

Why do farmers go for fertiliser bean?

Data were collected from two main sources: the information given by the farmers and the records kept by the extension workers who offer credit and technical assistance to the groups. During the two months needed to gather the information, there were three meetings with the farmers. Group discussion made it possible to crosscheck data perceived as incorrect or where differences in opinion existed. However, it also provided important information on, for example, the history of the use of the plant, the types of soil it does not prosper in, the effect of weed control methods or the absence of diseases.

Data from the second source made it possible to compare those aspects that farmers find relevant, such as production costs, labour utilisation and return to each invested Lempira. Data analysis was done together with the extension workers. The results were presented to the farmers in simple and comparative charts and explained as clearly as possible. This allowed for ample discussion on the results of the two groups. The suggestions, criticism and comments given by the farmers were incorporated in the final report. This approach proved to be a forceful learning tool for farmers as well as researchers.

Two ways to produce maize

There are two maize production systems in the Atlantic region. The first one combines traditional knowledge and experience related to maize production with some elements of modern technology. The use of the fertiliser bean is an integral part of this system. This system is here referred to as maize/mucuna. The San José group of farmers has used this system since 1974. Its main characteristics are:

- minimum tillage
- low use of external inputs, such as seeds, fertilisers and pesticides, although herbicides are generally used
- constant yields over the years
- extensive use of cultivated fields.

The second system is referred to as the "modern" system. It is promoted by the formal extension programmes. The farmer group El Retiro has practised this system for almost a decade. It is characterised by:

- intensive mechanised soil preparation
- high use of external inputs like e.g. fertilisers, seeds and herbicides
- high credit need to pay for production costs (the farmers of El Retiro obtained credit for an amount of L. 36,000 to sow 40 manzana (0.7 ha), whereas the San José group only required L.13,000 for the same area)

*The use of the velvet bean (*Mucuna sp.*), or fertiliser bean, has been largely spread in Honduras and Central America. It has been estimated that about 50,000 farmers are using mucuna in Central America as a whole. In recent years, numerous scientific studies have shown the contribution of this leguminous species to maintenance of soil fertility and control of nematodes. But, why do farmers decide to use this plant? Are there economic reasons for this preference? To understand why farmers decide to use or not to use fertiliser bean, CIDICCO carried out a comparative study on farming practices and the economic results of two groups of farmers from the Atlantic region in Honduras.*

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- increasing amounts of fertilisers to obtain constant yields (four years ago farmers applied two quintals of fertiliser per manzana, whereas today they have to apply four to six quintals per manzana)
- intensive use of land with two grain crops, maize and rice, with high nutrient demands.



For the maize/mucuna farmers the agricultural season starts in December with cutting the fertiliser bean. The beans have already produced seeds which, once there is sufficient humidity, will germinate. Maize is sown directly in the mulch of the fertiliser bean and thus germinates in a weed-free environment. Maize and fertiliser bean start to grow at the same time. About 15 days after sowing, some farmers do a first cleaning with a machete to control growth of the fertiliser bean. However, the majority of farmers apply gramoxone to control the weeds. Between 50 and 60 days after sowing, the maize/mucuna farmers apply the first and only Nitrogen gift in the form of urea. Fertilisation in the "technological" system is done according to technical specifications. Harvesting of maize starts end of April. After the harvest, fertiliser bean is allowed to cover the land until December.

The soils of the Atlantic region are classified as aluvial plains. They are generally well drained and deep with a slope of 1 to 2%. Land is used for pasture and crop production. Some natural forest has remained. The average temperature fluctuates between 24 and 27°C. The average annual precipitation is 2440 mm. The rainy season is from around mid-June till mid-December. In this season mainly rice is grown. From December until June maize is the main crop.

Economic comparison

The following charts summarise the most relevant economic information that could be documented and which was presented, discussed and modified during the discussions with the farmers.

The discussion with the farmers centred around reasons for the differences in costs between the two groups.

- **Seeds:** The San José group uses only traditional seed, whereas the El Retiro group uses improved seed which has to be purchased. They also use more seed due to smaller planting distances.
- **Herbicides:** Due to the cover of fertiliser bean weed infestation is considerably reduced, thus decreasing the use and application costs of herbicides.
- **Fertilisers:** Due to recycling of considerable amounts of biomass and symbiotic N-fixation, a better balance of nutrients is obtained when fertiliser beans are used.
- **Land preparation:** The San José group uses a system of minimum tillage that

Table 1. Comparison of production costs per manzana (0.7 Ha) in Lempira

	Maize/Mucuna System	"Modern" System
Seed	10	24
Pesticides	62	151.5
Fertilizers	100	206
Preparation of land	128	225
Sowing	40	56
Fertilizer application	16	48
Herbicide application	16	56
Harvest	80	96
Shelling	105	131.25
TOTAL	557	993.75

