Fifty years ago Ghana's Mampong Valley was a lush green forested area. Unhappily, like most of Africa, the local farming methods have not kept pace with population growth. Per capita food production has been in steady decline since the early 1970s. Most observers see a gloomy future in the extensive farming practices, deforestation, bush fires and overgrazing. Agricultural research and development still remain focused on yield problems of a few major crops. The green revolution bypassed Africa's smallholders and there cannot be much optimism that continuing conventional commodity research will change this. However, the small farmers of Mampong Valley, Ghana, are taking control of their own future.

Photo: Mark Prein

Farmers picture new activities

Joseph Ofori, Mark Prein, Frank Fermin, David Owusu and Clive Lightfoot

Smallholders in the Mampong Valley of Akuapem, the Ghana Rural Reconstruction Movement (GhRRM), an affiliate of the International Institute of Rural Reconstruction (IIRR), the Institute of Aquatic Biology (IAB) and the International Center for Living Aquatic Resources Management (ICLARM) have teamed up to craft alternatives based on Low-External-Input Sustainable Agriculture (LEISA).

The farmers around Yensi know the Ghana Rural Reconstruction Movement well. Like many local NGOs, GhRRM look for ways to serve farmers better. Many commodity improvements, including the production of fish, have not benefitted as many as had been hoped. Yet farmers and NGO remain committed to each other and the Institute of Aquatic Biology wants to understand what limits fish production.

In this supportive environment, it was easy for ICLARM and IIRR to start some participatory research. A sequence of farmer-researcher workshops or, more accurately, brainstorming sessions, and farmer experimentation defined this research. Farm resource assessments, modelling of existing and future farm resource flows, and technical information on water impounding and fish culture were sufficient to initiate experimentation by the farmers.

Picturing farm resources

Twelve farmers with adequate water sources from six villages were encouraged to identify all natural resource systems in the village. Workshop sessions allowed enough time for questions and drawing of the natural resource systems transect. We concentrated on bioresource flows within the farms and left out external inputs, because the primary idea was to get farmers thinking about how to use existing internal resources more efficiently. For instance, inputs like labour were not included, because labour is exchanged within the community and, as such, there is no shortage.

It is of vital importance that farmers use indigenous categories for the natural resource systems in their village. The models are not intended to be complete technical descriptions of the enterprises, but just tools to understand the situation and to think of new ideas.

Creating future flows

The workshop atmosphere encouraged farmers to draw present flows of the bioresources on their farms. Once a model of the existing situation was completed, they were encouraged to brainstorm future flows between future enterprises, especially with respect to fishponds. Intense

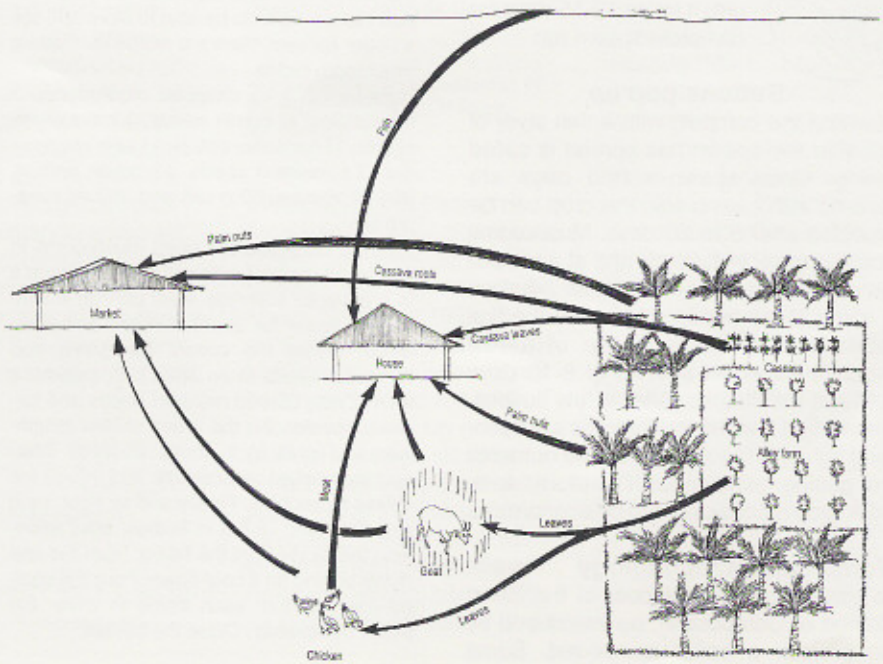

Fig. 1: In the present situation on the farm, there is little integration between enterprises besides the use of cassava and leucaena leaves for livestock fodder.

Farmer-researcher interaction during a drawing session of resource-flow diagrams.

farmer-to-farmer interactions followed. Farmers freely helped each other identify new enterprises and new flows. After the workshop, visits to individual farms were arranged to check the bioresource flow drawings.

Emmanuel Ansah's bioresource flow model (see Fig. 1) exemplifies the group's work. His current activities include the cultivation of oil palm and cassava as main cash crops and an alley-farming plot where maize is intercropped with leucaena. Interspersed on the farm are plantain and cocoyam. Feeding leucaena and cassava leaves to goats is the only bioresource recycled. Future activities appear more complex (see Fig. 2). Ducks, a fishpond and vegetable crops such as pepper, okra and eggplant have been added. Many more bioresource flows are evident.

