At first sight, it would not be a surprise to learn from farmer Yaya that he had let his field turn into jungle. One can see a few heads of corn, but what is easiest to see by far are the bushes and grass covering this patch of land in southwest Nigeria.

Mr Yaya moves in with his cutter. The blade comes down, but, how odd, it spares the bushes. From closer up, one can see that the bushes are standing in continuous rows and that they are all of the same kind. Then, in a part of the field that has already been cleared, one realizes that the shrubbery was planted to form hedges, and that they break the land into alleys along which Mr Yaya grows maize.

Christine Okali and James Sumberg had warned us that the new alley cropping or row farming method might not be too much in evidence in farmers’ fields. Back at the large research station operated by the International Institute of Tropical Agriculture (IITA) at Ibadan, Nigeria, where these two scientists run an IDRC-supported research program on small ruminants in cooperation with the International Livestock Centre for Africa (ILCA), the elegant geometry of alley cropping can be seen in all its simplicity: rows of shrubs spaced 3 or 4 metres apart form alleys or corridors in which several kinds of food crops grow — maize, yams, melons, rice, cowpeas, and others.

What is distinctive about alley cropping is that trees are treated like any other crop. For, even as they enter the fields, the proud lords of the forest lose their crowns. They are clipped up to five times a year and the leaves and branches spread on the ground to serve as mulch and fertilizer. Some species of trees would quickly reach ten metres if they were not continually pruned, but, although the crown is constantly removed, the roots go on growing. They act as “nutrient pumps” to draw — from depths of five or six metres — the minerals that keep the upper layers of soil fertile. In many tropical soils the elements needed for plant growth sink too deep to be useful and ligneous plants ensure that they are continuously recycled.

It is not simply by chance that Blaun Tjwan Kang, “B.T.” to his friends, the originator of alley farming, is a pedologist, or soil specialist. All too often he has measured what modern intensive farming takes out of African soils. Almost everywhere, not only does the soil lose its fertility, but wind and rain also carry away the most fertile top layers. Even adding fertilizers does not solve the problem. “Nitrogenized fertilizers acidify the soil,” says Dr Kang. “They should be used as little as possible.”

An answer of sorts has been around since agriculture began; all that is required is to burn a section of forest and plant in the ashes. After a few years, when the soil is exhausted, the operation is repeated a little further off. Meanwhile, the brush covers the former fields. Shrubs grow into trees that once again are cleared and burned to become fertilizer for the benefit of the plants being cultivated. This migratory slash-and-burn agriculture, however, needs enormous spaces of unsettled land, something that population pressure now denies.

Nowadays the specialists recognize that intensive tropical agriculture, where food crops replace trees entirely, is not the answer either. For the last 15 or so years they have been trying to find out how to integrate trees with tropical agriculture. In 1981, IDRC supported a collaborative program of IITA and ILCA to determine the technical and economic feasibility and merits of alley cropping.

Alley farming, as developed at IITA by B.T. Kang, may turn out to be the way of marrying modern intensive farming and a healthy tropical environment. The alleys are formed by fast-growing trees, which are repeatedly cut back to prevent them from overshadowing the crops. At first, out of respect for large trees, they were polled — only the crown was removed. Now they are cut back to within a few centimetres of the soil. B.T Kang’s assistants have been cutting back *Leucaena leucocephala* five times a year for seven years. The trees always put out new shoots again.

JEAN-MARC FLEURY
Another tree that has adapted well to alley farming is *Gliricidia sepium*, which IITA and ILCA introduced from Central America. The rows of Leucaena and *Gliricidia* provide a renewable and inexhaustible source of branches and foliage convenient to farmers. Used as mulch, leaves and branches prevent the growth of unwanted grass and replace herbicides. As they decompose, they contribute nitrogen, phosphorus, and potassium to the soil, thus reducing the requirements for fertilizers. They also help earthworms, which oxygenate and break down the soil, to multiply. On sloping land, the rows of bushes slow down the runoff of water and stop erosion. Farmers can also decide simply to let the trees grow: a longer thicker trunk for use as firewood or for construction becomes the crop. If the trees are left to mature, the resulting forest cover will finally clean out the grassy weeds by stopping the sunlight from reaching the ground. Yet at any time the farmer can cut back the trees and take up cropping again in the corridors. If a farmer wants wood, he can let the bushes ripen, but if he wants wood chips, he can thin them out. If they decompose, they are a source of fuel, and if they are sealed, they are a source of charcoal. The farmers can choose which they wish, depending on their needs. If the farmer wants wood, he can let the bushes ripen; if not, he can thin them out and use them for fuel. Or a farmer might decide to let the forest grow: some plots have produced up to 15 to 20 tonnes a year of wood chips. In any case, the farmer can use the wood for heating or for construction.

The two ILCA scientists have set up "intensive feeding gardens". In 200-square-metre areas the two shrubs are grown along with *Panicum maximum* and *Pennisetum purpureum* grasses. Each pasture, with three rows of forage bushes and six rows of grasses, can suffice to feed four or five sheep or goats, which would otherwise exist on a meagre diet of scraps. The animals do not set a hoof inside the pasture; the upper foliage and grasses are "cut and carried."

At the moment, IITA and ILCA specialists are evaluating the acceptance of alley farming by farmers and its effect on crop production. Those questioned by Dezi Ngambekisay that they do not have the hardware they are pleased to having lowered their costs for fertilizers and herbicides. In the savanna, where trees are scarce, it is particularly the production of wood for heating and construction that is appreciated. In the more humid regions, farmers have found a new ally in the struggle against unwanted plants, one which also helps to maintain the fertility of the soil.

Alley farming can be adapted to a wide range of priorities. As it is a synthesis of agriculture, forestry, and animal husbandry, farmers can put the emphasis on whichever type of production they need the most. If a farmer wants wood, he can let the bushes grow; some plots have produced up to 13,000 standards per hectare. If forage from the tops is more important, repeated pruning will give a farmer from 15 to 20 tonnes a year, the equivalent of 5 to 6 tonnes of dry material. If the alley farmer decides next to plant corn, there will be an excellent yield without any other input than the leaves and branches from the bushes. Whatever the priority, at the cost of a measure of compromise, the farmer can have wood, vegetables, and forage — all at the same time. All of this is available with the satisfaction of knowing that it is not done at the cost of any deterioration of the land.

Specialists in tropical agronomy have insisted upon the need to integrate trees into agriculture, and now that the work of Kanuri and his colleagues seems at last to have demonstrated the potential of integrated production, agroforestry, previously only a concept, is now moving towards reality, thanks to alley farming. It should be no surprise then, if a country like Kenya decides to re-think its agricultural development around the central concept of agroforestry. Perhaps scientists have at last succeeded in rediscovering a kind of agriculture that respects the tropical environment, does not ruin farmers, does not acidify the soil, and protects the soil from being carried off by the wind or the rain.

The idea is moving into the field. Teams are already trying to adapt this model to various environments worldwide. ILCA has begun to distribute posters that start out: "Plant a row of shrubs every four rows of corn..."

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