# Soybean Utilization Workshop

## Peradeniya, Sri Lanka

January 1985

## Summary Report

# Sri Lanka

ORGANIZED AND SUPPORTED BY:

Sri Lanka Department of Agriculture
International Soybean Program (INTSOY), USA

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## Summary Report

January 14-26, 1985
Soyfoods Research Center
Gannoruwa, Peradeniya
Sri Lanka

Sri Lanka Soybean Project
International Soybean Program (INTSOY)
December 1985

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# Background

Prior to 1970, soybean was a little known crop in Sri Lanka's agriculture. A variety of green soybean was traditionally grown and consumed on a small scale by farmers in a restricted area of the hill country. At the research level, the present Director of Agriculture (Sri Lanka), Dr. G.W.E. Fernando (then Deputy Director in charge of the dry zone agriculture research stations), maintained several soybean varieties, more out of personal interest in the crop than as an integral part of research priorities. At that time, the late William G. Golden, Jr., an expatriate consultant on rice research programs, had a vision for the potential of soybeans in the country and tried to arouse interest among researchers on growing the crop. Dr. Golden distributed a limited number of "mini kits" (containing seed, inoculum, fertilizers, and instructions) for raising small plots of soybeans.

The government became interested in the crop in the early 1970s, particularly to supplement the locally grown pulses and eventually to substitute imports. After careful consideration by the Ministries of Agriculture, Health, and Planning, the decision was made to study the feasibility of introducing soybeans to the local agriculture. The government addresssed the FAO on the matter and at their request, Dr. Carl N. Hittle of INTSOY (later coordinator of the Sri Lanka Soybean Program for several years) visited Sri Lanka in October 1972 for initial feasibility studies. A project proposal for soybean development was prepared by the FAO and Government of Sri Lanka and submitted to the UNDP in November 1973. The original proposal was accepted and funding became available for Phase I of the project to INTSOY at the University of Illinois at Urbana-Champaign. The UNDP continued to fund the project through three phases covering the period March 1, 1975 through December 31, 1984. The original proposal did not contain funds for soybean utilization and, therefore, additional funds were sought and obtained through CARE and UNICEF for that part of the program.

Ceremonial opening of the Workshop by Sri Lanka Minister of Agricultural Development and Research

Considering the progress of the project in the last 10 years, the Sri Lanka experience is perhaps a good model from which other countries with similar interests might benefit. Therefore, it is very appropriate that Sri Lanka should be selected to host this international workshop on soybean utilization.

## Workshop Objectives

The purpose and objectives of the workshop are as follows:

(1) To give policy makers a better understanding of the potential of soybeans as a source of protein in local diets.
(2) To assist participants in the design and management of indigenous soybean industries.
(3) To train participants in home-level and industrial processes which incorporate soybean's protein/calorie content to a variety of foods and beverages.

## Highlights

With continued government interest and the cooperation of many international agencies, the Sri Lanka Soybean Development Program made great strides in the last 10 years. Through concerted efforts on the part of the agricultural research, extension, and training sectors, soybean is now established as a profitable addition to the dry zone agriculture. From the inception of the program, soybean was promoted primarily as a food crop rather than a feed crop. Therefore, research and development in the food use of soybeans is an important component of the overall program. A modern food research facility was established to serve as a

