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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

PROJECT PAPER

NEPAL - SEED PRODUCTION AND INPUT STORAGE

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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

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5. PROJECT NUMBER (7 digits): 367-0118

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7. PROJECT TITLE (Maximum 40 characters): SEED PRODUCTION AND INPUT STORAGE

8. ESTIMATED FY OF PROJECT COMPLETION: 83

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 78; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 80

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL	2710		2710	4031		4031
(GRANT)	(2710)	( )	(2710)	(4031)	( )	(4031)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1. Peace Corps	80		80	80		80
OTHER U.S. 2.						
HOST COUNTRY	50	505	555	70	1328	1398
OTHER DONOR(S)						
TOTALS	2840	505	3345	4181	1328	5509

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 78 F. GRANT	E. 1ST FY 78 G. LOAN	H. 2ND FY 79 I. GRANT	H. 2ND FY 79 J. LOAN	K. 3RD FY 80 L. GRANT	K. 3RD FY 80 M. LOAN
(1)	123 B	010	–	2710				1321	
(2)									
(3)									
(4)									
TOTALS				2710				1321	

A. APPROPRIATION	N. 4TH FY ___ N. GRANT	N. 4TH FY ___ O. LOAN	O. 5TH FY ___ P. GRANT	O. 5TH FY ___ Q. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1)					4031	
(2)						
(3)						
(4)						
TOTALS					4031	

12. IN-DEPTH EVALUATION SCHEDULED: MM 09 YY 79

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 = NO
2 = YES

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Samuel H. Butterfield

TITLE: Director

DATE SIGNED: MM 06 DD 15 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM 06 DD 19 YY 78

AID 1330-4 (3-78)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

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1. TRANSACTION CODE: C (A Add, C Change, D Delete)

PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: Nepal

4. DOCUMENT REVISION NUMBER: 1

5. PROJECT NUMBER (7 digits): 367-0118

6. BUREAU/OFFICE: A. Symbol ASIA; B. Code 04

7. PROJECT TITLE (maximum 40 characters): Seed Production and Input Storage

8. PROPOSED NEXT DOCUMENT: A. 3 (2 PHP, 3 PP); B. DATE MM YY 06 78

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 78; b. FINAL FY 80

10. ESTIMATED COSTS $5,509 ($000 or equivalent, $1)

FUNDING SOURCE		Life of Project
a. AID Appropriated		4031
b. OTHER U.S.	1. Peace Corps	80
	2.	
c. Host Country		1398
d. Other Donor(s)		
	TOTAL	5509

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH CODE C. Grant	PRIMARY TECH CODE D. Loan	E. FIRST FY F. Grant	E. FIRST FY G. Loan	LIFE OF PROJECT H. Grant	LIFE OF PROJECT I. Loan
(1) FN	123 B	010		2710		4031	
(2)							
(3)							
(4)							
			TOTAL	2710		4031	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each)

14. SECONDARY PURPOSE CODE

15. PROJECT GOAL (maximum 240 characters)

To increase the productivity of Nepal's cropping systems, particularly those used on small hill farms.

16. PROJECT PURPOSE (maximum 480 characters)

To assist the MFAI in establishing a labor intensive system, ultimately based on private growers, for producing, testing, processing, storing and distributing seed of the major food crops cheaply and effectively for the small farmers

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

18. ORIGINATING OFFICE CLEARANCE

Signature: Samuel H. Butterfield

Title: Director

Date Signed: MM DD YY 06 15 78

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution: MM DD YY

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SEED PRODUCTION AND INPUT STORAGE
(367-0118)

I. Description of the Project.

This project is designed to help Nepal establish a seed production capability and a system for receiving, storing and distributing all agricultural inputs.

A. Project Purpose.

The purpose of the project is to help the Ministry of Food, Agriculture and Irrigation (MFAI) establish a labor intensive system, ultimately to be based on private growers, for producing, testing, processing, storing and distributing seed of the major food crops and of storing and distributing all inputs used in the production of these crops cheaply and effectively to the small farmers.

