

3860367(17)
PD-AAD-114-A1

PROJECT COMPLETION REPORT

29 p.

AGRICULTURAL INPUTS PROJECT
PLANT PROTECTION AND RODENT CONTROL .03

JOHN S. BALIS
Project Manager

AUGUST 1973

PROJECT COMPLETION REPORT

Sub-Project 386-11-190-367.3, Ag Inputs Dev-Plant Protection

1967-1972

PART I - NARRATIVE REPORT

I. Introduction

Plant protection is a new input in Indian agricultural production. The term generally refers to chemical application for disease and insect control of both growing and stored crops. Recently, this practice has been broadened to include improved storage practices for grain, chemical weed control, and rodent control measures.

Up to about 1965, plant protection other than mechanical weed control, was practically neglected as a crop production practice. There were a few research studies being conducted at agricultural research stations on the biology of plant pests and diseases. These studies, however, gave little attention to control measures for extensive commercial use. A few agricultural development officers in widely scattered blocks developed some control practices, particularly field spraying for control of insects. In the Intensive Agricultural Development project, which started in the late 1950's chemicals and sprayers were distributed under a subsidy for emergency and epidemic situations. During this period, a very limited

production and marketing organization had been established for agricultural chemicals and spraying equipment.

In general, chemical insect and disease control had marginal benefits for those crop varieties commonly cultivated in India through 1965. Further, subsistence and small farmers were not expected to buy or properly use chemical preparations. Consequently plant breeding programs gave maximum attention to developing disease and insect resistant varieties in their selection processes. Under these circumstances, yield was given secondary importance and while the available varieties were extremely hardy, yields were markedly below the means of other countries. The introduction of the high yielding Mexican wheat varieties in 1965-67, was the first stage in a major shift in crop improvement strategy in India.

The change to high yielding varieties with acknowledged diseases and insect weaknesses, but with a potential for yield increase 2-3 times over available varieties also introduced plant protection as a basic input for agricultural production. The IVth Plan included targets for production of chemicals, sprayers and areas to be covered in plant protection programs of various kinds. Budgets for research in plant protection were established at research centers, targets for area coverage were fixed in the Block Development program and the GOI Locust Control

program was reorganized into a operational unit - the Plant protection Directorate. The Package of Practices for the cultivation of high yielding varieties included plant protection recommendations. Unfortunately, these efforts produced only modest impact for the farmers were not able to regularly secure chemicals, equipment repairs and manage application as timely as needed and as accurately as needed to insure effective control. The results of erratic plant protection continued to limit crop production and encouraged the GOI to further strengthen the inputs directed towards this aspect of crop production.

II. Agricultural Inputs Project

In the reorganization of the Ministry of Agriculture in 1966 the Minister of Agriculture, Mr. C. Subramaniam directed the establishment of an Inputs Wing in the Department of Agriculture under the charge of a Joint Secretary. The Inputs Wing was responsible for Plant Protection, along with Fertilizers and Seeds. To support this GOI emphasis a new AID technical assistance program was established under the Agricultural Inputs Project.

In the Agricultural Inputs project, provision was made for continuing the existing technical assistance program in fertilizer production and use, for a new program of assistance to the National Seeds Corporation, and for technical support staff in plant protection and

farm machinery. By 1969, the needs for technical assistance in plant protection were defined and a request was received for assistance to the Pesticides Association of India (PAI) and to the Central Plant Protection Training Institute (CPPTI). A technical assistance component in rodent control was later added as a Technical Support component of the Plant Protection Sub-project.

