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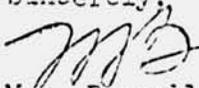
October 17, 1973

Dr. W.D. Buddemeier  
International Agric. Programs  
114 Mumford Hall  
University of Illinois  
Urbana, Illinois 61801

Dear Bud:

Here is a copy of the short report I left with Phil Smith of AID when I left Kathmandu. Also enclosed is a copy of my notes of anyone is interested.

Please pass these on to Earl, Carl et.al. who may be interested. I expect to be back in Beirut on October 31.

Sincerely,  
  
M.A. Russell

Enclosures: Copies of Reports

A.I.D.  
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## THE POTENTIALITIES FOR SOYBEANS IN NEPAL

M.B. Russell - October 4, 1973

It appears to me that the future role of soybeans in the agriculture of Nepal is largely dependent on the answers to three major questions.

1. Can a satisfactory package of practices be developed that can be realistically adopted by the farmers which will result in a level of production that is competitive with other alternative uses of production resources?

2. Is there a sufficiently large and stable demand (either for processing export or local consumption) to make soybeans competitive?

3. Can soybeans be introduced into the Nepalese diet in a nutritionally significant way without the intervention of large-scale, sophisticated, or capital intensive processing?

In reflecting on these and related questions I believe that one should consider the Terai and the hills regions separately. In the former it appears that soybeans could be treated as a commercial crop and that a wider range of alternatives concerning off-farm production inputs and utilization can be considered. In contrast, in the hill areas the general lack of transportation will impose several limitations on both the supply of production inputs and on the marketing and utilization of the crop. Of course similar constraints apply to introduction of improved production and utilization technology for other crops and agricultural enterprises also.

In areas where soil conditions and water supply are favorable for paddy production it is unlikely that soybeans can compete as a kharif crop. They might find a place in such soils where the water supply is insufficient for a spring paddy crop. In the Terai soybeans will probably be in direct competition with maize on the higher terraces and lighter soils that are unirrigated. Experience in India and U.S. suggests that given a 1: 2.5 to 3.0 price ratio soybeans will compete very favorably with maize provided a satisfactory set of production practice can be adopted.

It would appear that soybeans should be able to find a place in the Terai in competition with either ground nuts or cotton which are also being evaluated for introduction. All three of these crops will require the availability of significant off-farm production inputs and the creation of a dependable marketing and utilization infrastructure.

In the hill areas it would appear at this stage that the future role of soybeans will be largely determined on whether or not it can become a significant part of the diet in that region. Although now grown and consumed in small amounts by the hill people it is not believed to be a nutritionally significant factor in their diet. It would seem therefore that the development and field evaluation of simple methods for processing of soybeans into acceptable food products and the determination of the nutritional value of such foods should be undertaken simultaneously with studies of soybean production practices that could be adopted in the hills. It is possible that soybeans might find a place as a livestock feed in the hill region but given the heavy pressure on the limited arable land for human food this doesn't seem to be likely.

The following lines of research are suggested as a means of determining the possible future role of soybeans in the agriculture and economy of Nepal.

1. Production research in the Terai designed to establish the combinations of varieties, fertilization cultural practices, disease, insect, weed control practices, harvesting and storage methods etc. best suited for the several sets of soil and climate found in the Terai. Such studies should involve replicated experiments on the experiment stations as well as many simple observational trial-demonstrations on farmers fields.
2. Economic studies of the costs of production for the Terai and of potential market demand for soybeans under different assumptions of off-farm utilization. Such data should also be obtained for such alternatives as maize, peanuts
3. Simple adaptation trials under a variety of conditions in the hills to get a broader based idea of the range of ecological conditions that soybeans might be grown in the hills.
4. Field studies to learn more about the food consumption practices of the hill people and preliminary studies of their acceptability of soy-based products. Such studies also should determine the current practices of food preparation to determine if any of them could be adapted to local preparation of soybean foods.

The INTSOY program at the University of Illinois would be willing to discuss ways in which it could assist H.M.G. through USAID or other agencies in the planning, conducting and evaluating a broad-based R&D program for soybeans. Such assistance could involve rather minimal services of supplying materials and information or might involve more program involvement of various combinations of short-term and/or long-term research scientists.

Production research for soybeans:

1. Variety trials - yield, plant characteristics
2. Date of planting
  - a. kharif crop
  - b. spring crop
3. Population, row width, depth, etc.
4. Inoculation amt., method, persistence, effectiveness.
5. Fertilization - correlation of soil tests.
6. Disease occurrence and varietal susceptibility .
7. Insect occurrence and control - life cycle studies -
8. Crop sequence studies - the place of soybeans in a cropping system.
9. Weed control
10. Crop maturation, shattering, harvesting methods.
11. Seed storage and quality.
12. Extensive simple comparative trials to better define the range and importance of various production problems.

*MAR*

Notes on Visit to Nepal to look at Soybeans :

September 30 :

Arrive at 1000 from New Delhi - met by Staley Pitts and Philip Smith. Learned that Colin McClung of New York office of Rockefeller was also arriving to discuss possibility of a team to study hill agriculture development.

Checked in at AID staff house - had lunch at Smith's and saw N.B. Basynet in the afternoon with McClung, Smith and Pitts.

Dinner at Pitts.

October 1 a.m.

