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II.

SRI LANKA SOYBEAN DEVELOPMENT PROGRAM

Report No. 5

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Contract No. UNDP/SRL/73/007-1/AGOF INTISOY
May 15-25, 1977

SRI LANKA SOYBEAN DEVELOPMENT PROGRAM
Report on a February 1977 Visit to Sri Lanka to Observe the Soybean Crop
During the Maha Season

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This visit was an adjunct to my earlier visit to Sri Lanka, in August 1976, when I observed the soybean crop in the Yala season. The purposes of this visit were (1) to observe the Maha season crop, (2) to obtain overall assessment of soybean production problems, and (3) to assist in strengthening the Sri Lanka soybean breeding program by providing technical suggestions and suitable breeding materials from India.

My visit lasted 10 days during which time I observed the soybean crop at several seed multiplication sites and research plots at MI and CARI. I also met and had discussions with research and extension personnel. A summary of activities during my stay in Sri Lanka is indicated in Appendix 1.

I submitted a rather detailed report after my first visit to Sri Lanka which included suggestions on personnel and training and on experiments to be undertaken on different aspects of soybean production and seed multiplication.^{1/} A few additional comments based on my observations during the Maha season are included in this report.

^{1/} Sri Lanka Soybean Development Program. Report No.3 by Bir Bahadur Singh who was a consultant in Sri Lanka from July 25, 1976 through August 30, 1976.

Soybean Production Research

I. The major problem in the 1976-77 Maha season appeared to be yellow mosaic and stem borer. This was particularly true of the late plantings. All plots which had been planted prior to December 1976 had a very low incidence of yellow mosaic and stem borer. The incidence increased with delay in planting; so much so that the breeding materials planted at MI in the last week of December and first week of January showed about 90-95% incidence of yellow mosaic and stem borers. Presently, these problems can be overcome by early plantings but as the soybean hectareage increases such problems may be widespread.

I had detailed discussions with Dr. P. Sivanathan, Mr. S. Dharmalingham and Mr. Ross Fellowes regarding systematic research on control of yellow mosaic and stem borers as well as on monitoring the incidence of diseases and pests throughout the season at a few locations. Some good work in this direction has already been done. However, these officers have multi-directional responsibilities and they are unable to devote adequate time on soybean research. This point was also emphasized in my earlier report. There is an urgent need for one full time soybean pathologist and one entomologist.

II. The soybean breeding materials planted at MI and SARI showed a good deal of variability for agronomic characters as well as for disease and pest incidence. Some of the lines from the Puerto Rico program and a few selected lines from other segregating materials appeared quite promising. These should receive additional testing at different locations.

The hybridization program should be expanded using local varieties, resistant sources and currently grown varieties as parents. PI 171443, which has been found to be immune to yellow mosaic at Patnagar, and Nuwara Eliya local, with small seeds, should be frequently used as parents. Specific suggestions relative to the crossing program were made to Miss.P. W. S. M. Weerasinghe and Mr.V. Arulnandhy.

With additional germplasm and advanced breeding lines due to arrive from Pantnagar and new segregating populations generated by hybridization, the breeding program will rapidly expand during the next year. Miss.Weerasinghe and Mr.Arulnandhy, who are presently handling soybean breeding materials, will not only need additional help in planting and taking observations but they will also need more technical advice from senior breeders such as Dr.N. Vignarajah to carry out the program in a systematic manner. Dr.Vignarajah is currently coordinating the entire grain legume program. Therefore, some sort of priority has to be established so that he may devote a bit more time on soybeans.

III. The cold room at CARI should be fitted with suitable racks as soon as possible so germplasm lines and other breeding materials can be properly stored.

IV. The manager of the government farm at Alutharama and some farmers of that region were facing serious problems in harvesting and threshing the Maha soybean crop due to frequent rains in February. Date of planting experiments should be conducted, keeping the rainfall pattern

in view, so that the crop maturity may be shifted in such a way as to avoid the rainy period. A number of early and late maturity varieties should be evaluated and ones which escape the rainy period during maturity should be selected.

Soybean Seed Multiplication

A systematic soybean seed multiplication program should be initiated as early as possible. As I had indicated in my first report, it will be highly desirable if a "Seed Production Cell" is established in CARI which will plan, coordinate, certify and help in the processing and distribution of seeds of all crop varieties. The Central Seed Testing Laboratory at Gannoruwa is very well equipped to handle the job.

Soybean Development Program

The District Agricultural Extension Officers (DAEO's) are doing an excellent job of promoting soybeans in several of the districts. The soybean development programs in Anuradhapura, Jaffna, Elahera, and Pelwehera (Kandalama Irrigation Project) are of exemplary nature. A great deal of enthusiasm has been generated among the farmers in this region for cultivating soybeans.