During the period 1966-69, the GOI priorities and programs for development were defined by Annual Plans. This period was characterized by considerable uncertainty as a result of border troubles with both Pakistan and China and severe famine in 1965-66. The impact of the high yielding varieties, the Intensive District Programme and the input development efforts produced a significant increase in agricultural production. By 1969, India had again established a trend of stabilized growth and the IVth Plan was taken up. The IVth Plan established the following targets for plant protection and production of chemicals:

Plant Protection Targets by Years*

(in millions of acres)

<u>Kind of treatment</u>	<u>1969-70</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>
1. Seed Treatment	49.40	61.75	74.10	86.45	98.80
2. Rat Control	19.76	24.70	29.64	34.58	39.52
3. General Pest Control	14.82	19.76	24.70	24.70	29.64
4. Intensive Treatment	32.74	98.80	113.62	133.38	148.20
5. Weed Control	1.23	2.47	4.94	7.41	9.86
Total	167.96	207.48	247.00	286.52	326.04

Pesticides Targets by Years*

<u>1969-70</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>
(tons of technical grade chemical)					
42,825	54,200	66,185	78,360	90,305	331,875

The actual use of pesticides as reported by the P.M. is:

<u>Year</u>	<u>Consumption (Tech.) tons</u>
1960-61	8,620
1961-62	10,300
1962-63	9,890
1963-64	11,030
1964-65	12,060
1965-66	14,630
1966-67	17,130
1967-68	20,900
1968-69	19,580
1969-70	20,650
1970-71	24,820
1971-72	29,784 (Projection)

* Fourth Five Year Plan Working Group, Ministry of Agriculture, 1968.

By design the Agricultural Inputs Project was established for institution building with a low profile and high potential multiplier effect. The strategy of the project was to improve manpower training capabilities in marketing and in certain control operations. Also, attention was given to establishing disease and insect surveillance techniques in order to establish early warning procedures for potentially dangerous conditions. This project as described in the PROP did not provide for precise identification and association of project inputs and outputs. During 1970-71, while drafting a Project Logical Framework, the outputs were defined somewhat, but no major revision of the project was then attempted as tentative plans were already laid for a 1972-73 revision of the total Agricultural Inputs Project.

A. The Pesticides Association of India (PAI)

The PAI was organized at the initiative of the Indian pesticides formulators and was established mainly to represent their common interests in negotiations with the Government regarding import decisions and matters related to governmental policy regulating the industry. The Secretary General, Dr. P. R. Mehta, recognized a broader mandate for trade development through the association and requested technical assistance for this purpose. Mr. C. J. Fredrickson

was assigned to the PAI from 4/1/70 to 6/25/72 to provide assistance in developing marketing training programs, technical advisory services and other association member services. The PAI was established by essentially the chemical formulators but has managed its limited resources well to achieve a position of repute as a representative of the entire plant protection industry. The PAI was called upon to draft a mid-term appraisal of the IVth Plan by the GOI Planning Commission; an evidence of the status of the association in the opinion of GOI.

The USAID technical assistance to the PAI has supported several activities. Institutional services of the PAI have been pioneered under a Rupee Project Activity; this included the improvement of a periodic newsletter, the development of audio-visual techniques in marketing development and introducing pesticide technology, the building of an industry reference service and library, and several other minor activities. The PAI was requested by the Plant Protection Directorate of GOI to recommend rules for enforcement of the Indian Pesticides Act and in so doing made extensive reference to U.S. practices in pesticide quality control and use regulations. The PAI also promoted sophisticated market survey techniques to further improve pesticide production, market planning, and management. Mr. Fredrickson regularly participated in the PAI Managing Committee as

well as the Technical Committees as a co-opted member and in this way found many opportunities to introduce technology and recommend action for institutional development of the Association.

Several aspects of technology have also received attention. Foliar application of fertilizer with insecticides has been undertaken on extensive dryland tracts by aerial application under a demonstration project. Preliminary results from these pilot studies have encouraged more extensive applications under several state government programs. During 1971 and 1972 weed control experiments were initiated in some new and specialized situations; i. e., forest nurseries and aquatic weeds. Fredrickson has also been responsible for the plant protection participant training programs and selection. In this area as in other areas of technical assistance, there have been regular requests to participate in seminars, conferences, etc. conducted by the GOI, state governments, agricultural universities, etc. Several of these have been particularly significant in pioneering new developments; i. e., First All-India Crop Protection Seminar, First All-India Symposium on Pesticides Residue Analysis.

