



Agroecological livestock-production systems

Introduction

Agroecology transition involves implementing technical changes, especially in livestock-production systems. These changes are generally part of greater changes to agricultural production systems, in particular the reinforced integration of crop and livestock production activities.

This note is one of seven (07) thematic ones resulting from the capitalisation of the ECOWAS Agroecology Programme in West Africa (AEP). It is the wrap-up of the various changes implemented as part of the experiments supported by AEP, lessons and conclusions relating to the development¹ of agroecological livestock-production systems, their sustainability and their scaling-up as well as recommendations related to public policies likely to promote these various aspects.

The analysis is based on a review of various works on AEP-supported experiments and livestock farming in the region, general interviews with key stakeholders in agroecology and livestock farming at regional level, case studies carried out in six (06) countries in the region (Benin, Côte d'Ivoire, Ghana, Nigeria, Senegal and Togo) and the conclusions of a regional workshop to discuss the provisional results.

In particular, the topic includes changes related to animal feed, which is a major limitation to the productivity and regularity of animal production in the region. Some technical changes relate to other aspects of animal production (animal health, genetic improvement, waste management).



› In the bocage area of Guiè set up by Terre Verte and AZN in Burkina Faso, intensive use of fallow land (rotational grazing) increases fodder production.

The production and agricultural use of animal waste, and the use of animal energy for tillage and transport, on the other hand, are dealt with in thematic note 2, entitled “Innovations for agroecological cropping systems”.

¹ The development of agroecological practices and systems refers to all the processes of experimentation, adaptation and expansion of agroecological practices and systems, at different scales, i.e. from the plot of land or the livestock unit to the farm as a whole, right up to the territory.

Summary of experiences

The main experiments in agro-ecological livestock-production systems identified in projects supported by AEP can be classified as follows.

INTEGRATION OF AGRICULTURE AND LIVESTOCK FARMING.

The agroecological nature of livestock-production systems is often linked to their integration in agricultural activities, which aims at increasing the productivity of farming systems by recycling organic matter and mineral elements. Agroecological livestock-production systems are often based on the production of plant organic matter, its use as fodder and the recycling of animal waste to improve soil fertility and agricultural yields.

- In agricultural areas where **sedentary or semi-sedentary ruminant livestock farming** is experimented, the traditional practices of including fallow land in crop rotations, grazing stubble after harvests and assisted natural regeneration (ANR) are largely in line with the principles of agroecology. Various practices reinforce this agroecological character: integration of fodder plants into crop rotations and their development (cutting, conservation and feeding of animals in the dry season, grazing practices, including rotational grazing to optimise grass production). Fodder plants are sometimes grown in open fields, as pure or combined crops, or as dual-purpose food/fodder varieties. They may also come from hedgerows or fodder trees in the fields. It can also be a more intensive use of fallow land with rotational grazing.
- The integration of agriculture and livestock farming also concerns **non-ruminant livestock farming, with the recovery of agricultural produce or by-products** and the use of manure as fertiliser. Free grazing of poultry in fields or plantations (e.g. cocoa) also has a biological control function in some cases (consumption of parasites by poultry). Fish farming combined with irrigated rice cultivation is another example of agriculture-livestock integration. Similarly, water from fish farming is sometimes used as fertiliser for growing vegetables, while plant waste is used as compost/organic fertiliser for fish farming.
- Agroecological livestock-production systems sometimes use by-products from neighbouring farms or local agro-industries, such as cotton and peanut cakes. In these cases, organic matter is recycled at a wider territorial level than that of the farm.
- Some practices aim at strengthening the integration of agriculture and livestock farming by breeding animals for use in **transport and animal traction** (oxen, donkeys).

SUSTAINABLE MANAGEMENT OF PERMANENT PASTURE.

Many pastoral farms that depend exclusively or to a large extent on permanent pasture can be considered of agro-ecological nature. These are systems based on the use of natural resources which, up to a certain density of livestock, allow resources to be regenerated. In general, they are partially integrated with agriculture (stubble grazing with the addition of animal dung, purchase of fodder) and are potentially climate-neutral. Improving animal feed on the basis of agroecology principles can therefore involve various practices to improve the management of grazed areas: rotational grazing, including with electric fencing, and RNA. Although not strictly speaking cultivated, pastures are often managed in such a way as to increase productivity, protect the soil and guarantee the sustainability of the fodder resource.

OTHER AGROECOLOGY PRACTICES. Other farming practices are also in line with the principles of agroecology.

