Pakistan Soybean Technology

Training Course

March 1985
Summary Report
Pakistan Soybean Technology Training Course

March 18-28, 1985
NARC, Islamabad, Pakistan
Summary Report

Pakistan Agricultural Research Council
National Agricultural Research Centre,
Islamabad, Pakistan
INTSOY, International Soybean Program

June 1985
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Background

Edible Oil Needs

Pakistan has serious trouble in the edible oil sector. The following are several sobering statistics prepared by a team which recently looked at Pakistan's stock and trade management system for edible oil.

"High Edible Oil Imports, have increased at an annual growth of 20 percent over the last decade and reached over 700,000 tons in 1984."

"If the current trends continue; prospects for the future are indeed very serious."

"Future consumption will increase at an annual rate of about 11 percent, reaching as high as 2.8 million tons by 1994."

In sharp contrast to consumption, future production will likely decrease at an annual rate of about one percent, falling as low as 183,000 tons by 1994. As a result, future imports will increase at an annual rate of about 13 percent, reaching as high as 2.6 million tons by 1994."

"If international price trends continue through the next decade, annual edible oil import costs will increase at an annual rate of 21 percent, reaching 2.9 million dollars by 1994."

Potential for Soybeans to Provide Edible Oil and Protein

Soybeans can provide a share of the edible oil and meet the protein needs of Pakistan. Although soybeans have been considered a choice crop for fallow areas in a number of the cropping systems at the present time, the commercial acreage is very small.

The following constraints have been associated with soybean production:
* Lack of suitable location specific varieties with the following characteristics
  - High yield
  - Disease resistance
  - Seed viability and germinability
  - Drought tolerance
  - Efficient nodulation
* Lack of standardized cultural practices for different areas
* Inefficient disease and pest control measures
* Lack of large-scale production of bacterial inoculants
* Lack of production and sufficient high quality seed
* Lack of longevity and storability in planting seed
* Lack of research and extension staff to work on soybean

Results from limited research indicate that soybeans can be grown in the following cropping sequences:
- Rice and cotton fallow land
- Riverine lands fallow in winter
- Intercropping and cropping with sugar cane, cotton, maize, tobacco, groundnut, soybean, and millet etc.
- Wheat/soybean rotation in areas where land remains fallow in summer

Course Development

Dr. Akhtar Beg first discussed the need for a soybean technology training course for extension and research workers at the Asian Soybean Working Group Meeting in Jakarta,
### Area and Production of Soybean in Pakistan, 1975-1983

(Area in hectare - Production in metric tons)

<table>
<thead>
<tr>
<th>Year</th>
<th>Sind Area</th>
<th>Sind Prod.</th>
<th>N.W.F.P. Area</th>
<th>N.W.F.P. Prod.</th>
<th>Country Total Area</th>
<th>Country Total Prod.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975-76</td>
<td>2</td>
<td>2</td>
<td>831</td>
<td>901</td>
<td>833</td>
<td>903</td>
</tr>
<tr>
<td>1976-77</td>
<td>52</td>
<td>32</td>
<td>1610</td>
<td>583</td>
<td>1663</td>
<td>615</td>
</tr>
<tr>
<td>1977-78</td>
<td>76</td>
<td>74</td>
<td>2973</td>
<td>1216</td>
<td>3049</td>
<td>1290</td>
</tr>
<tr>
<td>1978-79</td>
<td>140</td>
<td>137</td>
<td>3297</td>
<td>1618</td>
<td>3437</td>
<td>1755</td>
</tr>
<tr>
<td>1979-80</td>
<td>168</td>
<td>166</td>
<td>3340</td>
<td>1160</td>
<td>3512</td>
<td>1326</td>
</tr>
<tr>
<td>1980-81</td>
<td>260</td>
<td>266</td>
<td>2902</td>
<td>1076</td>
<td>3162</td>
<td>1342</td>
</tr>
<tr>
<td>1981-82</td>
<td>68</td>
<td>70</td>
<td>3263</td>
<td>1465</td>
<td>3691</td>
<td>1535</td>
</tr>
<tr>
<td>1982-83</td>
<td>67</td>
<td>69</td>
<td>4034</td>
<td>1281</td>
<td>4101</td>
<td>1350</td>
</tr>
</tbody>
</table>

Source: April statistics of Pakistan 1983 GOP, MINFRA, FAO (Planning Unit) Islamabad.
Indonesia in July of 1984. Dr. Kauffman and others suggested that a Pakistan soybean training course could be one of the first activities of the new Asian Soybean Improvement Network.