Improvements in marketing of pesticides proposed for this project were not attempted after the initial studies. The individual pesticides formulators have widely varied marketing needs, plus well thought out plans for market development. The limited range of common needs seemed to be best served by facilitating participation of pesticides

companies in established marketing training programs. Consequently, in the April 1972 Market Training Course of the Fertilizer Association of India two members of the pesticide trade were enrolled.

The technical assistance to the PAI was terminated in June 1972 by the GOI, essentially two years earlier than proposed in the PROP. The GOI did not indicate any dissatisfaction with the project; in fact, they emphasized that the capability of the PAI to undertake the mid-term appraisal of plant protection program indicated the official high regard held for the organization. It was acknowledged that many of the proposed functions of the PAI had not been timely established. In brief, because of a high level decision to reduce technical assistance levels and considering progress of PAI, this input was marked as one that could be reduced.

B. Central Plant Protection Training Institute

The technical assistance provided to the Central Plant Protection Training Institute was focussed in two main areas: first, the general improvement of training program for field operations and second, the development of plant pest and disease surveillance programs. Mr. P. M. Schroeder assisted the CPPTI from 11/26/69 to 4/5/72 for the position originally requested by GOI in July 10, 1969 for one year.

The development of the training program was undertaken jointly with the senior staff member of CPPTI by updating the lectures and laboratory problems, increasing the use of audio-visuals, and revising the program to take maximum advantage of new laboratory facilities. The collection of economic insect specimens and 2x2 color slides was given major attention by preparing new displays and improved cataloging. In all some 200 slides were added to the collection. During Schroeder's assignment, the Institute moved from a mid-town building to a small, rural campus with a number of smaller, old buildings and a small tract of land. This move offered an opportunity to increase somewhat the practical or laboratory experience included in the training program. Lectures were revised and experiments planned in chemistry, physiology, and equipment applications for both regular and special training programs. An off-campus pilot training program for aerial spray methods was planned for a later training program.

A sub-project objective was to establish an all-India Plant Pest and Disease Surveillance capability. The objective was given second priority and operational matters proceeded very slowly with the result that only a minimal start was made during the life of the project. Discussions with the Plant Protection Directorate, State

Director of Agriculture, and state Plant Protection officers resulted in widely divergent recommendations for operations. A rice survey program for the five southern states with the CPPTI as headquarters and Schroeder as coordinator was established to develop survey techniques, establish the reporting techniques and compile information by season, crop and insect or disease on current patterns of disease and insect problems. This project was given full cooperation in A.P.S. and started there in 1971. Five hundred workers compiled weekly reports with a reasonable record of consistency throughout the surveying season. Mysore and Tamil Nadu states expressed interest, but were slow to mobilize state resources for the first season. Continuation of the survey was planned for 1972-73 by the three states with reports to be compiled and distributed by the PPD. At the same time a rice survey was undertaken in the five northeastern states of Bihar, West Bengal, Orissa and parts of U.P. and M.P. The strategy was to integrate the N.E. survey with the S. India: after routines had been developed and simplified for collection of data and reporting. The integration phase was not started at the termination of the project.

Schroeder's position was terminated in March 1972 for several reasons. The CPPTI anticipated a UNDP project for comprehensive institutional development which was expected to provide the inputs associated with the USAID specialist position and provide development

funds and personnel of other fields also. The experience with the surveillance program had demonstrated the extreme complexity of the task, the need for state level and central level institutional changes, and the limitations of the available research base. In the opinion of USAID, further efforts to develop an all-India Surveillance capability needed a stronger PPD and CPPFI to achieve any widescale impact on the disease and insect monitoring and controlling capabilities.

C. Rodent Control

Numerous reports of excessive grain losses caused by rodents, some spectacular and some quite vague, had stimulated interest in this Plant Protection sub-project. One of the duties of the rodent control specialist was to review and study all of the available information on losses caused by rodents in order to provide more sound estimate of actual losses. The specialist was also expected to initiate grain protection and rodent control demonstration projects. Initial discussions of rodent losses with GOI officials revealed concern about the problem but little interest in directing resources in this area. Under the circumstances of the low-level of the GOI interest in rodent control and at the same time impressive evidence of serious rodent losses, the USAID established this position without a GOI request for technical assistance and as a technical support position.

