

# Christine's organic farm

Christine Karuru took part in the ILEIA workshop on assessing farming techniques. She has a farm in Mangu village, about an hour's drive northeast of Nairobi. John Njoroge from the Kenyan Institute of Organic Farming (KIOF) and Laurens van Veldhuizen from ILEIA visited Christine at her farm in February 1991 and together they evaluated it. There were several interesting findings.

## John Njoroge and Laurens van Veldhuizen

Christine owns a 9-acre farm in the Central Kenyan Highlands, a 'high-potential' area, which basically means that rains are adequate for cropping. Population pressure is high and continuous intensive cropping has led to depletion and deterioration of the land. Christine's farm is scattered over 4 plots, some more than 1 km from her house. Two women labourers help her almost on a full-time basis, and she regularly hires 2-3 other labourers to help her complete tasks such as soil cultivation, preparing compost and collecting fodder and/or compost materials.

Even before she started organic farming, Christine bought few inputs for her farm: mostly concentrates for her dairy cattle and chickens which, in turn, provided her with enough animal manure to maintain soil fertility. Where most of her neighbours relied heavily on purchased fertiliser for their maize, coffee and other crops, she chose her own way. She strongly felt that the fertilisers were too expensive compared with manure. She had also observed several cases of health problems, e.g. swollen legs, which she related to incorrect use of fertiliser.

### Key changes

In 1986 Christine participated on behalf of her parish in a course organised by the Catholic Diocese. Training in or-

ganic farming techniques by the KIOF was a major part of this course. After returning to her village, she immediately started implementing several of the techniques. In the following years, Christine further developed her farm to make it a fully integrated organic farm. The key changes she made included: Improved composting. She has learned to mix properly the dung of her cattle, goats, pigs and chickens with other organic waste materials from her farm.



With a wooden stick she monitors the cooking process, temperature and moisture content and adds water when necessary. She is thus able to produce good compost in only about 6 weeks.

Crop diversification. She planted more tree crops, integrated banana trees into her coffee field and intercropped them with french beans and sweet potatoes. She also started planting different kinds of vegetables for home consumption and sale.

Double digging. This helps to break a hard pan in the subsoil.

Liquid manure and plant teas. She lets all kinds of fresh dung decompose in water for 1-2 weeks to produce liquid manure. She also uses the shoots and leaves of non-oily broad-leaved plants to rot in water for 6-8 days to make a

plant tea. She uses both liquid manure and plant tea for top dressing her vegetable crops.

Crop rotation. She rotates leguminous crops (mainly french beans) with here other crops.

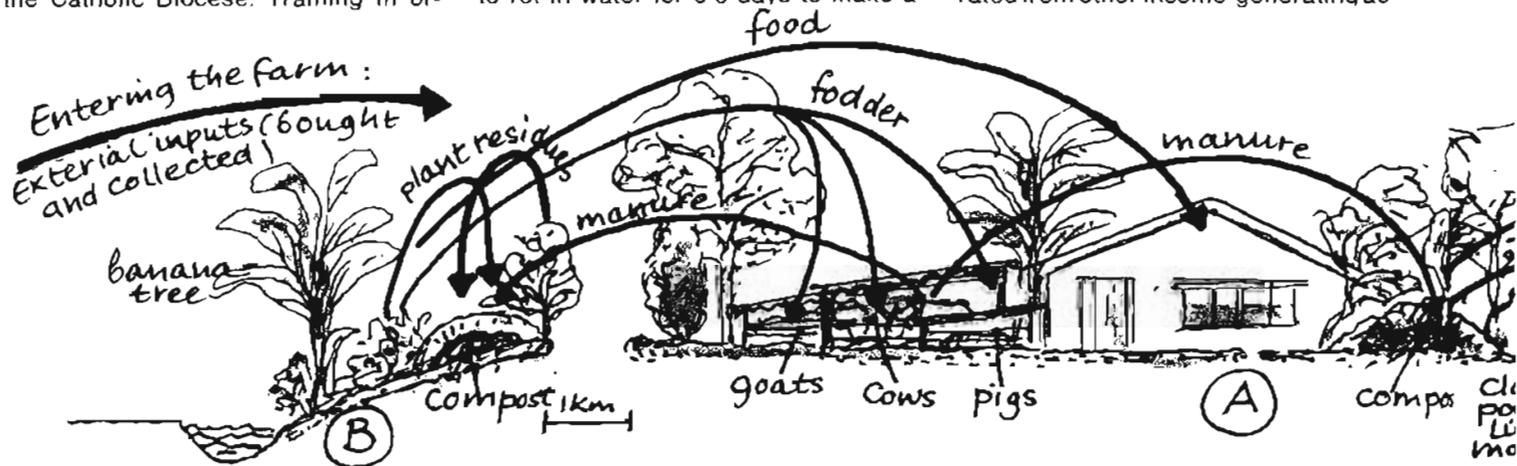
Natural pesticides. Christine uses the leaves of Mexican marigold (*Tagetes minuta*) to make a pesticide to control blight and aphids. She is experimenting with various other preparations such as chilies (hot pepper), pyrethrum flowers, onion/garlic and tobacco leaves.

Other techniques. She is starting to use leguminous trees to obtain nutrients from deeper soil layers, using the leaves for fodder, mulch and compost material. On steeper slopes, soil conservation has become an important point of attention.