At this stage it would be desirable to involve the actual processors of soybeans and suggest that they get in direct touch with the farmers and promote soybean cultivation by contract growing. Presently most of the soybeans are being used by CARE. In my opinion, CARE should employ soybean extension workers in the soybean growing districts.

These extension personnel would provide all the technical know how to the farmers for soybean cultivation and purchase the produce at a pre-determined contract price. CARE should advance loans to the soybean farmers which can be recovered at the time of sale of the produce.

I discussed this proposal with Mr. John McLeod and other officers of CARE at Colombo. They indicated considerable interest in such a proposal. Further consideration will be given to this proposal.

APPENDIX I

- Schedule and Itinerary - B. B. Singh - - February 15 - 25, 1977
- May 15 - Arrive Colombo
- 16 - Arrive Kandy. - Discussions with H. M. E. Herath.
- 17 & 18 - Detailed observations of the soybean breeding materials planted at CARI; with V. Arulnandhy and Cecil Dharmasena.
- 19 - Visited the soybean seed multiplication program at the Government Farm, Alutharama, and the Agricultural Research Station, Alutharama. Accompanied by H. M. E. Herath.
- 20 - Visited the soybean seed multiplication plots in Pelwahera area under the auspices of Kandalama Special Irrigation Project. Accompanied by V. Arulnandhy.
- 21 - Detailed study of the soybean breeding materials planted at Maha Illuppallama (with Arulnandhy and Miss. Weerasinghe).
Discussions with Dr. Shivanathan, Mr. Dharmalingham, Mr. Besley Jinendradasa, DAEO. Visited School Farm at Maha Illuppallama.
Visited the soybean multiplication plots at Batalagoda Rice Research Station.
Discussions with Dr. D. Senadcere.
- 23 - Discussions with H. M. E. Herath, V. Arulnandhy, Cecil Dharmasena, Dr. (Mrs.) N. Wickramasinghe; at CARI, Gannoruwa. Visited the Central Seed Testing Laboratory at Gannoruwa.
- 24 - Discussions with Mr. John McLeod and other CARE Officers, in Colombo.
Discussions with Dr. N. Vignarajah about the soybean breeding program.
- 25 - Depart for Delhi.

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SRI LANKA SOYBEAN DEVELOPMENT PROGRAM

Report No. 6

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INTSOY
University of Illinois at Urbana-Champaign

Contract No. UNDP/SRL/73/007-1/AGOF INTSOY
April 16 - May 2, 1977

SRI LANKA SOYBEAN DEVELOPMENT PROGRAM
Water Management In the Dry Zone of Sri Lanka

M. B. Russell

Professor of Soil Physics

This summary report covers the period April 16 to May 2, 1977 when I served as consultant in Sri Lanka on soil and water management. The study focused on the research and development needs for the so-called dry-zone region. During the two week period I conferred with research personnel of the Department of Agriculture and the Irrigation Department and visited field research stations and pilot project areas in the northern dry zone. I led an informal staff seminar discussion on soil and water management at the Maha Illuppallama Dry Zone Station and gave a lecture on Soil and Water Management Research at ICRISAT to a large faculty seminar at the Peradeniya Campus of the University of Sri Lanka.

A four day field trip from Kandy to Anuradhapura, Jaffna and Puttalam and a one day trip to Mahiyangana provided an opportunity to study the soils and agriculture of a cross-section of the northern dry zone and to visit field research stations and associated project areas at Maha Illuppallama, Thirunelvely, Vanathavillu and Alutharama. While in Kandy I conferred with research officers and administrators at the Peradeniya research center. An itinerary and list of persons with whom I conferred is appended to this report.

The main features of the soils and climate of Sri Lanka are summarized in a chart entitled Agro-Ecological Regions of Sri Lanka and in the Handbook of the Soils of Sri Lanka. Useful background information was also obtained from the articles by Abeyratna, Panabokke, and Panabokke and Waigama listed in the attached bibliography. The main features of the dry zone and the problems of improving the agricultural production of the region are well summarized in the paper presented by Somasiri at the 1976 Cropping Systems Workshop at Maha Illuppallama.

Based on my observations and on information gained from others during this short study period I have made the following comments and suggestions concerning soil and water management problems and research needs for the dry zone of northern Sri Lanka. It must be recognized that my exposure to the problems and potentials of the region has been very brief and that my comprehension of them is undoubtedly superficial; hence these observations should be treated as "topics for discussion" rather than as mature judgements or recommendations for definitive action.

1. Existing information on the soils, climate and production practices of the dry zone provides the basic picture of the natural resource base and current level of production technology of the region.
2. The amounts and bimodal distribution of rainfall in the dry zone are sufficient if managed wisely to produce two crops annually for much of the area with little or no use of tank-stored water.
3. The development of systems of soil, water and crop management for the rain-fed areas of the dry zone constitutes a major change from the tank-based rice and shifting chena cropping system currently used.

