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# Seminar on Hatchery Management and Practices/Economic Factors of Livestock Production

Improved maize production in Sri Lanka,  
for import substitution

Prepared by

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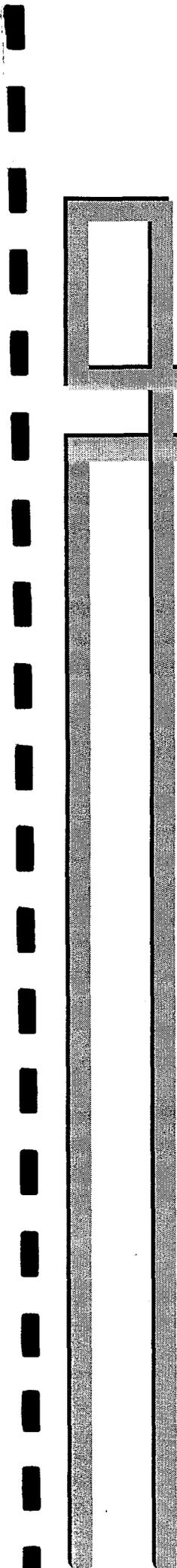
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**IMPROVED MAIZE  
PRODUCTION IN SRI LANKA,  
FOR IMPORT SUBSTITUTION**

Prepared by AgEnt  
Production Division  
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## MAIZE PRODUCTION IN SRI LANKA, FOR IMPORT SUBSTITUTION

### A. BACKGROUND

Maize, (*Zea mays*), constitutes between 35-40% of the livestock feed milling component requirements in Sri Lanka, and considerably more than 80% of raw product requirements are imported annually.

The technical production, harvesting, and post-harvesting requirements are well known and available to local producers through several avenues including: The Department of Agriculture (DOA), Local Feed Milling Companies, and the AgEnt Project interventions.

Maize crops in Sri Lanka, are produced primarily in the dry zone. There is currently sufficient evidence to support the fact that maize also performs equally well under supplemental irrigation practices in paddy fields during the Yala season.

The Yala season should also be utilized as the major seed production season for *open pollinated* varieties, which are needed for the major Maha planting season.

Given this background, the AgEnt Project incorporated maize into its crop trialling program during the 1995/96 Maha season. The crop will contribute to all of the Project's primary objectives and output requirements; namely: increased domestic maize production through the introduction of *improved technologies, improved high yielding varieties, developing an outgrower scheme using small-farmers, linked to an integrator-processor-end user clients, and the collaborative support of the Ministry of Agriculture and the Department of Agriculture and its supportive Task Force*. The AgEnt Project has acted primarily as a catalyst, bringing people together in a common cause to improve Sri Lanka's position. This need will continue for the mid to long term.

The majority of the maize processed in Sri Lanka, currently (1995) about 85% of the total annual requirement is imported. Primary suppliers include: India, Thailand and China. Smaller quantities are imported from other countries. The annual 1992-1995 import figures are summarized in *Table 1 below*.

TABLE 1. SRI LANKA'S MAIZE IMPORTS, VOLUMES AND VALUES(Rs)\*

Year	MT Annually	Value (Rs)	Value Per MT	Value Per Kg
1992	36,168	340,027,205.00	9,669.00	9.67
1993	63,887	536,021,032.00	8,390.00	8.39
1994	84,824	587,843,073.00	6,930.00	6.93
1995	88,059	634,734,929.00	7,208.00	7.21
1996**	96,864	698,208,411.00	7208.00	7.21

\* The figures were taken from the Bureau of Sri Lankan Import Statistics.

\*\* The 1996 figure are estimates based upon ten percent increases during 1994 and 1995.

Added to the figures in Table 1 for accurate costing must be: in-country transportation, off-loading labor or other labor handling costs, storage, labor for feed milling system, packaging, handling, and distribution costs. Best estimates of these costs would be about 25% of the landed FOB kg prices stated in Table 1. The summation of these costs should approximate what local processing companies should be in a position to pay for locally produced maize against competitive world market pricing structures.

With the increased production and marketing activities currently being experienced in the poultry and piggery sub-sectors for *domestic consumption*; the need for high quality protein grain supplements for prepared feed mixes will likely continue for the short and mid terms. They will continue to grow in relation to the sub-sector's annual growth rate; generally believed to be about 15-20% annually at the present time.

In 1994 the total production of poultry feed produced in Sri Lanka was estimated to be 258,528 Mt.\*\* Additional feed was produced for other specific sub-sectors of the animal industry. *The poultry sector is without question, the driving force for the feed milling industry at the present time.*

Input products that are utilized in the feeding industry are summarized in Table 2.