USAID Islamabad agreed to fund a major portion of the course expenses through a contract with PARC and INTSOY. AVRDC and IITA agreed to support their staff participation. The program was drawn up by Dr. Akhtar Beg and his staff in consultation with INTSOY.

Course Objectives

The course objectives were to:
* Raise the overall level of knowledge of soybean technology among the research and extension scientists in Pakistan.
* Discuss ways soybeans can help solve Pakistan's chronic edible oil and vegetable deficits.
* Involve representatives of the Asian Soybean Improvement Network institutions in encouraging the Government of Pakistan to accelerate research and development activities in soybean.

Results and Accomplishments

Participants were provided information about the physiological and agronomic requirements, growth and development of soybeans, how soybeans fit into cropping and farming systems, the contribution and essentials for nitrogen fixation by rhizobia, elements of pest control, some economic considerations in production and marketing, and the potential of soybeans in contributing to oil and protein supplies in Pakistan.

Throughout the course participants actively took part in discussions centered on research activities needed to develop appropriate production technology for soybeans under the four major cropping systems where soybeans are likely to be grown successfully.

Each participant received a number of relevant publications about soybean production and utilization. Additional reference materials were given to the libraries at each participants' home institution.

The experience and information obtained in the course should enable the participants to cope more effectively with the constraints which up to this time have limited soybean production in Pakistan. In addition, it should enable administrators to see more clearly other steps that need to be taken to expand soybean production.
Appendix I

Participants

The following participants attended the course:

Dr. Salahuddin Solaiman  
Senior Scientific Officer  
Oilseeds, NARC Islamabad

Mr. M. Sulyman Khan  
Agriculture Consultant  
American Embassy Islamabad

Mr. Falak Sher  
Agricultural Officer  
840619  
c/o Deputy Director of Agriculture  
Rawalpindi

Mr. Rashid Anwar  
Senior Scientific Officer  
PGR, Lab, NARC Islamabad

Mr. Atta Hussain Soomro  
Assistant Botanist  
41606  
Oilseeds Section A.R.I.  
Tandojam, Hyderabad

Mr. Noor Ahmed Umerani  
Assistant Research Officer  
Tandojam, Hyderabad

Ch. Akhtar Ali  
Development Officer  
T.T. Unit, NARC Islamabad

Mr. Nowshad Khan  
Asst. Research Officer  
Agr. Res. Station  
Swat

Mr. Muhammad Nawaz  
Assistant Research Officer  
Agri. Res. Station  
Ratta Kulachi, D.I. Khan

Mr. Muhammad Noshad  
Assistant Agronomist  
Barani Project Chakwal

Mr. Muhammad Sajjad Mirza  
RO  
Plant Pathology Labs  
Biology Department  
Quaid-e-Azam University, Islamabad

Mr. Ghulam Sarwar  
Assistant Scientific Officer  
Atomic Energy Agri. Res. Centre  
Tandojam, Hyderabad

Mr. Azmat Rashid  
Assistant Botanist  
Oilseeds Research Institute  
Faisalabad

Mr. Muhammad Akram Sadla  
Assistant Agronomist  
Agri Barani Area, Murree Road  
Rawalpindi

Nazir Ahmed Ch.  
Asst. Technologist (Oil)  
Oilseeds Research Institute  
Faisalabad