The Rodent Control Specialist's position was filled by Mr. Kenton Harris from 10/9/67 to 10/21/69 under a PASA with the Food and Drug Administration. Mr. Harris traveled extensively and studied grain storage and handling practices at all levels from the village to the larger warehouse. These investigations revealed that a very small number of scientists had collected limited data on losses, and further that there was strong need for major improvement in grain storage and rodent control practices. Harris initiated two major demonstration projects intended to reduce rodent caused losses with available technology; i.e., the village grain bin project and the village rodent control project. In the village grain bin project a revolving fund was to be set up for assistance to small farmers in purchasing standardized steel bins. The fund was set up with a grant from USAID PL-480 Section 104(h) rupees and the administration of the project was handled by the state governments. The village rodent control project was planned as a demonstration of complete village-wide rodent control in a 40 village, area-wide program. This project was initiated with a voluntary agency under a Section 204 project.

From March 1971 to March 1973, Mr. C.R. Madsen, Vertebrate Pest Control Specialist backstopped the village grain bin project, village rodent control project and further evaluated rodent control techniques. The delay between Harris' departure and Madsen's arrival disrupted both

demonstration projects. Unfortunately, rodent control experts were not easy to locate, recruit or contract with and the delay was prolonged. During Madsen's assignment the grain bin project was increased from Rs. 4 million to Rs. 10 million, integrated with the Save-the-Grain Campaign of the GOI, and incorporated the bin designs produced by the FAO sponsored work at the Central Grain Storage Research Center, Hapur. Madsen also participated in the reorganization of the Gujarat Rodent Control Project which strengthened the project staff, increased the contribution of village residents and generally improved the project effectiveness.

By September 1972, the project area was covered and the project was expanded to include an additional 40 villages plus provide for training of officers from other interested areas. This project had demonstrated that there are large numbers of rats normally living in villages (2-3 per person), that the rat population can be controlled and that village people can be motivated to provide major inputs in a control program. These lessons have been incorporated in a training program to extend rodent control to other areas. Madsen's investigations of rodent control technology discovered many gaps and misunderstandings. Consequently, a one-page newsletter "RAT FACTS" was initiated on a nominal monthly schedule. RAT FACTS were widely distributed and acknowledged with a high level of appreciation. How-

ever, no agency was discovered who had the capability or interest in continuing this publication upon the departure of Madsen.

On the completion of Madsen's assignment, USAID terminated the rodent control technical assistance. This project had demonstrated the effectiveness of a considerable body of available grain storage and rodent control technology. The project had also identified gaps in technology available. In summary, rodent losses can be reduced and excessive losses are the result of ineffective organization rather than inadequate technology.

Consultants

This sub-project utilized nine consultants to participate in a Rodent Symposium held in Calcutta December 1966. Both Madsen and Harris participated in the Symposium as consultants. The Symposium effectively established the foundation for the technical assistance that was provided through the life of this sub-project.

Participants

<u>Name of Participant</u>	<u>Field of Training</u>	<u>Date of Departure</u>	<u>Date of Arrival</u>
C.D. Rao	Chemical Analysis of Pesticides	8/26/70	6/28/71
K. Parshad	Aerial Spraying	8/12/71	10/18/71
P.K. Menon	Pesticides Formulation and Quality Control	6/16/71	9/13/71
S.L. Tandon	Aerial Spraying	8/4/71	11/15/71
G.K. Handa	Pesticides Formulation and Protection	6/16/71	9/21/71
P.K. Rao	" " "	"	9/13/71
A.C. Thakur	" " "	"	"
S.K. Patil	Pesticides Formulation and Quality Control	"	"
K.M. Swalesh	Plant Diseases & Pest Surveillance	7/28/71	10/28/71
A. Singh	" " "	"	"
L.S. P. Trijar	" " "	"	"
J.F. Sannu	" " "	"	"
S.F. Singh	Aerial Spraying	8/4/71	10/18/71
D.M. Bhargave	" " "	"	"
D.D. Singh	" " "	"	"

Plan Protection Picture - 1972

The Plant Protection requirements of Indian farmers for maintaining projected targets of food production have not been as large as was used in Plan calculations. While chemical production and use has remained significantly below planned levels, food production has nearly achieved the targets through the 1971 harvests. However, the shortfall in use of plant protection and other inputs is expected to have progressively more serious effects in subsequent years as efforts are made to continue the trend of increasing food production.

