

THE ORGANISATION OF FRENCH BEAN CULTIVATION FOR EXPORT IN TROPICAL REGIONS

It should be specified from the outset that this crop has been introduced and developed in Tropical Regions for the following reasons:

- The most suitable period for production in Tropical Regions (the dry season in Sub-Saharan and Tropical Upland Regions) coincides with the coldest time of year in Europe, during which the growing of French beans is impossible.

- The French bean is one of the most labor-intensive crops, particularly at harvest time: one picker can harvest between 2 and 5 kg of beans per hour. Such cultivation has thus shifted to regions where the cost of manpower is lower.

1. THE CHOICE OF PRODUCTION SITES

The following elements should be considered when choosing production areas:

THE ADAPTATION OF THE FRENCH BEAN TO TROPICAL CONDITIONS

The French bean is a hardy plant with a short growing cycle and is well adapted to many conditions found in Tropical Regions:

- Its cultivation can only be profitably carried out in the dry season; the rainy season brings with it a rapid increase in plant pests and damage by heavy rainfall.

Humid, low-lying areas must be ruled out Coastal Regions of West Africa, Equatorial Central Africa.

The most suitable areas for cultivation are:

- **The Sahel Region**, during the dry season. Beware of harvesting too late in the dry season as high temperature at this time of year can affect bean formation and harvesting.

-**Tropical Highlands** over 800/1000 meters altitude (2500/3000 feet), during the coolest and driest periods: Central Africa and East Africa.

-The driest and coolest seasons in islands of the **Caribbean and the Indian Ocean**.

For the export of fresh bean, Tropical Countries of the Northern Hemisphere are generally better placed than those of the Southern Hemisphere, since the most suitable growing season (dry and cool) is between September/October and March/ April, a period in which demand is healthiest on European markets. This is not true for tinned extra fine beans.

- SUITABLE SOILS

Very clayey and damp soils are not suitable as they generally make sowing very difficult. In germinating the bean has to push its cotyledons out of the soil (upright germination) and it thus very sensitive to conditions on the soil surface at this stage.

Bean roots have the reputation of being shallow. This is partly false. Above all the roots are sensitive to compaction or poor soil preparation as well as to excessive water levels.

The bean plant is sensitive to high chalk or salt content in the soil. It is, however, fairly tolerant of pH levels (optimum: 6.1 to 7.6).

- poorly drained soils,
- soils with low water content: the sandy area of the Sahel call for more frequent irrigation
- unstable soils.

2- THE CHOICE OF A CULTIVATION SYSTEM

The majority of projects based on the concept of large production units, using hired manpower for cultivation and harvesting, have failed.

This type of crop is better adapted to family based units and small holder cultivation.

In Tropical Africa it is considered that the average area which can be cultivated by a family unit is **at most 1000 to 2000 square meters** (1/4 to 1/2 acre).

A mixed system has been developed with apparently good result. Based on a large irrigated area, the soil preparation (plugging- harrowing) and treatments are carried out by a development organization which manages the scheme, while for labor intensive operations, particularly harvesting, the area is divided into 1000 to 2000 square meter parcels places under the responsibility of individual families.

3- SITING OF PRODUCTION UNITS

Most of the off- season French bean crop is exported by air in the absence of new techniques to allow shipment by sea.

Production units must not therefore be too distant from the airport. The maximum distance will depend on the existing lines of communication between the production sites and the airport. A distance of 150 to 200 km is usually considered an upper limit in Tropical Africa.

4- ORGANISATION OF SORTING, GRADING AND PACKAGING

SORTING

The producers themselves on the production site, eliminating sub-standard beans carry out preliminary sorting. Section Heads control the fieldwork and this first sorting operation. The beans are first weighed and the producer's number marked on each sack or basket. While waiting in the field and during transport the sacks or baskets are kept in the shade and covered with damp sacking to avoid drying out.

The beans are then transported, often in 50-kg sacks (less commonly in cartons), to the packing station, which is practically always controlled by the organization or the company in charge of exports. At this station secondary sorting is carried out on large tables; this removes a remaining percentage of sub- standard or over-size beans (medium).

GRADING

Next, grading is carried out. Grading, often done manually, separates medium, fine and extra fine beans. Sorting and grading in the station is usually done by teams of women paid at piece- work rates (by the basket). They can sort and grade 10 to 155 kg baskets in two hours. Some exporters, after manual pre-sorting on tables, grade by machine.

PACKING

The fine and extra fine beans are usually packed in cartons, or less often in small baskets of 3 to 5 kg. In the cartons the beans are laid, usually in two rows,

to the full depth of the box. The stalk end is placed outward and more delicate tip towards the center. Care should be taken that the beans are not packed too tightly, to avoid rotting at later stages.

* In the course of transport the beans will dehydrate. To compensate for this drying out, extra beans are often placed in the carton. For example, a 5-kg carton should be packed to 5,25 kg, if it is to arrive in Europe with a net weight of 5 kg.

5- STORAGE IN COLD ROOMS

The best policy is, of course, immediate shipment to export markets. However, in practice, this is rarely done. Storage over a greater or lesser period is usually necessary, either waiting for a flight out or to put beans on the market on certain days of the week (Monday or Tuesday and Wednesday or Thursday) when prices are better.

More and more exporters are using cold rooms, which should be as close as possible to the airport. The cold room should be kept at 5⁰ C and 90% humidity. Inside the cold room the boxes should be stacked in “beehives” to allow a good flow of air.

Before loading into the aircraft the cartons should ideally be palletized, when being taken from the cold room, in an area kept at 14/15⁰C. This is hardly ever done.

6- BASIC ELEMENTS IN PROGRAMMING AN EXPORT OPERATION FOR BEANS

Following a market study, the first necessity is to fix the tonnage, periods and rhythm of exports. Given these three elements it is possible to plan cultivation and program the supply of necessary inputs: seeds, cartons etc.

E.g. - It is planned to export 300 tons of fine and extra fine beans to Europe in the off- season, between the 1st December and the end of March, broken down as follows:

20 tons/week in December = 80 tons/month

12 tons/week in January =60 tons (weaker demand)

20 tons/week in February = 80 tons

20 tons/week in March = 80 tons

TOTAL = 300 tons

A study of local agricultural conditions or a trial program has provided the following data:

Average yield per hectare = 5 tons (50% extra fine, 50% fine)

Average growing cycle of varieties used = 55 days

6 harvesting operations over a 12 day period

The cultivated area necessary will be : $300 \text{ tonnes}/5 = 60 \text{ hectares}$

With a sowing density of 80 kg of seed per hectare, the total quantity of seed required will be $60*80 = 4800 \text{ kg}$

The quantity of cartons required by the export program (5 kg cartons) will be : $300 \text{ 000 kg}/5\text{kg} = 60 \text{ 000 cartons}$

Generally speaking, for most varieties used, sowing is required every 10/12 days for regular flow of produce throughout the season, taking into account peaks and troughs in output.