**TABLE 2. FEED GRAIN INGREDIENTS THAT ARE UTILIZED IN SRI LANKA'S FEED MILLING INDUSTRY, 1994\*\***

Product	Import MT	Local MT	Total Usage MT	% Imported	% Local
Maize	79,830	1,030	92,869	86	14
Broken Rice	0	5,130	5,130	0	100
Rice Polishing	0	65,276	65,296	0	100
Rice Bran	0	3,650	3,650	0	100
Wheat Bran	0	18,237	18,237	0	100
Soya Meal	60,903	0	60,903	100	0
Coconut Meal	0	4,842	4,842	0	100
Fish Meal	8,331	0	8,331	100	0
<b>TOTAL</b>	<b>166,757</b>	<b>110,185</b>	<b>276,942</b>	<b>60</b>	<b>40</b>

\*\* Department of Agriculture, Animal Production and Health, Statistics, 1994.

Several of the above items are noteworthy. Firstly, maize represents 34% of the total livestock feed requirement and currently 86% of the needs are imported; secondly, 22% of the domestic feed grain needs are being filled by soybeans which can easily be produced in Sri Lanka. This must be addressed immediately; and lastly, why does Sri Lanka import fish meal which is 3%. The point is Sri Lanka is major consumer of fish and have a large local fishing industry? What is happening to the by-products? This product could be increased significantly in the milling ration if the product could be processed. *These three products represent 54% of the total raw products and are essentially 100% imported at the present time, when they should be 100% produced locally.*

The primary maize production areas in Sri Lanka include the following districts: Ampara, Anuradhapura, Badulla, Moneragala, System H, System C, Matale, Kandy, and Puttalam areas.

The ten year average planted area in these districts has been 3,190 hectares annually. In addition, there were very small planted areas, e.g., 50 hectares planted during the Yala season. The average production for the same time period was 2,784 mt. Historically, 1-1.5 metric tons (mt) per hectare. *This is not economically acceptable, particularly given the growth rate of the two animal sub-sectors, requiring large volumes of milled animal feeds.*

It has been stated in a Government produced document, that if one were to initiate a maize improvement program, *"varieties should be the first thing to consider"*. This implies both open pollinated and hybrid varieties.

This introductory program clearly established the fact that by using hybrid varieties and high quality open pollinated seed, high levels of fertilizer, correct plant population, adequate weed control measures and improved management, 3-6 fold yield increases can be achieved.

The Extension Services of the Department of Agriculture (DOA), supported by the Task Force for Other Field Crops, together with the small-farmers, have been convinced that the varietal/fertilizer response must be exploited to the fullest in future plantings.

## B. CURRENT STATUS

The Project assisted directly 475 participating outgrowers and indirectly 4,000 follow-up farmers during the initial implementation phase of the Maha season of 1995/96. By the Yala season of 1996, there are three additional clients who intend to join the Yala program. It is anticipated that a minimum of 1,000 ha is possible in Yala 1996. The trials were both commercial and demonstration in nature.

The Ministry of Agriculture and the Department of Agriculture are appreciative of AgEnt's initiative to this collaborative program and are planning an expansion of the maize program in the future using similar collaborative approaches.

The AgEnt Project has received several requests for assistance to increase maize production in Sri Lanka from local *"feed grain processors"*, following the collaborative Department of Agriculture/AgEnt/CGE Maize Extension and Trial (DACMET) Maha 1995/96 program. The production base can be established but could breakdown if the marketing linkages are not nurtured and maintained.

### C. FUTURE DEVELOPMENT

In the current Yala season (May-August-1996), we are planning to have a series of somewhat large scale demonstrations based on our findings in the Maha DACMET.

Future Project Assistance Strategies Include:

- Promotion of an extensive production program beginning Maha 1996/97 in all areas, but specifically in the Southern, North, and Eastern Provinces;
- Stabilize, increase, and continue, the necessary linkages among producers, farmer organizations, collectors, feed miller-processors, distributors, and end users;
- Training and continuing AgEnt's presence in the maize program to a point that there is proof that its objectives are achieved;
- Develop the required training and extension materials that will be required to fully commercialize the maize production program;
- Incorporate as required, additional "Feed Grain" crops into the AgEnt Program so as to reduce the future need for imported products; and
- Policy interventions/collaborative funding through banks.