There are several contributing factors to the irregular and low levels of increase in plant protection practices. A very serious constraint is the irregularity in supply of imported basic chemicals. These imports are delayed in part by complications in arrangements for the necessary foreign exchange, in part because of changing regulations regarding import and foreign collaboration, and in part due to administrative red-tape and the long communication channels necessary for management of the import pipeline. Other contributing factors to irregular growth are the frequent changes in the package of practices recommended for effective field control. The control requirements are also frequently revised as new varieties are introduced which have changing levels of susceptibility to different combinations of insects and diseases.

A number of Block Development Officers report that they have tried plant protection but it has failed. The reasons for failure have not been traced, and consequently it is not known whether the practice was improperly prescribed or there was an error in the preparation or application of the chemicals.

It is not surprising that with this large number of serious adverse factors, the field of plant protection remains as one of the seriously undeveloped crop production technology areas. Plant breeders are

continuing to focus their attention on the disease and insect resistance and tolerance of varieties. In the minds of many agricultural research administrators this line of approach appears to be more promising than major investment in solving the large number of factors known to contribute to poor utilization of plant protection practices. However, a few research workers are giving attention to simple prophylactic treatments which might be applied in a manner similar to that of fertilizer top dressing. There is little information now available on insect or disease levels which have economic danger in terms of yields or reduction in income. However, in general the attention on the development side is much below that required to suitably solve the inhibiting factors in application of plant protection.

The experience of recent years has demonstrated two major points. First, and perhaps the most important, is that the new varieties are not as susceptible to epidemic disease and insect infestation as was earlier feared. Apparently, the genetic base of the new varieties and their culture interspersed with traditional varieties has been adequate to prevent rapid, massive spread of diseases or insects. The second lesson is that the technology of plant protection is extremely complicated, particularly for the illiterate small farmers. With the large number of newly introduced varieties and plant protection control chemicals, it has become nearly impossible to gear up an extension program or a field control program adequate for any extensive area coverage.

PART II - STRUCTURED EVALUATION

I Project Purposes

Develop within the Pesticides Association of India, the Central Plant Protection Training Institute and other central and state agencies improved capabilities for protecting growing and stored crops against disease, insect and rodent losses.

II. Conditions Expected at End of Project

1. A plant protection industry growth rate of 10% per year.
2. An industry trade association which provides marketing training, industry statistics, and promotional services.
3. An all-India plant pest and disease surveillance organization.
4. Improved standards and practices for rodent protection of stored food and feed grains.
5. A chemical pesticides industry of 90,305 tons annual production and area coverage of 326 million acres per year (98.8 M.A. Seed Treatments; 39.52 M.A. Rat Control; 29.64 M.A. General Pest Control; 148.2 M.A. Intensive Treatment; 9.86 M.A. Weed Control.)

III. Performance Summary (See Appendix I for details)

	<u>Unsatisfactory</u>		<u>Satisfactory</u>			<u>Outstanding</u>	
	1	2	3	4	5	6	7
Participating Agency			x				
Cooperating Agency				x			
AID/W				x			
USAID				x			
Participating Training			x				

IV. Progress towards Conditions Expected at the end of the Project

1. The plant protection industry production of control chemicals is seriously below targets. (See page for details.) Production has been constrained by foreign exchange for import of basic chemicals. Official policy does not concentrate attention and resources on any one or selected few techniques and supplies. Consequently, limited resources are spread very thinly and somewhat irregularly with detrimental effects for orderly growth.