Through her recent experience with her own farm, Christine's motivation and commitment to organic farming have increased even more. She saw the colour of her soil darkening and noticed a considerable increase in soil life. When strong winds blow the topsoil of her neighbours' farms away, she sees no soil movement on her own fields. Christine showed how her maize managed to produce a reasonable crop, now at the end of the short rainy season that brought very erratic rains. The reason is the improved moisture retention capacity of her soils. Her neighbour's crop was about to fail completely.

### Assessing Christine's farm

To what extent does this farm provide an example of a sustainable farming system? Are her practices applicable on a wider scale? We discussed the socioeconomics of her farm in detail. Although Christine was confident that she and her family can live off her farm alone, she had to admit that she had no clear picture in this respect. The farm as an enterprise has never been separated from other income-generating ac-



livities, as is not unusual among small farmers. Her husband is involved in a local taxi service and Christine herself does some trading with produce of her neighbours.

To gain a better understanding of the economics of her farm, we did a simple, theoretical comparison between her farm and a similar one using high-input techniques. On the cost side, her organic farm incurs very few costs for inputs such as fertilisers, pesticides and concentrates. But this was possible only by hiring more outside labour. Christine estimates she needs at least two extra labourers in the peak seasons, but feels she still wins compared with earlier expenditures on inputs. Fortunately for her, this extra labour is generally available in the Kenyan Highlands (for little more than \$1 a day). And the money paid for labourers stays in the area, supporting the local economy, instead of enriching the economies of Nairobi or other countries.

The comparison became more favourable for the organic farm when we considered the benefit side. Here, the differences are considerable. According to Christine, "yields are higher, especially under adverse conditions such as water stress". Soil fertility is much better cared for in her organic farm, not only because of the sheer number of nutrients added through compost and liquid manure. Also the variety of nutrients available through compost and the more efficient application methods contribute to soil fertility. In her experience, artificial fertilisers often do not make the nutrients available at the right time and place, and in the correct mixture.

### Nutrient balance

Another major issue in discussing the sustainability of her farm with Christine was the nutrient balance. We started the discussion by studying the nutrient flows, both within as well as into and out of her farm. Preparing together a map of her farm with arrows indicating biomass flows helped all of us understand the dynamics of her nutrient management. Christine obviously manages to

realise a very extensive and complex recycling of nutrients. All waste materials, including weeds, are used as fodder, as compost or liquid manure ingredients, or as mulch. The pattern of arrows clearly showed two important features of her organic farm:

**Recycling:** the amount of actual transportation of materials taking place within her farm: Napier grass and banana trees brought to the cattle shed for fodder, the bedding with dung from her cattle-shed brought to the compost heap; added to the heap are residues brought in from all over the farm; compost taken again to all corners of the farm etc.

The complexity of management of the organic farming system to arrive at an optimal use of available resources. Transporting organic materials is a problem because, as a newcomer in this village, Christine had to buy her land plot by plot in different places. On the other hand, her husband's taxi helped her keep this problem manageable. Yet, every day she goes to one of her plots she carries either dung or compost on her back: every day a little makes a lot in the end.

### External inputs

The discussion became especially interesting for Christine when we started to study the nutrient flows to and from her farm. At first she said she virtually did not obtain inputs/nutrients from outside. But confronted by a list of produce leaving her farm, prepared by herself, she listed in fact an impressive list of inputs bought or collected to replenish her lost nutrients. Table 1 summarises both the sources of nutrient losses as well as those for replenishment.

Although the present nutrient balance cannot be determined in detail during just a one-day visit, the above table suggests a favourable situation. Preparing this table helped Christine once again realise the importance of nutrient management. There is doubt, however, to what extent her model for nutrient management can be applied at a larger scale in her area. There would not be

enough pulp waste at the coffee factory, neighbours might stop supplying materials for liquid manure, and even chicken manure might become short in supply. Other sources of nutrients would then have to be found.

### Replicability

Although the study of Christine's farm was a brief one, all the evidence seems to suggest that her farm as such does provide her and her family with a good living and will continue to do so in the future. Asked at the end of the discussions whether she feels that her farm is a model for a sustainable farming system in her area, she answered in very positive terms. Yes, other farmers may have to scale down to a certain extent, a smaller acreage, less cows, less transportation from far away, but still it would be viable.

Looking at it from an outsider's perspective, however, several bottlenecks are apparent that may limit the replicability of Christine's farm. These include:

- complexity of her farm management, the level of technical knowledge and understanding required;
- labour availability, the need for cash to advance labourers' salaries where credit is difficult to obtain, especially for most women;
- supply of nutrients from sources outside the farm;
- water supply for animals and compost production.

Yet, farmers may judge differently. Christine has been asked by the local parish to meet every Tuesday with interested farmers at the church to explain organic farming techniques step by step. Between 30 and 40 farmers attend these meetings, both men and women, which has led to more than 80 farmers applying several of these techniques. Because, according to Christine: "ordinary farming has failed so obviously in our area". ■

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This is a simplified model of the complex organic farm of Christine Karuru. The homestead (2 acres): compost, trees, animals, vegetable garden with tomatoes, seed beds, French beans and leaf cabbage. Field B (2.5 acres): compost, bananas, Coffee + sweet potatoes, tomatoes, leaf cabbage/onions, arrow roots, napier grass, reed. Field C (4 acres): compost, coffee + sweet potatoes/French beans, organic maize, arrow roots, bananas. Field D (0.5 acres): napier grass, bananas.

Similar exchanges, as between the homestead and field B, can be found between the homestead and the fields C and D.

Leaving the farm: food, coffee and milk to market; human consumption.

Entering the farm: external inputs (bought and collected).

