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Runner Bean Profile for Sri Lanka

Steve Caiger



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RUNNER BEAN PROFILE FOR SRI LANKA

A) BACKGROUND

This profile has been prepared to give the background production techniques and European market opportunities to help establish the viability of commercial production in Sri Lanka. This quick profile was undertaken by contacting runner bean growers and advisors who have experience of production in sub-tropical conditions. European market information was gained by interviewing importers and supermarket buyers.

It is generally agreed that *Phaseolus coccineus* originated in the New World, probably in Central or South America. It is believed that it was first domesticated in the Tehuacén valley in Mexico about 2,200 years ago. In the wild it is a perennial plant, but domestication in more temperate climates has led to a number of changes in plant characteristics. For example pod and seed size have become larger. However, the most pertinent change that has taken place is the response to photoperiod. Since the genus is native to Central or South America, it must have either been a short day or day neutral plant. Certainly, some of the varieties native to these areas exhibit these characteristics. However, all the varieties grown in Europe are long day plants. Therefore, these varieties need lighting to extend daylength if acceptable yields are to be obtained in countries such as Zimbabwe, Kenya or Sri Lanka. Another climate factor crucial to the success of runner bean production is temperature. At temperatures above 26°C, the flowers abort or pollination is incomplete. This can happen at lower temperatures if the crop is water stressed.

In Europe, the only market where any significant quantities of runner beans can be sold is the UK. It is hardly ever traded on mainland Europe. The main British production season is July to mid-September. Zimbabwe, Kenya and Guatemala are the main off season suppliers. Sri Lanka should initially aim to supply in the off season. One of the major competitive marketing advantages that Sri Lanka could enjoy is a lucrative local market for selling second quality.

Unlike most other beans, runner beans are a more difficult crop to grow and harvest commercially. For this reason, it tends to command higher prices than other beans. Also, considerable care and research are recommended before commercial scale investments are made.

B) MARKET

The major market for runner beans is the UK. Continental Europe prefer the bobbi bean. The British market is dominated by local production, mainly in Worcestershire and Kent. The main British season is from July to mid-September. Early production will start a month earlier and in some years harvesting can continue in October. Market statistics for the runner beans are difficult to obtain

because they are normally combined with all other types of beans. In the high season, it is estimated that the market consumes about 320/tonnes per day. This would give a total UK production of about 18,000 to 20,000 tonnes.

Imports for the off season come mainly from three sources, Zimbabwe (probably 5 companies exporting and about 35 to 40 ha), Kenya (3 companies, 40 to 50 ha) and Guatemala. Official figures show that 429 tonne were exported from Kenya and 211 tonne from Zimbabwe in 1994. South Africa have occasionally tried to supply, but are not considered major players. It is estimated that between November and May, on average about 150 tonnes per week are imported, mainly to supply the supermarkets. One of the major Kenyan sources is reputed to supply 40 to 60 tonnes per week. It is assumed that Sri Lanka will be trying to compete with these African and South American suppliers.

Virtually all of the imported runner beans are sold through supermarkets. It is difficult to get C&F prices, but these have been calculated to range from US\$ 2.80 to 4.50/kg for beans pre-packed in 250 gram punnets. In the medium term, it is expected that prices will decrease in real terms as more growers enter the market. It would be sensible for Sri Lanka to budget for an average selling price landed in UK of US\$ 3.00/kg.

It must be noted runner beans are time consuming vegetable to prepare; they have to be thinly sliced before cooking. Given that there is a trend towards pre-prepared vegetables in the UK, ways of reducing the preparation time must help stimulate sales. The eating quality of frozen runner beans is not very good, hence the demand for the fresh product. Recently Marks & Spencers (a UK based retailing chain) have started selling pre-sliced runner beans. The trade believes this idea may become popular and increase the volume of sales. A well organised supplier who has an effective cold chain and good, hygienic, pack house should be able to meet the supermarkets' quality standards. Sri Lanka's best opportunity in the longer term is to try and target this market.

If Sri Lanka starts to export runner beans, it will have to initially start to supply in 250 gram pre-packs. Once their quality and reliability have been established, they may be able to supply sliced beans. It must also be noted that the supermarket trade would be looking for a regular supply for a reasonably long season.