2. The Pesticides Association of India is an established organization which is broadening its clientele and has been recognized by the GOI as capably representing the industries' interests.

3. Prototype systems of plant pest and disease surveillance have been installed for rice in Andhra Pradesh and in the five northeastern states. This experience has not established the design of a compatible all-India surveillance system. The GOI Plant Protection Directorate is continuing the individual programs and intends to increase the number and extent of coverage for surveys of specific insect or disease problems. The objective of establishing a national system has been postponed indefinitely pending the experience of the specific systems.

4. The village grain bin project and the Gujarat Rodent Control project have established effective techniques for cereal grain storage and for essentially complete village rodent control.

5. The 1971-72 report of the Department of Agriculture states:

"A gross area of 38 million hectares is expected to be covered by plant protection measures during 1971-72 as against 32 million hectares in the previous year. These included seed treatment, ground operations, aerial spraying, weed control and rodent control measures. Aerial spraying operations were further extended. As against 6.76 lakh hectares during the previous year, an area of 10 lakh hectares was aeriaily sprayed during 1971-72. To help the small farmers in the eradication of pests/diseases on crops in endemic areas by aerochemical operations, a Centrally sponsored scheme was initiated in 1970. Under this scheme, the annual target of 6.4 lakh hectares is expected to be achieved during 1971-72 as against 5.16 lakh hectares covered during the previous year."

V. Follow-up Action Required

Plant protection by use of chemical sprays for disease and insect control is expected to be a constantly changing area of crop production technology. On the one hand are the continual changes in chemical technology which offers new chemicals and application techniques. On the other hand are the continuous plant breeding programs which offer new varieties of increased yield potential and disease or insect resistance. The actual production of susceptible high yielding varieties will be determined by the effectiveness of plant protection programs in adapting to all of this new technology as it is available. This adaptation process will be a major information collecting, evaluating and disseminating operation; an operation of potentially very great importance to the country as a whole. Meager efforts have been made in this direction by some of the crop production research people in their pre-

paration of recommended packages of cultural practices, but this needs more specialized attention either through the Plant Protection Directorate or by the Pesticides Association of India.

Evidence suggests that the effectiveness of field operations is extremely low, particularly for operations performed by the smaller farmers and illiterate farm laborers. Commercial services such as aerial contractors, agro-industries corporations and cooperative societies offer services by trained specialists with considerable gain in effectiveness at modest increase in cost. Expansion of such commercial services seems to offer the best means of providing the small and less well informed farmer with effective control. An official program to facilitate establishment or expansion of such services are needed to achieve both area targets and effectiveness of coverage.

The experience of the last several years has apparently demonstrated that the danger of a serious epidemic is quite low, contrary to the expectations five years ago when the new miracle cereal varieties first became popular. Nonetheless, a reliable crop disease and economic insect surveillance and reporting system offers insurance for maintaining high production levels. Continued development of such systems should be encouraged, particularly techniques that are effective within the limits of present staff and communications systems. The danger of devastation such as the corn blight of 1971 in U.S. continues to exist throughout the

modernizing agriculture of the world, yet the capability to quickly identify and monitor such outbreaks is practically non-existent. This is largely an organizational or operations research problem, but the plant protection technician will carry the major responsibility for success or failure in establishing effective surveillance systems. Further investments in technical assistance for developing surveillance systems is an investment in future crop production stability.

Another opportunity for follow-up action is continued provision for consultants and participant training. Research and Development in plant protection technology is proceeding at a very rapid rate in many countries, particularly U.S. Consultants and participant training offers an effective means of transferring selectively that technology of apparent value to India. From the experience in this project more study needs to be given for selecting participants and organizing their training programs. Also, more attention needs to be given to the use of consultants. The maturity of the plant protection organizations in India is such that specialized programs of manpower development will be effective in the future. The participant training and the consultancy programs offer this specialized input.