- Some agroecology practices focus on **animal health** and **reducing the use of inputs**, such as the use of natural products that limit the use of antibiotics and other synthetic veterinary medicines. Feed quality, the absence of growth hormones and housing are also an integral part of experiments, with some of these practices helping to prevent disease and parasitism. In some cases, there is a concern for overall health (the One Health approach), including good veterinary care and waste management practices and the use of natural alternatives, as well as specific herd and pasture management practices. Some of these practices also help to improve animal welfare. The promotion of agroecological livestock-production systems also sometimes includes a **genetic improvement** component aimed at maintaining, enhancing and improving **local breeds**, with a view to greater resilience. **The use of quality inputs and the management of effluents** from livestock-production systems can be integrated into initiatives aimed at promoting agroecology, with a view to reducing pollution and greenhouse gas emissions.



- › The use of local materials can reduce investment costs, but they may be less durable than purchased materials, as is the case with fish ponds and chicken coops in Ghana with integrated livestock farming systems promoted by the KITA training centre.

Lessons learnt and conclusions

Benefits and challenges

The benefits of agroecological livestock-production systems are many. A number of studies, particularly those related to projects supported through AEP, highlight the effects of fodder crops on animal carrying capacity, limiting weight loss in animals, maintaining milk production during the dry season and producing animal manure (and therefore improving agricultural yields). In some systems, the existence of fodder production means that part of the herd remains on site (rather than transhumance) during the dry season, what increases fattening capacity and milk production that can be used locally. Feeding the draught oxen well also means that they are in better physiological condition to work the soil. This increases their work capacity, enabling them to sow earlier and make better use of the first rains. Assisted natural regeneration (ANR) also helps to maintain and bring back important plant species. Several of these elements help to make livestock farmers more resilient to climate change. Studies have shown that systems based on a high degree of integration between agriculture and livestock farming can significantly increase value-added and farm incomes, thanks not only to an increase in livestock production but also to a rise in agricultural yields resulting from more intensive use of manure to fertilise crops.

Some activities may benefit mainly women or young people when they are in charge of them. For women, this is often the case with small ruminant and poultry rearing or dairy processing activities, thereby strengthening their economic autonomy, their contribution to family expenditure and their social and economic status.

The free grazing of poultry in fields or plantations (e.g. cocoa) can also be a tool for biological control (consumption of parasites by poultry), thus increasing crop yields and reducing the use of chemical inputs. Agroecological effluent management practices in intensive livestock-production systems help to reduce pollution of surfacewater and groundwater, as well as greenhouse gas emissions.

Among the negative effects, however, the development of livestock farming activities can result in an increased workload for women, with no net improvement in their quality of life. In addition, certain agroecological intensification practices can weaken relations between farmers and livestock breeders. In pastoral livestock-production systems based on the development of agropastoral areas, farmers traditionally benefit from the crop residues left on the land and the spontaneous vegetation of fallow land. In return, animal

droppings help to recycle organic matter. However, certain agroecological intensification practices can call these cooperative relationships into question. This is the case when farmers enclose their plots to protect them from grazing in order to plant trees, maintain plant cover and protect soil protection devices, grow off-season crops, plant as early as possible in the rainy season to take advantage of the first rains, or replace fallow land with fodder crops for their own use. Farmers may therefore be the “losers” in the agroecology transition, but they can also play an active part in these changes (see below).

Conditions for implementation and success

The conditions identified for the implementation and success of agroecological livestock-production systems are presented below.

- **The lack of excessive competition between forage production and food production** (use of soil, water and labour). Incorporating a year of forage production or a year of set-aside into crop rotations may be difficult to envisage on small farms that devote all their land to food production every year. Competition can be reduced if yields increase significantly and if fodder production is dual-purpose, including food use (e.g. cowpeas, sorghum, certain trees). Initial support to significantly increase biomass production, livestock activity and subsequently agricultural yields would then appear to be necessary.
- **Access to water** for irrigating fodder crops or building pastoral wells.
- **The availability and cost of inputs**, particularly fodder seed and feed purchased off the farm. The availability of electric fences for rotational grazing implies access to energy, which is facilitated by the availability of low-cost solar panels.
- **The level of initial capitalisation**, especially in livestock. Some farms with no livestock capital are unable to begin a process of greater integration between agriculture and livestock farming.
- **The systemic nature of interventions**: interventions that focus on some aspects of livestock farming without integrating all the components, in particular animal health, but also feed, housing, reproductive manage-



› The RAFIA project (Togo) funded the purchase of equipment (carts, ploughs, etc.) and draft animals for women.

ment and marketing, often lead to insufficient or even unsatisfactory results.