Demonstration in progress at the home level utilization kitchen

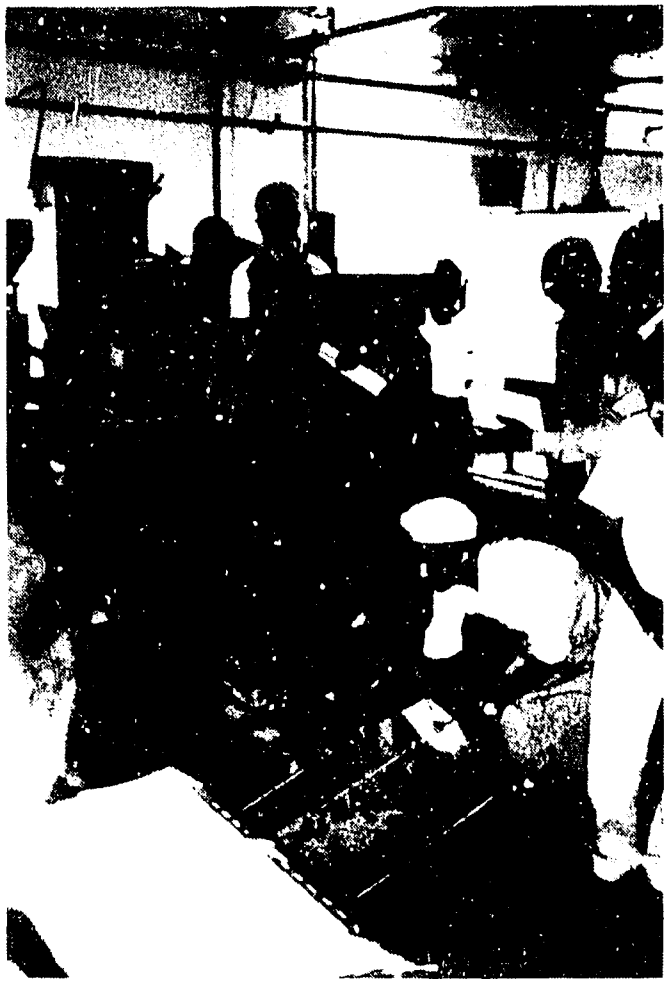
center for research and product development, training of personnel, and technology transfer. The center has made remarkable progress in the promotion of soybean utilization at home, village, and commercial levels.

The home-level program consists of the development and dissemination of techniques by which whole soybeans can be incorporated by the housewife into the daily diet of the household. Numerous recipes were developed for the preparation of main dishes, side dishes, desserts, and snack foods containing soybean as a main ingredient. This know-how is disseminated to field-level workers in both government and private sectors by training programs conducted in the center and the regions. The trainees, in turn, act as trainers for taking the message to the housewife. Over 3,000 people were trained in courses lasting three days, one week, or three weeks. In addition, about 18,000 people have participated in demonstrations on soy cooking lasting one day. On account of the increasing demand for training on the home-level program, two regional training centers have been opened.

Utilization at the village level envisages the manufacture of soy foods at centralized places in the urban or rural setting with relatively small capital investment. In addition to the nutritional impact of such ventures, they also have considerable potential for generation of income and employment. For this reason the village-level program has been supported by several sectors of government other than agriculture. Products such as dehulled soybeans, soy beverage base (as cooking adjunct), soy fortified bakery products, soy milk, tempeh, tofu, and soy/cereal snacks have been identified for village-level manufacture. Many small scale ventures are now in operation throughout the country. In addition, under the direction of the Ministry of Plan Implementation, the center has undertaken several pilot projects for the on-site preparation and feeding of soy fortified mid-day meals for school children. A porridge-type product made from rice, soy and leafy vegetables has found wide acceptance under this program. In addition to product development, the center also provides technical evaluation, pilot-level demonstrations and training for key personnel in order to establish small-scale industries in soybean processing.

Commercial-level utilization activities are geared to the development of products appropriate for large-scale manufacture and the transfer of technology to the prospective entrepreneur. Full-fat soy flour, coconut milk substitutes, extruded products, weaning foods, soy beverage, soy oil, and soy meal were identified as products having commercial potential in Sri Lanka. Based on the research work done at the center, a commercial plant for the manufacture of a coconut milk substitite from soybeans has been established. This plant has a processing capacity of two metric tons per day and is expected to stimulate further investments in expansion with the saving of coconuts for export

processing. Soy-based weaning foods developed by the center have been clinically tested and found satisfactory. Their commercial production using low-cost extrusion technology is expected to be undertaken by the private sector in the short term. Feasibility studies for the manufacture of full-fat soy flour, soy beverage, oil, and meal have been completed and are being evaluated by commercial concerns.



Low cost extruders are used for development of weaning foods at the Soybean Foods Research Center

Due to the commercial profitability of soybean in relation to competing crops, it has been possible to greatly increase the area under cultivation. The constraint now experienced is one of slow growth in the demand. Increasing demand can be achieved by expansion in utilization and this aspect now needs greater emphasis. The fact that the people have accepted several soy products is a healthy sign, but the task in hand is to stimulate and accelerate the activities in the processing and utilization sector.