### D. PER HECTARE MAIZE BUDGET (Rs)

#### Crop Inputs

Land Preparation(mechanical)	3,700.00
Basal Fertilizer	3,575.00
Seed	
* Hybrid	[1,200.00]
* Open Pollinated	[500.00]
Top Dress Fertilizer	1,180.00
Labor* (including harvest/thrashing)	8,600.00
<b><u>TOTAL EXPENSES</u></b>	<b><u>18,255.00(h)**</u></b>
	<b><u>17,555.00(op)***</u></b>
<b><u>REVENUE</u></b>	
Hybrid-5.5 tons per ha @ (Rs) 6.50/kg	<b><u>35,750.00(h)</u></b>
OP- 4 tons per ha @ (Rs) 6.50/kg	<b><u>26,000.00(op)</u></b>

## RETURN PER Ha.

Hybrid	<u>17,495.00</u>
Open Pollinated	<u>8,445.00</u>

## PRODUCTION COSTS BREAK-EVEN AT SELECTED YIELD LEVELS

<u>Yield/Ha</u>	<u>Production Costs/Kg</u>	
	(H)	(OP)
8.0 mt	2.28	NA
7.5 mt	2.43	NA
7.0 mt	2.61	NA
6.5 mt	2.81	NA
6.0 mt	3.04	NA
5.5 mt	3.32	3.19
5.0 mt	3.65	3.51
4.5 mt	4.06	3.90
4.0 mt	4.56	4.39
3.5 mt	5.22	5.02
3.0 mt	6.09	5.85
2.5 mt	7.30	7.02

\* Farmers or family labor. The time to maturity is about 120-130 days; it would be very easy to produce two crops annually from each hectare.

\*\* The break even price at 5.5 mt per ha is (Rs) 3.32/kg, including labor costs.

\*\*\* The break even price at 4 mt per ha is (Rs) 4.56/kg including labor costs.

The bolded figures represent what AgEnt and the Department of Agriculture authorities and the Project's Production Staff feel is a reasonable yield range to expect in Sri Lanka, using available varieties and improved cultural practices. The Open pollinated variety does not have the maximum yield potential that the hybrid possesses, but may be adequate for some farmers.

## E. CONSTRAINTS

The Project has experienced three major areas of constraints during the implementation of the Maize Program. These include: 1). a lack of adequate communication among the local identities, 2). the lack of improved hybrid varieties in Sri Lanka and 3). need for facilitating the import of disease free hybrid varieties. There is a major need to improve the production and quality of locally produced seed.

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## SOYBEAN PRODUCTION IN SRI LANKA, A MAJOR IMPORT SUBSTITUTION POSSIBILITY FOR SRI LANKA

### A. INTRODUCTION

Soybeans are not a traditional crop for Sri Lanka, but were first introduced to the country in 1947. Major production initiatives appear to have taken place between 1974/75 through 1983/84. All of these efforts involved products for human consumption. The peak years of activity were 1982-84 with another small spurt of activity between 1986-88.

A very modest review of available information for soybeans would indicate that considerable research/development and extension work has been completed over the years, providing a valuable information base.

The import figures of soybeans stated in metric tons and their Rupee value are summarized in the following table.

TABLE 1. ANNUAL SOYBEAN IMPORTS REFLECTING BOTH VOLUMES  
AND VALUES(RS)\*

Year	MT	Total Value	Value Per Kg
1992	266	4,632,854.00	17.42
1993	2,989	52,035,387.00	17.41
1994	14,779	197,148,939.00	13.34
1995	2,663	32,355,786.00	12.12

\* Sri Lanka Bureau of Statistics. Major supplying countries include: India, China, Malaysia, and United States. The above volumes are expressed "weather whole or broken" in the import statistics.

### B. FIELD PRODUCTION\*\*

Soybeans are produced primarily in the dry zone areas of Sri Lanka. The general production areas are about the same as maize. Maha season production during the north east monsoon, from late October-January, is mainly as an upland rainfed "chena" crop. Yala season production in the southwest monsoon, from late April-August, is on paddy land with supplementary irrigation.

Although research yields of 3-3.5 mt/ha are considered normal, the national farm-level average over a 15 year period is only slightly over 1 mt/ha. Yields are consistently higher in the Yala season, averaging 1.5 mt/ha, and grain quality is usually better, resulting in this being regarded as the season for seed production.

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In the past considerable time, energy and funds have been expended to develop soybeans in Sri Lanka. The following areas have been addressed:

- *Transfer of Technology-* This included the transfer of technology to a large number of rural farm families. As many as 100 programs were conducted during each season with 10-20 participating at any one location;
- *Farm Level Adaptive Research-* Varietal research, inoculant, fertilizer, and the use of bio pesticides;

*Certified Seed Production-* This activity was conducted by the Department of Agriculture and included the release of two new varieties, PM-13 and PM 25. The program also had a target of 10 mt of certified seed of the "Pb-1" variety;

- *Appropriate Biotechnology-* Emphasis was placed on the development of the soybean inoculant (Rhizobium japonicum) and the need for small-scale production in Sri Lanka. Ongoing discussion were conducted with the Appropriate Technology International organization in Washington, DC.
- *Training and Entrepreneur Support-*
  - Outreach training centers in Kandy, Colombo and Madatugama
  - Five day residential training
  - Training of Trainers Workshop
  - School Feeding Program
  - Demonstrations
  - Exhibitions and Markets