Learning in practice

Technical information on site selection for impounding water was shared with the farmers, with emphasis on site requirements to make fish farming operational. Next followed a session on pond construction, which emphasised the use of local materials for inlet and outlet structures and using manual labour. Photographs, diagrams and models made from stakes helped get the general principles involved in pond construction across. Theory was followed by a half-day practical session using a nearly completed pond of one of the farmers. The farmers finished digging the pond, installing the inlet and outlet structures and fertilising the pond.

Farmers start with enthusiasm

The participating farmers responded to the workshop vigorously. They decided themselves to dig ponds on a cooperative basis. So, of their own accord, they came to the GhRRM Centre to borrow digging implements. Out of the group of twelve, three farmers with the best sites were loaned implements to start the construction of their ponds.

During later visits to demarcate new pond sites, changes in farm activities and bioresource flows were discussed. So high was the enthusiasm shown by farmers that, within a few weeks, four ponds were under construction. Over the last few months, farmers have implemented fish culture, tomato, cabbage and pepper planting on pond dikes, and pond water irrigation on newly constructed vegetable beds adjacent to the pond. Seeds, seedlings, fingerlings and small amounts of fertiliser are the only external inputs used in these LEISA systems. Moreover, experienced farmers now act as trainers for approaching and teaching new entrants.

No doubt the enthusiasm shown by farmers in Mampong Valley is partly due to their previous involvement in GhRRM projects. Nevertheless, some credit must be given to the approach that encourages farmers to see ways to implement LEISA farming systems.

Keys to success

Our experience supports that of others: LEISA can brighten the future for smallholder African agriculture. Overall farm incomes increase, more proteins and vitamins are available, stature in the community grows, and a decent living in pleasant surroundings can be made. Perhaps more importantly, this is achieved in an environmentally friendly way. Wastes are reused. Pollutants are kept to a minimum. Natural resources are rehabilitated. Then why do we not see more LEISA?

> Rainfall in Mampong valley is approximately 1200 mm per year in two rainy seasons (major peak in June, minor in October). Dry seasons are in August and December/January. Although rainfall is not very regular, the bimodal pattern and higher volume permit two rainfed cropping seasons with maize, cassava and plantain. Altitudes range between 168 m to 305 m. The soils are mostly forest ochrosols, sandy clays and loams.

LEISA is a young movement. While still in its early days, there are more success stories like ours. What is now important is to draw out the transferable elements of success. In our case four such elements emerged:

- There would have been no success if a local-level or grassroot NGO was not there to support the local action research. Partnerships between government, NGOs and farmers are crucial for success.
- There would have been no LEISA without managing the water resources. Water allowed vegetables and fish enterprises to be added. Water allowed wastes to be recycled through fish.
- There would have been no LEISA without bioresource flow models for farmers to brainstorm about the future. The workshop sessions and the drawing of these models enabled farmers to exchange ideas between themselves and with researchers and thus discover where and how LEISA technologies fit into their farming systems.
- There would have been no success if eliciting farmers' categories of natural resource systems had not been the entry point for research. Identifying what natural resource systems exist and modelling their management leads more naturally into applying LEISA technologies than diagnosing commodity productivity problems.

Joseph Ofori and Mark Prein, Institute of Aquatic Biology, CSIR, PO Box 38, Achimota, Ghana.
Frank Fermin, IIRR, Silang, Cavite, Philippines.
David Owusu, GhRRM, PO Box 14, Mampong, Akuapem, Ghana.
Clive Lightfoot, ICLARM, MC PO Box 2631, Makati, 0718 Metro Manila, Philippines.
ICLARM contribution 984

■

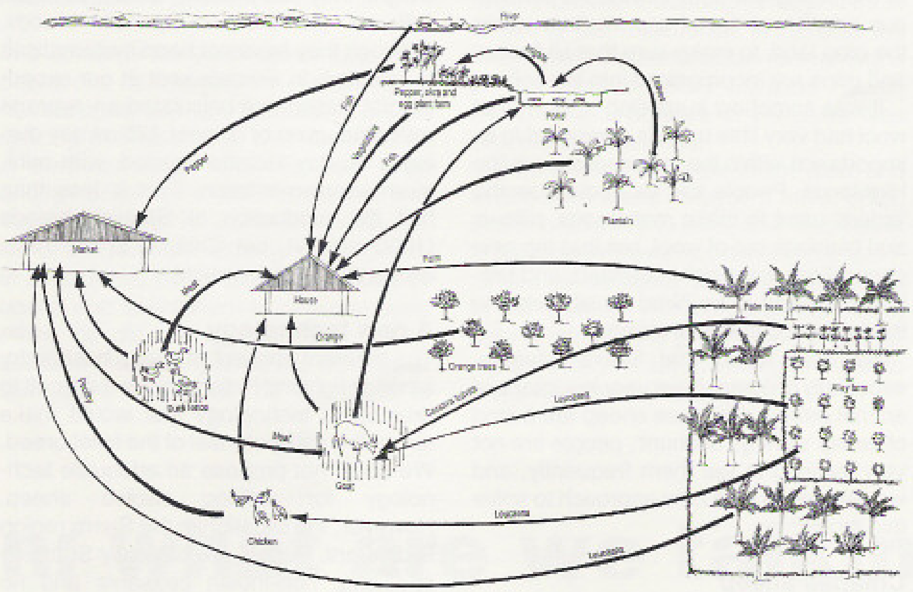

Fig. 2: In future more enterprises, more links among enterprises and the use of waste materials such as chicken and goat droppings to fertilise ponds and pond water for irrigating vegetable gardens are envisaged.