- › **The suitability of innovations to the agri-environmental and socio-economic context:** the failure to adapt imported breeds to local conditions results in fragile animals and high mortality. Where water is scarce, water-intensive fodder crops are often less appropriate than agro-forestry, which helps to improve soil fertility and feed animals.
- › **Availability of labour:** this is particularly important where there is competition with food production. In addition, the excessive workload generated by certain practices can be an important factor in keeping young people away from agroecology practices.
- › **Specific knowledge/skills:** forage production is not a common practice in some areas. The same may be true of some livestock activities such as fish farming, or improved animal health management practices.
- › **Access to land and the rules governing it:** free grazing can be an obstacle to fodder crops or tree planting. The latter are often impossible if the farmer does not own the land. In addition, insecure access to land does not make it easy to invest in trees.

The issue of free grazing raises the question of how **pastoralists can be involved in the development of agroecological systems**. Depending on how the agroecology transition is

implemented in agro-pastoral areas, it may exclude or include these communities, with multiple consequences in terms of economic and social development, ecological dynamics, conflicts and the region's independence in terms of animal products. Toshiba ... (Songhai centre?) insists, for example, that *“the protection of areas must not lead to the evacuation of breeders”*. To achieve this, new agreements and conventions involving farmers and livestock breeders can be put in place, providing, for example, for the sale of fodder to livestock breeders or a system of intermittent grazing compatible with the ANR. Livestock farmers can also implement agroecological agro-pastoral systems themselves, based partly on feeding from cultivated fodder resources. This presupposes a certain degree of sedentarisation (part of the animals, part of the year, part of the family). Even partial sedentarisation entails not only a renewal of relations with farmers, but also the transformation of some natural areas into grassland. Ousseynou Ka of the CNCR (Senegal) points out that *“the sedentarisation of livestock farmers (.../...) makes it possible to fix populations and reduce conflicts linked to transhumance”*. However, in the West African climatic context, the existence of complementarity within livestock-production systems between pastoral livestock farming (birth of animals, animals not in production) and sedentary livestock farming (fattening, milk production) is necessary to ensure the profitability of the system, while at the same time bringing it into line with the principles of agroecology. These practices, which combine



the mobility of part of the herd with the allotment of certain animals, can also enable better adaptation to climatic risks.

With regard to **pastoral systems**, West African livestock specialist Bio Goura Soulé points out that *“one of the major challenges is to have systems that allow equitable access to natural resources (land, pasture and water). Livestock farmers and their herds need to be able to move around, to find the right fodder at the right time, uncontested watering places, rest areas and corridors that do not encroach on farms. Access to fodder and water is a key issue (.../...)”*.

Sustainability conditions

Various conditions for the sustainability of agroecology change can be identified.

 **THE DURATION OF THE PROJECT:** the duration of the project must be long enough to allow farmers to acquire new knowledge and skills, to experiment with and adapt innovations, to take advantage of agroecology investments with deferred profitability, to organise themselves in a sustainable way and to guarantee the permanence of favourable conditions at the end of the project. The effects of short projects (two to three years) are often of a non-permanent nature, unless they form part of a pre-existing, long-term strategy on the part of local stakeholders, who can then fund part of this strategy by means of successive projects.

 **CONTINUITY OF FAVOURABLE CONDITIONS:** over and above the duration of the interventions, an essential element in the sustainability of the changes is the fact that the intervention aims from the outset to guarantee the continuity of favourable conditions for the development of agroecological livestock-production systems (advisory support, access to means of production, services and commercial outlets, maintenance and replacement of equipment, partnership relations between farmers, livestock farmers and other types of stakeholder by means of agreements and conventions). The ability of farmers' and stockbreeders' organisations to keep facilitators and technicians in the field (or through contracts between farming organisations and advisory bodies) is essential.

- › **Strengthening farmers' organisations** in terms of training, organisational management and financial autonomy.
- › **Coordination between local stakeholders**, especially local authorities and decentralised technical services, to ensure collective ownership of initiatives and the sustainability of changes.