Mr. Muhammad Salim Zia  
Assistant Director  
T.T. Unit, MARC Islamabad

Mr. Muhammad Usman  
Project Officer  
GCP (Oilseeds Division)  
Mangora, Swat

Zar Quresh  
Economic Botanist  
Agri. Research Station Mangora Swat

Mr. Gulfam Khan Jhangir  
Economic Botanist  
Agri. Res. Station Mansehra, NWFP
APPENDIX I (cont'd)

Mr. Muhammad Rahim
Asst. Research Officer
Agricultural Research Station
Swat

Mr. Naseer Ahmed Miraz
SO
BNF Programme, NARC Islamabad

M. Athar Anis Tariq
SO
BNK Programme, NARC Islamabad

Mr. Muhammad Iqbal
Research Fellow
Department of Biological Science
Quaid-i-Azam University
Islamabad

Mr. Mohammad Riaz Chatha
SO
Oilseeds NARC Islamabad

Mr. Muhammad Yousaf
SO
Oilseeds Programme, NARC Islamabad

Mr. Khaliq Ahmed
SO
Pulses Programme, NARC Islamabad

Dr. Masood Amjید Rana
SO
Oilseeds Programme, NARC Islamabad

Mr. Mohammed Akram
SO
Rice Programme, NARC Islamabad

Mian Nawab Ali Shah
Field Agronomist
Ghee Corporation Seed Division
G. 6/4 Islamabad

Muhammad Aslam Cheema
Agri. Officer
Agri. Department, NARC Islamabad

Abdul Hayee
Agriculture Officer
E.A.D.A. Mustung Quetta

Masal Khan
Agri. Officer
Agri. Department, Extension Wing
Jamrud Khyber Agency

Mr. Abdul Rehman Khan
SO
Oilseeds Programme, NARC Islamabad

Mr. Muhammad Siddique Mirza
SO
Oilseeds Programme, NARC Islamabad

Mr. Khaleel Ahmed Tetlay
SO
93340
S. Sc. Div., PARC Islamabad

Mr. S. M. Sarwar Alam Anjum
SO
Pulses, NARC Islamabad

Muhammad Amjید
SO
Oilseeds Programme, NARC Islamabad

Mr. N. Ahmed
Regional Manager
Ghee Corporation
G. 6/4 Islamabad

Qamar Ali Khan
Deputy Director
Agri. Technology Dept.
Sittera Market
Islamabad
Appendix II

Instructors

From Pakistan:
Muhammad Anwar Khan, Dir. General, NARC
Amir Muhammad, Chairman, PARC
Akhtar Beg, Coordinator, Oilseeds
Altuf Hussaid
Ashraf Ahmad
Mohammad Iqbal
M. A. Mawbool
S. M. Moughal
Manzoor Ahmad
Shad Mohammads
A. A. Hashmi
Abdul Rehman
Khalid Massod
M. Akmal
S. M. Rana
Taquir Azam
S. Solaima
M. Azlam

From other countries:
K. Dashiel (Plant Breeder-IITA)
R. Davis (NifTAL)
M. Dawson (Agronomist-IADS)
M. E. Irwin (Entomologist-INTSOY)
J. A. Jackobs (Agronomist-INTSOY)
H. E. Kauffman (Director-INTSOY)
E. D. Nafziger (Agronomist-INTSOY)
R. K. Pandey (Agronomist-IITA/IRRI)
A. Tschanz (Plant Pathologist-AVRDC)
S. Williams (Economist-INTSOY)
Appendix III

Course Schedule

March 18, 1985 (Monday)
8:00 a.m. Registration
9:00 a.m. Welcome
9:15 a.m. Inaugural address
9:30 a.m. Brief overview of the training program.
10:00 a.m. Overview and objectives of training program.
Comments by representatives of cooperating organizations: INTSOY, AVRDC, IITA, IRRI.
12:00 Noon Soil management for soybean production.
2:00 p.m. Global developments in soybean production: presentation by panel of cooperating organizations: INTSOY, AVRDC, IITA, IRRI.
3:45 p.m. Soybean farming systems: rotations in various parts of the world. Presentations by above panelists.