With Staley Pitts and S.N. Lohani. Visit Kakai station  $\pm$ -7000' about 25 m NW of city Kaushal in chq. (agr. graduate of Udiapur). Work on maize, finger millets, radish, burk wheat soybean.

Adjacent to horticultural station.

Rainfall 120+ inches. Low hours of sunshine in kharif. Maize harvested except some very tall African material. Much variability in a single terrace.

Early soybeans 5 var. Lee, Clark (2), Hoed and 2 locals had been harvested.

Reported to have been very poor due to blight and virus - ?

Late soybeans 5 var. Punjab 1, Imp Pelican, Hardee, - still in field but so poor and variable that no valid comparison possible. Some small nodules still evident. Punjab 1 being interest in small lots.

Soybeans interplanted in maize and grown on bunds of paddy and millet fields.

No reliable info on soil pl<sup>t</sup> - little evidence of effectiveness of inoculum.

Beans planted in first part of April!

Sufficient rain in Agriculture - May to establish both corn and beans.  
Long cloudy kharif and lack of drying at maturity make this a questionable  
ecology for soybeans.

October 1 p.m.

Visited Kulmatar experiment station in Katmandu valley. Date of planting (4)  
with Hardee and Madlani (local):

May 22, 29, June 5, 12. Little difference between varieties and not much  
between dates. Good growth well padded pods still green. Recent rains and  
standing water (drainage outlet problem). No inoculum??

Variety trial (5). Hardee, Hood, Imp Pelican, Punjab 1 and Madlani.  
Hardee probably the best. Well podded but wet and immature.

Inoculation trial no mp on treatments but no obvious differences - plants  
mature but still high moisture pods.

A block of soybeans in the Botany section (Mrs. Pande). No one available  
to explain the but it appeared to be a single row evaluation of  
many lines. Quite good growth with not many outstanding differences.

The general appearance of the soybeans at the Kulmatar station was much  
better than at the hill station. Lack of close supervision and experience  
with soybeans may account for some of the short fall but it appears that  
soybeans could be highly productive in the Kathmandu valley given experience  
and good production practices. However paddy, wheat and vegetable will be  
hard to replace!

October 2 a.m.

Met with Colin McClung, FAO rep. and AID agriculture staff to discuss hill agriculture and the proposed UNDP and RF study teams.

Met Dr. B.P. Dhital Planning Commission and Mr. Basu Dev Pyakurel Act. Secr. of Ministry of Food, Agriculture and Irrigation. Met with a member of Planning Commission.

October 2 p.m.

Discussed soybean inoculation trial at Kulonutas with Mrs. Shanti Bhattarai - IARI trained soil microbiology. Pot and field trials have not shown effects of inoculation on nodulation or growth of soybeans. One culture used was CB 1809 (Brazilian) from Rothamsted. No U.S. cultures or commercial inoculants used.

Visited Food Processing Lab and met Dr. Khan (Ph.D. London). Wants to cooperate with production scientists in det'n nutritional qualities of crops. Involved in a Nepal nutritional survey - much interested in soybean potentialities. Has visited U of I and NRI at Peoria, Pilot plant scale facility being assembled. Mrs. Splitter Ph.D. Cornell doing amino analysis etc, did not see her.

October 3 a.m.

Flew by helicopter to Rampur field station in Rapti valley with Arnold Radd, Staley Pitts and N.B. Basynet returned to Kathmandu by 1030.

Photos of soybean variety trial involving Hardee, Hood, Hampton, Punjab I, Imp. Pelican and Mahili (local). Planted in May, no inoculation 80-80-0. All leaves badly chewed. Hood fully mature, others still green. Hardee was best. A nearby seed increase field of Hardee was very good - no leaf damage,

upright plants  $3\frac{1}{2}$  ± ft. tall, well podded (photo). An adjacent seed increase of Tainun? was green but viny and semi prostrate. The variety trial yields for 1972 crop at Rampur gave:

Punjab 1	9.5 q/ha	} harvested last half of Oct. '72
Hardee	9.45 "	
Hampton	7.4 "	
Tainan 2	7.4 "	
Perry	6.2 "	
Tainan 1	5.7 "	
Mahili	4.9 "	

7 others all lower

Looked at ground nuts, cotton, paddy trials. Met Dean Rajbhandarai of the Agricultural Institute now located at old Panchaynt Training Center adjacent to the Rampur Exp sta.

## GUEST LIST

### USAID/N

1. Mr. William C. Ide, Director USAID
2. Mr. Frank Colling, Extension Advisor
3. Mr. Staley L. Pitts, Research Advisor
4. Mr. Arnold Radi, Extension Advisor
5. Mr. Donald Wilder, Training Specialist
6. Mr. Philip D. Smith, Chief Food & Agriculture Division

### HMG/N

1. Mr. Basu Dev Pyakurel, Acting Secretary, Ministry of Food, Agriculture and Irrigation
2. Mr. Netra Bahadur Dasynot, Director General, Department of Agriculture
3. Dr. B. P. Dhital, Agriculture Economist
4. Mr. K. B. Rajbhandari, Deputy Director General, Department of Agriculture
5. Mr. B. K. Thapa, Deputy Director General, Department of Agriculture
6. Dr. S. N. Lohani, Agronomist
7. Mr. G. R. Rajbhandari, Maize Coordinator
8. Dr. B. B. Shahi, Rice Coordinator
9. Mr. A. N. Bhattarai, Wheat Coordinator