# Nutrition

The key role soybeans can play in LDCs is in the battle against malnutrition. In Sri Lanka, 40 percent of the people consume diets which do not provide their daily nutritional requirements. The problems are more serious in nutritionally vulnerable groups such as pregnant and lactating mothers and preschool children. With the government's emphasis on productive investments at the national level, the national food policy has changed from the traditional consumer orientation to producer orientation. Yet, in order to cope with the nutritional impact of such policies in the short term, government is maintaining certain welfare programs such as income transfer through food stamps and food supplementation. The problem of malnutrition and its solution are related to national policy on food, nutrition, and health care. The government of Sri Lanka has set up a special planning sector with responsibility for food and nutrition policy planning within the Ministry of Plan Implementation. This body has fully recognized the potential contribution of soybeans as a protein and caloric source. This will give fresh impetus to the food use of soybeans, particularly in nutrition intervention programs.

# Sociology

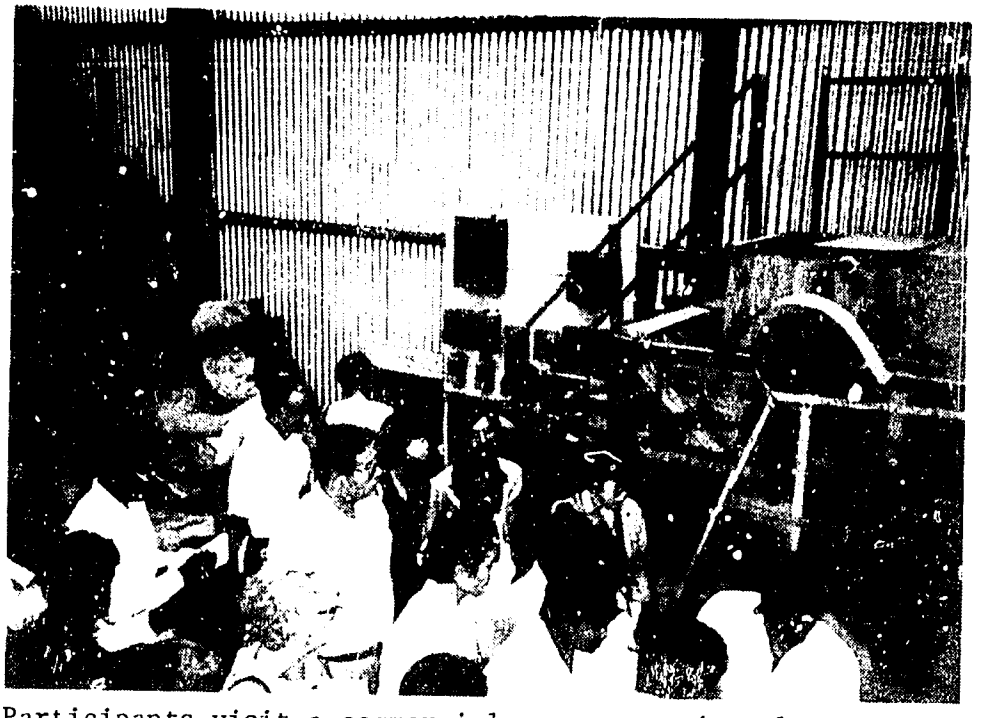
In Sri Lanka, 69 percent of the households spend over 70 percent of their income on food. Increased GNP has not necessarily resulted in improvement of quality of food consumed by the average family. The outlay on cereals is increasing while that on meat, milk and milk products, and vegetables is declining since 1973 (Consumer Finances and Socio-Economic Survey, 1981/82, Central Bank of Sri Lanka). Therefore, there is the need for introducing acceptable new foods of high nutritional value without causing strain on the family budget. The soybean with 40 percent protein and 20 percent oil is an excellent candidate for such a food item.

Participants evaluate soy beverage

The acceptance of a new food by the consumer is not a simple function of its cost or nutritional value. It involves complex motivational factors. Some of the questions that must be answered before a new food can be successfully introduced are as follows:

(1) Does the new food conform with traditional eating habits?
(2) Does the new food conform to acceptable concepts of taste, texture, and color?
(3) Can the food be conveniently cooked in the traditional kitchen without additional investment in new cooking facilities?
(4) Does the food give satisfaction to the income earner and the mother in the household by giving them the assurance that they are doing the best for their family?
(5) Is the product affordable?

Food products such as bread, canned fish, powdered full cream milk, margarine, noodles, and textured vegetable protein are non-traditional foods that were introduced and have found wide acceptance in Sri Lanka. Such foods found acceptance mainly as substitutes for traditional products which were either difficult to obtain or too expensive. With the right approach for product development, marketing and pricing, soybean can become another food successfully introduced to the Sri Lanka diet on the national scale.