There is a mixed view as to much further the market will expand. Some importers claim that the market is approaching saturation, others report that there is considerable room for expansion. These divergent views probably reflect the different supply positions of the importers interviewed. The importers who are already sourcing imported runner beans do not want to encourage other entrants, those who do not have a source want to encourage new growers. Perhaps the fact that the growers and exporters guard their information so closely is an indication that they are making a good profit which they are trying to protect. Hence, there is room for the market to expand. If Sri Lanka was planning to enter this market, a medium term target of 20 tonne per could easily be accommodated from November to April. This weekly rate could easily be doubled around Christmas. This would

give total exports of about 500 tonnes. In the longer term, the scale of output would depend on the profitability and quality. The other factor affecting the rate of development in the longer term is whether Sri Lankan exporters were able to develop a sliced product into the supermarket trade.

To maintain acceptable quality levels, it is important that overseas exporters are able to supply at least three times a week, at regular intervals. More frequent sendings would be desirable if a sliced product was going to be produced.

For information, the EU "common standards of quality for beans" is attached.

c) PRODUCTION CRITERIA

Climate - The main climate criteria are to ensure that the growing crop has a 16 hour day and that temperatures are not too high. If daylength is not naturally long enough, then supplementary lighting will be required. Experience has shown that 500 watt lightbulbs at 100 metre intervals on poles spaced 15 metre apart will give sufficient light (ie 12 approx. lights/ha). This should cost about US\$ 1,000/ha.

If temperatures rise above 26°C, the flowers abort or pollination is incomplete. This can also happen at lower temperatures if the crop is water stressed. Therefore it is important to select a cool site at altitude in Sri Lanka.

Irrigation is essential, because even a short dry spell can reduce flower set and yield. During hot spells of weather in Zimbabwe, sprinkler irrigation is required to raise humidity levels to maintain pod set. Whether drip, micro-jet or sprinkler irrigation systems are used will depend on the micro climate of the site. In terms of supplying the crop with water, drip irrigation is preferred. However, if the humidity has to be raised to facilitate pod set, then sprinkler irrigation should be purchased. Maintaining pod set is important to achieving profitable yields and is also important because the supermarkets need a regular supply.

Seed - It is recommended that only varieties which are acceptable to the UK supermarket trade are grown. The most popular variety grown in Africa is White Emergo. Recently, an old British variety, Stringo, has been trailed successfully in both Zimbabwe and Kenya. There is considerable variety and site interaction, therefore it is essential to initiate a significant trials programme. There are a number of seed-houses that would be prepared to supply a range of varieties for testing. The main variety grown in the UK is Anorma Original.

Recommended seed rate would be 30 to 35 kg/ha, giving a plant population of 33,000/ha. Seed would cost about US\$ 10/kg, giving a cost of US\$ 325/ha. Seed is not a significant cost for runner beans, but the choice of variety is vital to the crop's success.

Staking - Runner beans have to be staked to give acceptable commercial yields and achieve good quality. Without being raised off the ground, it is impossible to

harvest all the beans at the correct growth stage. In Europe, runner beans are grown on a simply system of canes. In Africa, the beans are raised off the ground by using various combinations of wire, string, bamboo and posts. It will be necessary to experiment in Sri Lanka to find the most cost effective combination of materials. The plant support structure will need to be about 2 metre high. It is estimated that the plant support system would cost about US\$ 750/ha in Sri Lanka, but should last 3 or 4 cropping cycles. The stakes should be arranged to give row widths of 1 metre. This allows sufficient space for efficient harvesting as well as allowing light to the lower canopy of leaves which helps ensure that the lower beans have a "good" green colour, which is essential for the supermarket trade.

Agrochemicals - This crop benefits enormously from both added organic manure or being grown in soils where the organic matter is high. The exact fertiliser requirement would have to be determined after soil analysis. However for budgeting purposes, it can be assumed that the fertiliser requirement would be 225 kg/ha of Nitrogen, 150 kg/ha of Phosphates and 100 kg/ha of Potash.

Runner beans can be susceptible to a number of pests and diseases. Most of these are common to other bean crops (ie french beans etc). In particular white fly, leaf miners and black bean aphids can be very troublesome. Care must be taken to ensure red spider mites do not reach epidemic levels; they can be controlled biologically. Rust can also be a problem.

Some diseases can develop after harvest. For example Botrytis, which can be controlled by good post harvest handling techniques. Substantial losses can result if the beans are damaged at harvesting by poor handling practices, as the cells on the ridged surface will beak allowing secondary infections. This results in a browning of the bean after packing. A well trained labour force is essential to keep this to a minimum, together with carefully designed and managed post harvest handling procedures to minimise the number of times the crop is handled prior to packing.

It is assumed that weed control would be by hand. Herbicides are available, but they are expensive and not always effective.

