilisers, which reduces nutrient losses while maintaining milk production at the same level. (van Weperen and Kieft p.24).



Presently, livestock research appears to show heightened interest in mixed or integrated farming systems going by the number of conferences that has dealt with this subject in Latin America, Africa and Southeast Asia (Sources p.30). Agroecological research in Colombia and Cambodia is working successfully on the development of integrated farming systems, with close integration of animals, recycling of all excreta, and the use of highly productive energy and protein crops, to improve productivity and sustainability of smallholder and commercial agriculture in the humid tropics (Preston p.26; Murgueitio p.14).

Integration of crops, grasses, trees and animals

Many of the authors stress the importance of diversification of agriculture. Van 't Hooft (pg.10) explains the importance of animal biodiversity in smallholder agriculture in the Andes. Primavesi and Primavesi (pg.12) report on the benefits of integration of leguminous crops and trees in pastures in Brazil. Funes-Monzote and Monzote (p.20) analyse the effects of integrating crops and trees in dairy farms in Cuba. Viengsavanh et al (p.16) explain how, in Laos, integration of specific grasses, trees and legumes help farmers overcome seasonal feed shortages for their animals, reduce labour requirements, improve animal health and performance in extensive systems. Murgueitio (p.14) points at the complementarity between ruminants, monogastrics like chicken, fish and earthworms, micro-organisms in biogas digesters, crops, grasses and trees to optimise the benefits of intensive integrated systems.

In tropical countries, especially in the humid zone, there are many crops and farming systems that considerably exceed the productive capacity of grain cereals. Key energy plants for intensive integrated systems are: sugar cane, cassava, the palm family (especially the oil and sugar palms). Key protein crops are: N-fixing legumes (trees and shrubs rather than soy beans) and water plants like "duckweed".The feeds derived from these "alternative" crops do not lend themselves to "factory" farming systems which traditionally use dry feeds, easy to store, transport and mix into "least-cost" rations. The "alternative" feeds require relatively small scale, diversified and integrated farming systems. The role of animals in these systems will be synergistic rather than as primary producers (Preston, pg.26).

In more marginal environments it is very important to integrate farm animals adapted to the local climate and forage (Primavesi and Primavesi, Pg.12). Indigenous animal species are often much better adapted to these conditions. Thriving even at low levels of fodder inputs, their maintenance is ecologically more sustainable. While they may not be able to compete with "improved breeds" in regards to milk and meat yields, indigenous animal species fulfil a much wider range of functions and provide a larger range of products. As is becoming increasingly clear, they often have scope for specialty products and can be essential to preserve habitats. Improved feeding can double the performance of local breeds (see box on p.9). But, according to FAO, one third of the world's estimated 4000 livestock and poultry breeds are in danger of extinction! The 'Livestock Revolution' will speed up the loss of indigenous animal biodiversity. Action is therefore urgently needed – an example of this is the LIFE project (Warsi p.27).

In addition, small animals and insects could have considerable potential to improve the integrated farming system. Poultry is an example of a small animal which plays a very important role in smallholder production and poverty alleviation. Earthworms (Murgueitio) and weaver ants (Van Mele and Vo p.28) are examples of very useful insects which could strongly enhance the overall productivity of integrated systems. And, of course, we should not forget the wide diversity of micro-organisms in the soil and the animals without which agriculture would not be possible.

Chain management and weak links

An increasing number of organisations are working on improvement of the whole livestock production chain, including aspects such as input supply, processing, marketing, transport and farmer organisation. Rocha (p.22) presents such an example. In the Andean highlands of Bolivia there is an enormous ecological and economic potential for llama production. However, llama production is strongly marginalised due to, among other factors, a parasite in the meat (Sarcocistiosis), which makes it less attractive for human consumption. Farmers, supported by a local NGO, have succeeded in reducing the prevalence of this parasite, improving market structures for commercialisation of this product, and undertaking other activities to revitalise family-level llama production, with positive economic, ecological and cultural effects.

Often there is a weak link in the production chain, which could strongly inhibit the overall performance of the system. Strengthening of weak links may have unexpected results. Unlike in the intensive systems in The Netherlands, mentioned earlier, in extensive systems, for example, animals often get too little proteins or lack specific minerals (e.g. phosphate, calcium, magnesium or cobalt). Integration of leguminous or other protein-rich crops and trees into the system and feeding of protein-rich concentrates with added minerals could contribute a lot to improve animal health and production (Primavesi and Primavesi; Preston; Viengsavanh et al).

In Kenya, Luo farmers had a lack of manure to fertilise their crops. By adopting 'zero grazing' they succeeded in strengthening the livestock component of their integrated crop-livestock system, which then brought the whole system to a higher level of production. However, intensification of indigenous farming systems, e.g. by introduction of zero grazing, has to fit local perceptions, needs and opportunities (Mango p.18).

Another example of a weak link is Newcastle disease in poultry production. Poultry networks are now testing new vaccines for control of Newcastle disease which can be produced locally and can be easily administered (van 't Hooft p.36).

Integrating researchers, policy makers and educators

By following a more holistic, ecological approach many farmers seem to come closer to their own 'gut feeling' of how they should manage their farm, which is also more in line with how their parents thought about it (van Weperen and Kieft, p.24). The problem is, however, to get other players such as researchers, policy makers and educators involved in this approach to form (inter)national networks and local platforms for change. Although, increasingly, these players are aware that there is something wrong with the conventional approach to livestock production, they have to make quite a change in attitude and thinking to take a different stand. For example, animal science as taught in Latin American universities and farming schools is focused on reaching the maximum productivity per animal, limited to the animal species used in industrialised livestock keeping, especially cattle, pigs and chicken. The absence of the essential elements of family-level livestock keeping and the basic principles of integrated, ecological livestock production in the curriculum is reflected in the frequent failures of livestock projects and the negative impact of livestock production on the environment.

Although integrated livestock systems have considerable potential to improve livestock production, the chances of small farmers competing with industrial livestock production will remain weak as long as research, policies and education systems do not change.

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