Participants visit a commercial soy processing plant

Participants visit soybean production research fields at the Dry Zone Agriculture Research Station

# Appendix I - Participants

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Pyakuryal, Mr. Devendra Raj
Central Food Research Lab
Babar Mahal
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Kolshet, Thane, India

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G. B. Pant University of Agriculture & Technology
Pantnagar (U.P.), 263145, India

Kumarasinghe, Mr. H. M.
District Agriculture office
Anuradhapura, Sri Lanka

# Appendix II - Instructors

Sri Lanka Department of Agriculture and Ministry of Agriculture

| | |
|---|---|
| Dr. and Mrs. Gamani Jayasuriya | - Honorable Minister of Agriculture Development and Research |
| Dr. H. M. E. Herath | - Coordinator, Soybean Project & Deputy Director (Horticulture Division) |
| Mr. Stanley D. Wijegoonawardena | - Deputy Director of Agriculture Education |
| Mr. P. Thirukkumaran | - Soybean Microbiologist |
| Mr. Cecil D. Dharmasena | - Agronomist and Soybean Project Manager |
| Mr. V. Arulnandhy | - Soybean Breeder/Agronomist |
| Dr. Nimal Ranaweera | - Deputy Director of Agriculture Economics and Projects |
| Dr. Mervyn Sikurajapathy | - Agronomist (Cropping System coordinator) |
| Mr. W. Ratnayake | - Assistant Director of Agriculture Extension, Anuradhapura District |
| Dr. Edward Suraweera | - Agriculture Economist |
| Mr. H. B. Herath | - Assistant Director, in charge of In-Service Training Institute, Gannoruwa |
| Mr. Dixon Nilaweera | - Additional Secretary, Ministry of Agriculture |
| Mr. T. D. W. Siriwardena | - Soybean Food Technologist, in charge of Soybean Foods Research Centre, Gannoruwa |
| Mrs. Fawzia Hewavitharana | - Assistant Food Technologist at SFRC, Gannoruwa |
| Dr. Jinasiri Fernando | - Deputy Director in charge, Agriculture Research Station, Maha-Illupallama |
| Miss Ellen Jayawardena | - Chief Instructress, Home Level Training Unit |

INTSOY/IADS and other staff

| | |
|---|---|
| Dr. Alvin I. Nelson | - INTSOY |
| Dr. L. S. Wei | - INTSOY |
| Dr. Wilmot Wijeratne | - INTSOY |
| Dr. Carl N. Hittle | - Project Leader, IADS, Nepal |
| Dr. H. E. Kauffman | - INTSOY |

Others (Sri Lanka)

| | |
|---|---|
| Dr. (Mrs.) Priyani Soysa | - Professor of Pediatrics, University of Colombo |
| Dr. (Mrs.) Beatrice V. de Mel | - Nutritionist Medical Research Institute, Colombo |

| | |
|---|---|
| Mr. Wilfred Kalansooriya | - General Manager, Spices & Essences (Ceylon) Ltd. |
| Mr. Kenneth Abeywickrama | - Consultant in Marketing |
| Mr. Lloyd Fernando | - Assistant General Manager, Ceylon Oils & Fats Corporation |

# Appendix III - Course Schedule

PROGRAMME

January 13 (Sunday) - Participants arrive in Kandy

January 14 (Monday)

A.M.

8:15 - Opening address
Dr. Gamani Jayasuriya
9:00 - Tea break
9:30 - Registration of participants
9:45 - Soybean Project - a Resume - Dr. H. M. E. Herath
10:15 - Planning and execution of the Sri Lanka Soybean programme - Dr. Carl N. Hittle (IADS - Nepal)
11:15 - History of Soybean Processing in Sri Lanka - Dr. Wilmot Wijeratne (INTSOY)
12:15 - Outline of workshop programme & announcements
12:30 - Lunch

P.M.

- SOYBEAN PRODUCTION (Convenor - Dr. C. N. Hittle)
2:00 - Soybean Microbiology & Inoculum Use - P. Thirukkumaran
2:45 - Agronomy & production - C. D. Dharmasena
3:00 - Tea break
3:15 - Breeding objectives - V. Arulnandhy
4:00 - Discussion

January 15 (Tuesday)

A.M.