APPENDIX I

Performance Analysis

A. U.S. Action Agent

(For this project the U. S. Agents are:)

C.J. Fredrickson	- Direct Hire USAID
P.M. Schroeder	- PASA
K.L. Harris	- PASA
C.R. Madsen	- PSC

	<u>Not applicable</u>	<u>Negative</u>	<u>As Planned</u>	<u>Superior</u>
1. Planning & Management			x	
2. Understanding of project purchase		x	x	
3. Relations with host nationals			x	x
4. Effective administration of participants			x	
5. Local staff training and utilization			x	x
6. Adherence to work schedule			x	
7. Candor and utility of required reports		x	x	
8. Timely recruiting of U.S. personnel		x	x	
9. Technical qualifications			x	
10. Responsiveness to AID Direction			x	
11. Management of Commodities	x			

No. 2 and 7 are rated negative in respect to Schroeder PASA.

No. 8 is negative due to delay in Schroeder's recruitment. No. 3 and 5 given Superior rating due to Madsen's contribution to Gujarat Rodent Control Project.

APPENDIX I

B. Cooperating Country

Pesticides Association of India	(PAI)
Central Plant Pesticides Training Institute	(CPPTI)
Gujarat Rodent Control Project	(GRCP)
Plant Protection Directorate	(PPD)
Save-the-Grain Campaign	(SGC)

1. Personnel

	<u>Not</u> <u>Applicable</u>	<u>Negative</u>	<u>As</u> <u>Planned</u>	<u>Superior</u>
1. Competence/Continuity of Project leadership		x	x	
2. Ability to implement project plans			x	
3. Use of Project-trained manpower			x	x
4. Technical skills of project personnel		x	x	x
5. Planning and Management skills			x	
6. Technical man-years available			x	
7. Continuity of staff			x	
8. Willingness to work in rural areas			x	x
9. Adequacy of pay and allowances			x	
10. Counterpart Acceptance of and Association with Project Purposes		x	x	
11. Management of commodities	x			

The negative ratings for 1, 4 and 10 are given to CPPTI and PPD in relation to Schroeder (PASA). The superior ratings of 3, 4 and 8 are contributed by GRCP. The PAI in all respects was As Planned or marginally better.

APPENDIX I

2. Other Factors

	<u>Not applicable</u>	<u>Negative</u>	<u>As Planned</u>	<u>Superior</u>
1. Cooperation within Host Government			x	x
2. Host Government cooperation with non-government organizations			x	x
3. Availability of reliable data/statistics			x	
4. Adequacy of Project Funding			x	
5. Legislative changes relevant to Project	x			
6. Adequacy of Project related organization			x	
7. Physical Resource Inputs			x	
8. Maintenance of Facilities and Equipment			x	
9. Political conditions specific to Project	x			
10. Resolution of Bureaucratic problems			x	
11. Perceptiveness to Change			x	
12. Actual Dissemination of Project Benefits			x	
13. Intent/Capacity to sustain and/or expand project impact after U.S. Inputs are terminated			x	

The superior ratings of 1 and 2 are associated with the performance of

PAI.

C. AID/W

	<u>Not applicable</u>	<u>Negative</u>	<u>As Planned</u>	<u>Superior</u>
1. Provision of personnel			x	
2. Provision of Commodities	x			
3. Provision of adequate AID/W technical backstopping			x	
4. Contract negotiation		x		

The delay between Harris (PASA) departure and Madsen (PSC) arrival.

D. USAID

	<u>Not applicable</u>	<u>Negative</u>	<u>As planned</u>	<u>Superior</u>
1. Responsibilities defined and assigned to USAID			x	
2. Authorities defined and assigned to USAID			x	
3. Effective communications with USA			x	
4. Effective communications with other Action Agents		x	x	
5. Mobilization of Mission staff as needed			x	
6. Coordination with related project(s)			x	x
7. USAID performance per terms of ProAgs/Contracts/PASAs			x	

The negative rating of 4 is the result of unclear definition of Schroeder's assignment between objectives of PPD and CPPTI. The superior rating of 6 results of close coordination between the PAI and the USAID contractors assisting the Agricultural Universities and the State Depts. of Agriculture.