4. In the dry zone the soil profile rather than the tank should be taken as the primary means of matching water supply and demand.
5. Effective water management must provide more adequate control of the processes of surface and subsurface water flow, therefore much more emphasis must be given to land shaping, waterway stabilization and drainage.
6. Multiple cropping without resorting to irrigation will require matching the crop growth cycles to the bimodal rainfall pattern. This will require timely sowing and harvesting and careful selection of crops and varieties.
7. Improved methods of seedbed preparation, planting and weed control must be developed if efficient rain-fed cropping systems are to be widely adopted in the dry zone.
8. A major research and field evaluation program on animal powered equipment for land shaping, seedbed preparation, planting, interrow cultivation and harvesting should be initiated. The labor intensive methods of the chena and paddy cultivators are too slow and costly to meet the physical requirements and time constraints of rain-fed multiple cropping systems.
9. More field studies of profile moisture retention and transmission characteristics of the major soils of the dry zone should be undertaken. These should be coupled with additional studies of the time and depth pattern of water use by rainfed crops.
10. Field studies of crop response to moisture stress are needed to help in the evaluation of alternative systems of cropping and soil and water management.
11. To achieve greater water use efficiency careful consideration should be given to a major reduction in the area now used for tank storage and to the improvement of drainage in the low-lying humic-gley soils. The objective of such a drastic change would be to reduce the excessive evaporative losses, to make multiple cropping in the low-lying areas feasible and to use the alluvial soil of the existing tanks for crop production.
12. The regional research facility at Maha Illuppallama and the pilot project areas nearby can serve as a base for the expanded research and development effort that must be made if the agricultural productivity of the dry zone is to be improved. Similar regional foci for the other sub-regions of the dry zone should be developed as soon as trained personnel and funds permit.

SCHEDULE AND ITINERARY

M. B. Russell - April 16 - May 2, 1977

April 16 Arrive Colombo

17 Sunday in Colombo

18 AM Visited Irrigation Department and conferred with
Dr. W. D. Joshua and Dr. K. A. de Alwis

PM Colombo to Kandy

19 AM Conferred with Dr. C. R. Panabokke and staff

PM Conferred with Dr. S. Somasiri and Mr. H. Somapala

20 AM Kandy to Maha Illuppallama with Dr. C. N. Hittle,
Dr. S. Somasiri and Mr. H. Somapala

PM Observed field research and pilot project at
Maha Illuppallama and pilot project at Walagambahuwa
with J. A. Lewis, C. N. Hittle, Mervyn Sikurajapathy,
et.al. Led a staff seminar discussion on soil and
water management. Travelled to Anuradhapura.

21 Anuradhapura to Jaffna with Lewis and Somapala.
Observed land use and intensive agriculture of Jaffna
peninsula.

22 Visited hydrology unit of Irrigation Department with
Mr. Ganeshalingam and Gunasegaram. Visited Thirunevely
research station and conferred with Mr. Selvaratnam.

PM Returned to Anuradhapura.

23 AM Anuradhapura to Puttalam and studied red and yellow
latosols at Vanathavillu with Drs. Panabokke, Somasiri
and Joshua and with Lewis, Somapala and Mr. Thiviyathan.

PM Travelled from Puttalam to Kandy.

24 Sunday in Kandy

25 Conferred with research staff at Peradeniya and reviewed
articles and reports on agriculture and resources of
the dry zone.

- 3 -
- April 26 Discussed with Dr. Somasiri and others the soil and water management problems of the Alfisol and Latosol areas of the Dry Zone. Prepared an outline for a Research Program Statement for research for the Latosol area.
- 27 Travelled to Mahiyangana with Hittle, Somasiri and W. B. Ledagama. Visited the seed farm and research station at Alutharama and the farm of the Livestock Development Board at Hambanwala and conferred with Ranjit Malleriyawa, Felix Elikonka, S. Kanagasay and E. Ramchandran. We returned to Kandy in the afternoon.
- 28 Discussed the Research Program Statement for the Latosol area with Somasiri, Rosam and planned specific studies to be conducted at Vanathavillu with Mrs. Padmasari and Mr. Thiviyathan. Gave a lecture on Soil and Water Research at ECASAT to a large seminar group held at the Chemistry Auditorium, Faculty of Agriculture, University of Sri Lanka, Peradeniya. This seminar was sponsored by the Soil Science Society of Sri Lanka.
- 29 Conferred with Dr. S. Narendran on the work of the Agricultural Chemistry Division and started writing a report.
- 30 Conferred with Dean R. R. Appadurai of the Faculty of Agriculture and with Director Aleyratne and Associate Director Panabekke. Completed writing of this report.
- May 1 Sunday Traveled to Colombo
- 2 Departed Colombo

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