- PRODUCTION & MARKETING (Convenor - Dr. N. Ranaweera)
8:30 - Soybean in Farming Systems - Dr. M. Sikurajapathy
9:30 - Extension Strategy - W. Ratnayake/Mr. Kumarasinghe
10:30 - Tea break
10:45 - Marketing - Dr. E. Suraweera
11:45 - Discussion
12:00 - Lunch

P.M.

- TRAINING & PUBLICITY (Convenor - S. Wijeygoonewardena)
1:30 - Training of Extension Staff - S. Wijeygoonewardena
2:30 - Farmer Training - H. B. Herath
3:30 - Tea break
3:45 - Government Policy on Soybean Development - D. Nilaweera
4:45 - Discussion

January 16 (Wednesday) A.M. - NUTRITION (Convenor - Dr. Priyani Soysa)

8:30 - Protein & Malnutrition - Dr. Priyani Soysa
9:30 - Child & Maternal Nutrition - Dr. Beatrice de Mel
10:30 - Tea break
10:45 - Nutrition Policy - Mr. R. M. Ratnayake
11:45 - Discussion
12:00 - Lunch

P.M. - UTILIZATION (Convenor - Dr. A. I. Nelson)

1:30 - Role of a Pilot Research Plant - T.D.W. Siriwardena
2:30 - New INTSOY Utilization Program - A. I. Nelson
3:30 - Tea break
3:45 - Soybean Utilization: global view - Dr. L. S. Wei
4:45 - Discussion

January 17 & 18 8:30 A.M. - Laboratory practicals - (Thursday Production of soy based foods at SFRC (T.D.W. Siriwardena, F. Hewavitharane, Dr. A. I. Nelson, Dr. L. S. Wei, Dr. Wilmot Wijeratne.

January 19 (Saturday) - DRY ZONE TOUR (Leaving Kandy at 7:00 a.m.)

- Agriculture Research Station, Maha Illupallama
  Dr. Jinasiri Fernando (Director of Research)
  Mr. V. Arulnandhy (Soybean Breeder), Mrs. A. Pathirana (Soybean Breeder)
- Dried Soy-milk Factory ("Rajasoya"), Maha Illupallama
  Mr. Lalith de Silva (Manager/Engineer)
  Mr. Aswer (Site Manager)
- Anuradhapura District - Farmer's field. (with Mr. Kumarasinghe, Extension Service)
- Pelwehera - Seed production farm

| | | | |
|---|---|---|---|
| January 20 (Sunday) | | | - HILL COUNTRY TOUR<br>(Leaving Kandy at 7:30 a.m.)<br>- Visit to Jam-making unit at Franciscan Convent<br>- Visit vegetable market garden<br>- Hakgala Botanical Gardens<br>- Tea Estate and Factory |
| January 21 (Monday) | P.M. | | - COMMERCIAL PROCESSING (Convenor - Dr. L. S. Wei/Mr. T. D. W. Siriwardena |
| | | 8:30 | - Production & Marketing Soy-Based Foods - W. Kurukulasuriya |
| | | 9:30 | - Introduction of New Food Habits Into Developing Countries - K. Abeywickrema |
| | | 10:30 | - Tea break |
| | | 10:45 | - Soybean in Animal Feeds - Mr. Lloyd Fernando |
| | | 11:45 | - Discussion |
| | | 12:00 | - Lunch |
| | P.M. | 1:30 | - Presentation of Country Reports by participants |
| January 22 (Tuesday) and 23 (Wednesday) Morning | | | - HOME LEVEL PROCESSING<br>- Lectures/demonstrations/ discussions (Ellen Jayawardena & Staff, T. D. W. Siriwardena, A. I. Nelson, Wilmot Wijeratne, L. S. Wei) |
| January 23 (Wednesday) | P.M. | 1:00 | - Leave for Colombo - Colombo Field Tour<br>- Visit CARE, Thriposha plant |
| January 24 (Thursday) and January 25 (Friday) | | | - FIELD TOUR<br>- Oils & Fats Corporation Plant, Seeduwa<br>- U. N. Gunasekara plant<br>- Forbes and Walker plant<br>- Glaxo Ltd. |
| | P.M. | 7:00 | - Reception & presentation of certificates in Colombo |
| January 26 (Saturday) | | | - Leave Sri Lanka |