Table 2. Comparison of the total production costs for 40 manzana in Lempira

	Maize/Mucuna	Costs %	"Modern"	Costs %
Labour	12,547	52	11,490	26
Inputs	6,583	27	17,266	39
Services	4,270	18	13,832	32
Others	35		0	
Interest	361		1,082	
TOTAL	23,790		43,670	

Table 3. Summary of the result from the production season 1990-1991

	Maize/Mucuna	"Modern"
Yield (100 kg/Mz)	48.21	62.93
Selling Price (L/100 kg)	55.00	55.00
Production Costs (L/Mz)	595.00	1,092.00
Gross Income (L/Mz)	2,651.55	3,461.15
Net Income (L/Mz)	2,056.55	2,369.15
Return to cash (L/L)	3.46	2.17
Return to land value (L/Mz)	2,056.55	2,369.15
Return to labour (L/L)	16.46	20.62

(1 US\$ = 6.5 L)

does not require machinery. The service cost for agricultural machinery considerably raises the production costs for the "modern" system.

The tables show that the production costs were 84% higher for the "modern" system. This is mainly caused by the costs of inputs and services. The tables also show that with the "modern" system, better yields can be obtained (22% in this case). In the maize/mucuna system labour costs are 52% of the total costs. Labour is provided by people from the area. On the other hand, in the "modern" system, costs of inputs and services, paid to local and regional business, are 71% of the total costs. From a social point of view, the maize/mucuna system contributes more to the generation of temporary employment opportunities, income and money exchange within the community.

Even though with the "modern" system yields were higher, the maize/mucuna system obtained a 1.29 times higher return on investment. As the costs of production of especially the "modern" system increase over the years and yields stay practically the same, this difference will become bigger in the following years.

Farmers perceived that the group with higher costs is exposed to greater risks if prices would suddenly fall. For example, at the moment of this study, the price per 100 kg for maize dropped to 25 lempira, which does not compensate for efforts and risks taken.

As credits have become difficult to obtain and interest on informal credit ranges from 60 to 400% per annum, return to cash is the most important criterium for poor farmers. The "modern" system is practised on flat valley bottomland. It yields a relatively good return per manzana which makes this system attractive to these farmers. However, the maize/mucuna system is mainly practised on lands with slopes of 20 to 50%, which are of lower value (about 50%). The return on land value (100% higher for the *Mucuna* system on sloping land) is therefore a more relevant measure than the return on land. For farmers for whom both capital and land are limiting the mucuna system is highly advantageous. The return to labour is hardly an important consideration for small farmers, as in most cases, it is their least limiting resource.

The information is not complete and further economic issues could be brought up. For instance, it is known that even on steep

hillsides, fertility increases steadily over a fifteen year period after adoption of the *mucuna* system. The value of increased fertility is not included, nor is the decreased fertility in the "modern" system. Nevertheless, we still believe that the main conclusions drawn from this will hold and explain why the farmers of San José inter-crop fertiliser beans with maize.

Traditional practice discarded

The farmers gave several reasons for discarding the traditional practice of using fertiliser beans. Until five years ago, the message had been that agricultural modernisation required adopting the so called "technological package". At the same time, access was offered to credit allowing farmers to obtain the inputs. Campaigns stated that the technological alternative would be more productive and efficient in terms of labour. In the first years, farmers indeed experienced improved productivity and income. Under these circumstances, no extension programme promoted other practices than the use of chemicals. Traditional practices, like the use of fertiliser bean, were even seen as signs of old fashioned agriculture. Even farmers' associations promoted the new system. A farmer said: "The birds sing pretty...that is why the farmer is hooked".

Limitations

One of the most important limitations of the maize/mucuna system as practised in this region is that only one crop per year can be grown. Many farmers want to grow rice after harvesting the maize.

Farmers who have no security in land ownership do not cultivate fertiliser bean. This is directly related to the idea that fertiliser bean improves the soil. And no-one wants to improve something he or she does not own.

Fruit trees, mainly citrus, have been planted on many fields where farmers used to grow cereals. Many farmers have abandoned the use of fertiliser beans for this reason.

The majority of organised farmer groups use the "technological" system with some adjustments. The maize/mucuna system is used especially on slopes and by independent farmers.

However, rising prices of fertilisers and other chemical products, particularly herbicides, combined with decreasing yields and the ending of credit programmes have caused farmers to re-evaluate "technological" practices and bring back cultivation of the fertiliser bean.

Reference

- Milton Flores, 1993. *Tienen razon los agricultores de usar el frijol abono? La contribucion de esta especie a la economia de algunos grupos campesinos de la Costa Norte De Honduras*. CIDICCO, Informe Tecnico No.12.

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