Scaling conditions

The conditions for scaling up are partly the same as those for implementation, in particular the existence of competition between fodder crops and food production that is not too strong, the availability of support mechanisms for initial capitalisation (animals, investments needed for fodder production), and the possibility of sufficiently valorising animal products (namely milk), the implementation of complementary practices that make it possible to use the increase in animal waste to fertilise crops and increase yields (and thus offset the competition between food and fodder production), the availability of systems to inform farmers and stockbreeders about successful experiments, and the existence of rules to guarantee sustainable land management in transhumant livestock farming areas..

Another key issue is the rules governing access to land and natural resources, and the agreements between farmers and livestock breeders. In areas where farmers and herders coexist, the aim is to make it possible to plant trees, set up hedgerows, grow fodder crops and implement measures to protect the soil and improve its fertility. At the very least, the aim is to ensure that livestock farming practices do not call into question the agroecology practices implemented by farmers and, if possible, to enable transhumant livestock farmers to participate in the dynamics of agroecology intensification.

Public policy recommendations

The following recommendations can be made to local, national and regional authorities to encourage the sustainability and scaling-up of agroecological livestock-production systems:

A GLOBAL APPROACH TO POLICY AND A LONG-TERM PERSPECTIVE

- Better coordinate policies on crop production, livestock farming and the environment (water, natural resources, etc.), to promote greater integration between agriculture, agro-forestry and livestock farming (grouping together within the same Ministry of Agriculture and Livestock, or interministerial body for the agroecology transition of territories).
- If agroecology time-limited actions (programmes and projects) are taken, allow for a minimum duration of six years or the existence of several successive phases, as well as the definition of the conditions for the sustainability of the changes from the design phase onwards.

ACCESS TO LAND AND NATURAL RESOURCES

- Encourage rules for access to and management of land and natural resources, particularly by means of agreements between farmers and stockbreeders, allowing for the use of ANR, planting of trees, establishment of hedgerows, growing of fodder crops, implementation of soil protection and fertility improvement systems and other agroecology practices, and more generally, participation of transhumant stockbreeders in the dynamics of agroecology intensification.
- In areas of transhumant livestock farming, promote the development and implementation of rules for sustainable land management: social agreements between different groups of livestock farmers on the management of hydraulic structures and associated resources, social agreements between farmers and livestock farmers on the definition and marking of transhumance corridors.

BUSINESS ENVIRONMENT

- Support the development of supply chains for complementary feed, particularly from agro-industrial by-products.
- Implement a policy to support the dairy industry (investment funding, partnerships between farmers, collectors and processors) and protect the dairy market to guarantee profitable outlets for farmers and encourage them to increase production.
- Implement public purchasing programmes to stimulate demand for local livestock products, particularly local milk (school catering namely).

TRAINING, RESEARCH AND FARM ADVISORY SERVICES

- Overhaul the zootechnical curricula of universities and colleges to include agroecology and plan to upgrade trainers' skills.
- To steer research in the direction of a) greater participation by farming organisations in defining research priorities and topics for agroecology; b) work to identify, capitalise on and improve traditional agroecology practices (such as ethno veterinary animal care practices); c) better assessment of the effects of agroecology practices on livestock systems and the conditions for their development, in order to specify the public policy that need to be mobilised.
- Incorporate agroecology and genuinely participatory approaches (choice of themes and types of experimentation, peer exchanges and training) as a key aspect of support and advice for livestock farming, particularly for women and young people. Implement a system for communicating successful experiments to farmers (public competitions, fairs, broadcasting programmes, digital platforms, etc.).

FINANCING

- Set up financing mechanisms for family farming, especially for women and young people, with priority given to investments in the agroecology transition of livestock-production systems (animals, fodder storage infrastructure, etc.). Encourage the introduction of village savings and credit mechanisms.



For a more in-depth look at the subject, consult the '*Agroecological livestock-production systems*' thematic report in the PAE cross-cutting capitalisation study (in French). You can also consult the study 'What scenarios for mobile livestock farming systems in 2040? Note de synthèse sur la prospective élevage en Afrique de l'Ouest', produced as part of the PEPISAO project.

CONTACTS

-  araa@araa.org
-  <https://www.araa.org>
-  <https://ecowap.ecowas.int>
-  [@araaraaf](#) / [@ecowas.agriculture](#)
-  [@ARAA_CEDAO](#) / [@ecowas_agric](#)

FINANCIAL PARTNERS



TECHNICAL PARTNERS



This publication is produced with the financial support of the European Union and the Agence française de développement. Its content is the sole responsibility of ECOWAS and do not necessarily reflect neither the opinions of European Union nor the ones of the Agence française de développement.