Growth phases - It should take about 8 to 10 weeks from seeding to the first harvest. The crop should be producing for about 4 to 6 weeks. To get a steady continuous supply for a marketing season, it will be necessary to have a sequence of staggered plantings, at 1 to 2 week intervals. In the UK, the crop is normally picked every 3 to 4 days; in Sri Lanka, it would be recommended to harvest more frequently.

Insect pollination is important for establishing good yields of runner beans. In the UK, bee keepers are encouraged to leave their hives near runner bean crops. Similar practices are also developing in the main production areas in Africa. Trials have shown that without pollinating insects, yields are very low. The requirement for insect pollinators is one reason why great care must be exercised when using insecticides.

Harvesting - Great care is required to harvest runner beans effectively. Poorly trained labour will often cause significant yield and quality losses. Pickers have to take care to harvest the beans at the right stage of growth. Ones which are harvested too early or too late are rejected in the packhouse. Care has to be taken not to damage immature beans and flowers when harvesting mature pods. It is estimated that it would take about 1,000 man hours in Sri Lanka to harvest a 15 tonne/ha of export quality crop of runner beans.

Post-harvest - After harvest and pre-packing, runner beans should be kept at 4 to 7°C and at 92 to 95% Relative humidity, but care must be taken to prevent condensation on the pods. Above 7°C, the beans quickly deteriorate and at lower humidities desiccation is rapid. Temperatures below 4°C can cause chilling damage, although varieties differ in their susceptibility. Achieving these post-harvest standards will be even more important if Sri Lankan exporters are trying to export sliced beans. Beans are sensitive to ethylene and should not be stored or transported with ethylene producing crops such as passion fruit, citrus or bananas.

Yields - The yields can vary enormously. In the UK, marketable yields of 20 to 25 tonne/ha are achieved. Export yields in Zimbabwe vary from 5 tonne/ha in the hot season to 15 tonne/ha in the cool season. Kenyan yields are reported to be even higher than in Zimbabwe at 20 tonne/ha. Reject rates in the packhouse are high. In UK, 30% of the harvested crop is below "Class 1". In Africa, most companies accept a reject rate of 40%, most of which either have to be dumped or fed to cattle. Many of the rejected beans are simply "too curved".

For Sri Lanka, it is suggested that export yields of 15 tonne/ha should be used in the gross margin analysis and for future business planning. This yield should easily be achieved and will be exceeded with experience and good management. The crop would also produce about 10 tonne/ha of second quality beans, most of which could be sold on the local Sri Lankan market.

D) GROSS MARGIN AND OTHER COSTS

The following Table gives an indicative gross margin for runner bean production. Some of the costs are estimates and the analysis should therefore be treated with care, in particular the costs allocated for land preparation, irrigation, crop management, packaging and local transport and handling costs. However, it shows that runner bean production in Sri Lanka could have an attractive gross margin, which could be significantly improved if the second quality produce could be sold on the local market. The biggest variable cost is air freight. It should be noted that a 10% increase on the air freight has been made to allow for overfilling the cartons and weight loss during transportation.

**Table 1 Gross margins for runner bean production in Sri Lanka,
(US\$/ha)**

Revenue		
Yield	10,000 kg	
C&F price	3.00/kg	
Total revenue		30,000
Expenses		
Air freight @ US\$ 1.50/kg	16,500	
Packaging	666	
Seed	325	
Land preparation	200	
Fertiliser	215	
Pesticides	310	
Irrigation - electricity	240	
Irrigation - labour	90	
Cold store electricity	180	
Harvest and packing	275	
Local transport	200	
Total expenses		19,201
GROSS MARGIN		10,799

The other costs that have to be allowed for are the capital costs associated with the lighting and the staking (US\$ 1,000 and 750/ha). These could be written off after 5 and 4 years respectively giving a total annual depreciation on these items of US\$ 388/ha. In addition, there could be capital expenditure required on the field irrigation equipment and either getting a supply of electricity to the field or a generator.

It must also be recognised that if runner beans are to be grown commercially in Sri Lanka, an allowance will have to be made for a trials programme. Also, it will probably take a couple of years to gain sufficient "experience" to achieve the yields and quality standards assumed in the gross margin analysis.

E) COMPARISON WITH OTHER COUNTRIES

Sri Lanka will be competing mainly against Kenya and Zimbabwe on the European market. The biggest variable cost associated with runner bean exports is air freight. The rates to Europe from Sri Lanka (assumed to be US\$ 1.50/kg) are similar to both Kenya (US\$ 1.50 to 1.70/kg) and Zimbabwe (US\$ 1.55 to 1.65/kg). Labour rates in all three countries are similar. Therefore, Sri Lanka

does not have any inherent cost competitive disadvantages compared with the countries already supplying the European markets.