March 19, 1985 (Tuesday)
8:30 a.m. Soybean production in the tropics.
11:00 a.m. Soybean growth and development stages. Iowa State University slides.
12:00 Noon Prospects of soybean as inter, mix, and relay crop.
2:00 p.m. Variety development and soybean breeding for the tropics and sub-tropics.
3:45 p.m. Characteristics of appropriate varieties of soybean.

March 20, 1985 (Wednesday)
8:30 a.m. Nodulation of soybean by Rhizobium Japonicum.
9:30 a.m. Promiscuous nodulation in soybean.
11:00 a.m. Visit to Biological Nitrogen Fixation Laboratory at NARC.
12:00 Noon Soybean physiology.
2:00 p.m. University of Illinois slide set: Planting to emergence.
3:30 p.m. Round table discussions with IITA, IRRI, AVRDC, INTSOY, and NARC/PARC Oilseed staff participating.

March 21, 1985 (Thursday)
8:30 a.m. Soil fertility.
9:30 a.m. University of Illinois slide set: Emergence to flowering.
11:15 a.m. University of Illinois slide set: Flowering to maturity.
2:00 p.m. Soybean seed technology lecture and demonstration.
3:00 p.m. Land preparation and moisture conservation in rainfed areas for soybean cultivation.

March 22, 1985 (Friday)

March 23, 1985 (Saturday)
8:30 a.m. Soybean production potential of Pakistan.
9:30 a.m. Round table of discussion and mid-program evaluation by participants.

March 24, 1985 (Sunday)
8:30 a.m. Nematode diseases of soybean lecture and practical.
11:00 a.m. Viral diseases of soybean lecture and practical.
## APPENDIX III (cont'd)

### March 24, 1985 (Sunday) cont'd

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 Noon</td>
<td>Fungal and other diseases of soybean.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Soybean weeds and their control.</td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td>A practical for weed control through chemical methods in the field.</td>
</tr>
</tbody>
</table>

### March 25, 1985 (Monday)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Soybean pest management principles and tactics.</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>Foundation of pest management: sampling, damage assessment, economic injury levels.</td>
</tr>
<tr>
<td>10:45 a.m.</td>
<td>Integrated pest management tactics: biological control.</td>
</tr>
</tbody>
</table>

### March 26, 1985 (Tuesday)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Soybean production in irrigated areas with special emphasis on irrigation.</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>Preparation of extension teaching materials in soybean development.</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Utilization of soybean as oil, feed, and human food.</td>
</tr>
<tr>
<td>12:00 Noon</td>
<td>Book evaluation and report writing.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Economic considerations in soybean production and marketing.</td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td>Adjournment.</td>
</tr>
</tbody>
</table>

### March 27, 1985 (Wednesday)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>Seed increase and storage.</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>Economics of soybean production.</td>
</tr>
<tr>
<td>12:00 Noon</td>
<td>Quality characteristics of soybean oil.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Panel on farming systems research and extension as related to soybean production.</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>Review of soybean research at NARC (practical).</td>
</tr>
</tbody>
</table>

### March 28, 1985 (Thursday)

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30 a.m.</td>
<td>A soybean production program in Bangladesh.</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>General discussion and wrap-up.</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>Address by the Chief Guest.</td>
</tr>
<tr>
<td>2:30 p.m.</td>
<td>Vote of thanks by PARC, participants, and instructors.</td>
</tr>
<tr>
<td>3:15 p.m.</td>
<td>Certificate distribution.</td>
</tr>
</tbody>
</table>
Appendix IV

Publications and Training Materials for Participants and Libraries

For individual training participants (total = 50 copies)


For libraries of participants' home institutions (total 10)


4. Sampling Methods in Soybean Entomology, Kogan and Herzog, eds.


6. Soybeans: Improvement Production and Uses. ASA Publication


7. World Soybean Conference III.


9. Handbook of Soy Oil Processing and Utilization - ASA and AOCS.