In terms of climate, Kenya has an advantage over Zimbabwe because, as it straddles the equator, it has a more uniform temperature regime. Zimbabwe's climate is sometimes too warm and production drops off. If a suitable location is found in Sri Lanka, it should not be at climate competitive advantage compared with other countries already supplying the target market.

Where Sri Lanka does have a competitive disadvantage is lack of experience and technical knowledge. Zimbabwe started trials with runner beans in 1985 and Kenya slightly later. They have tested a wide range of varieties, established good growing techniques and now have a core of well trained workers. The costs of achieving this probably have already been written off. Sri Lanka still has to go down a similar learning curve. Given that some of the information can be transferred from Africa, it should be possible to go down the learning curve quicker than the Kenyan and Zimbabwean growers, but the experience still has to be accumulated.

F) SUMMARY

Runner beans represents an interesting potential export crop from Sri Lanka. However, because it is a difficult crop to grow, it would be important to establish a trials programme to establish the best varieties and agronomic practices. Also, it must be recognised that an investment in training staff is important. The European market would like an alternative source to their current African suppliers. If Sri Lanka could quickly achieve the quality the supermarkets require, it could easily establish an interesting market presence.

A significant potential competitive advantage that could be enjoyed by Sri Lanka is that they have a much larger local market for second quality beans. Most of the second quality in Kenya and Zimbabwe does not generate income.

The key facts are:

- the market is small, but growing, with a restricted supplier base; it is primarily an out-of-season market over the period October to June;
- the market is based on supply of pre-packed product, and growth is likely to come in the area of pre-packed pre-sliced product;
- high field yields can be achieved, but outgrade % is high, and losses through poor handling can easily reach excessive levels; post harvest handling conditions and practices are critical;
- good production levels require field lighting to extend daylength, and very careful management of soil moisture, humidity and pollination conditions;
- there is a very restricted variety base to existing production, and varietal selection would be a critical part of any development programme.

CHAPTER 3

COMMON STANDARDS OF QUALITY FOR BEANS

REGULATION 58/62 ANNEX I/4

PRODUCE

I DEFINITION OF PRODUCE

This standard applies to beans grown from *Phaseolus vulgaris* L. and *Phaseolus coccineus* L. to be supplied fresh to the consumer, beans for shelling or processing being excluded.

QUALITY

II PROVISIONS CONCERNING QUALITY

A. General

The purpose of the standard is to define the quality requirements for beans at the dispatching stage after preparation and packaging.

B. Minimum requirements

(i) The beans must be:

- intact,
- sound (subject to the special provisions for each class),
- of fresh appearance,
- clean, in particular free from any impurity or any visible trace of the chemicals used,
- free from foreign smell or taste,
- free from all abnormal external moisture.

(ii) The beans must be of sufficient size. The state of the produce must be such as to enable it to withstand transport and handling, to be kept in good condition until it reaches its place of destination and to meet market requirements there.

C. Classification

(a) **Fine beans ('needle beans')**

Fine beans are graded in three quality classes which are defined below:

'Extra' class

Beans in this class must be of superlative quality and of the shape, size and colour characteristic of the variety. They must be:

- turgescient,
- very tender,
- seedless and stringless,
- free from any defect.

SIZING

III PROVISIONS CONCERNING SIZING

Sizing is required only in the case of fine beans. Sizing is determined by the maximum diameter of the pod in accordance with the following classification:

- very fine: width of the pod not exceeding 6 mm,
- fine: width of the pod not exceeding 9 mm,
- average: width of the pod exceeding 9 mm.

'Fine' and 'average' beans may not be placed in the 'Extra' class.

'Average' beans may not be placed in Class I.

TOLERANCES

IV TOLERANCES

Tolerances in respect of quality and size are allowed in each package for substandard produce.

A. Quality tolerances

'Extra' class: 5% by weight of beans not satisfying the requirements of the class but meeting the requirements of the Class immediately below (Class I).

Class I:

10% by weight of beans not satisfying the requirements of the class but meeting the requirements of the class immediately below (Class II); of these, a maximum of 5% may have strings in the case of varieties which should be stringless.

Class II:

10% by weight of beans not satisfying the minimum requirements but fit for human consumption.

In no circumstances shall tolerances include produce affected by *Colletotrichum* (*Gloeosporium*) *Lindemuthianum* blight.

B. Size tolerances (fine beans)

For all classes: 10% by weight of the produce in each package not conforming to the standard size.

C. Cumulative tolerances (fine beans)

In no circumstances may quality and size tolerances together exceed:

- 10% in the 'Extra' class,
- 15% in Classes I and II.