This is to be accomplished by helping the MFAI and the Agricultural Inputs Corporation (AIC) establish a system for producing good seed and distributing all inputs that are compatible with the Nepalese culture and which can be conducted under the physical and economic conditions that exist in the country.

B. Background.

Agricultural development has come slowly to Nepal but during the last few years, the pace has been stepped up considerably. Governmental infrastructure has been developed to the extent that a research program has been established and research is being done on all of the major cereals, potatoes and citrus fruit; an extension service has been set up and while it is still understaffed, officers are stationed at the district level in most districts and a large staff of (inadequately trained) Junior Technicians (JT) (with two years of agricultural training) and Junior Technical Assistants (JTAs) (one year of agricultural training) have been stationed in the rural areas. Organizations have been established such as the Agricultural Projects Services Center (APROSC) to help develop and evaluate projects and activities, the Agricultural Development Bank (ADB) to finance farmers and agri-businesses, the Cooperative movember, the AIC and others in addition to the normal ministries found in most governments.

The building of this total organizational structure has been painfully difficult and much of the activity carried on under it has not been effective. For example, well trained technicians are very scarce in view of the very large development job to be done and the physical infrasgructure needed to promote development is still deficient. Such things as roads, schools, research laboratories, administrative headquarters, adequate markets and agriculturally based businesses are either insufficient to meet the needs of the country or totally lacking.

As a result, agricultural development has been slow, both because the farmers have not been taught or convinced of the value of new technology, and because the inputs needed to make the new technology work such as markets, tools, seeds, fertilizers and pesticides have not been available to them or prices have been such as to discourage their use.

Too, there have been differential rates of development in the country. In the terai, new ideas, new inputs and new markets have been accepted so that many farmers have increased production. But even in the terai, consumption of the new inputs has not been encouraging. In the hills however, except in the Kathmandu valley, these new developments have not reached the farmer. It is estimated that in 1975/76, only 6% of the fertilizer used in Nepal was used in the hills and mountains while 52% was used in Kathmandu valley and 42% was used in the Terai. However, of the total cultivated area of the country, only 7.0% was fertilized.

A study of the seed situation shows that development in this sector has been even slower. While 85% of the wheat acreage has been planted to the High Yielding Varieties (HYV), the percentage of improved seed that has been used is very low. During the six years from 1970/71 to 1975/76, the farmers of Nepal spent about Rs.341 million for agricultural inputs; seed, fertilizer, implements and pesticides purchased from official institutional suppliers. Of this, about 83% was spent for fertilizer and only Rs.22 million or about 6.5% was spent for improved seed. Recent research, however, indicates that the demand for good seed might be much greater if farmers had more confidence that seed from official sources was actually good seed.

There are no statistics as to how much seed is usually purchased from neighbors nor how much much cow dung or compost is used to fertilize fields. These figures, if available, might be indicative of the potential for the sale of seed and fertilizer in the years to come. The seed because it would give us an estimate as to how much seed is actually sold or bartered each year to meet the needs of the small farmers and the dung/compost figure would provide an estimate as to the demand for chemical fertilizers in future years as the organic manures are more and more used as fuel.

C. Present Situation

1. Department of Agriculture (DAgr)

The DAgr is one of the largest and best organized departments in the government. It has a staff of about 550 gazetted officers filling 600 positions and is supported by about 1500 non-gazetted, lower level employees out of 2,000 authorized. Its staff is apportioned among several divisions and sections such as research, botany, livestock, training, extension, administration etc. In addition, it has several projects such as the Integrated Cereals Project which are handled as separate entities within the department.

a. Botany Division.

The Botany Division has a small core of personnel trained in seed analysis who are capble of inspecting and evaluating seed fields and of analyzing seed for purity, maturity, diseases, moisture content and other factors influencing seed quality. However this staff is very small and they neither have vehicles nor allowances for travelling to inspect seed fields, to provide technical assistance to growers or to check on seed quality. Neither is the central seed laboratory fully equipped and some of the staff members are not well trained in their disciplines. However, the Division does, at the request of the AIC, visit the rural areas to inspect potential seed fields and to determine if they meet the DAgr's quality standards. They also inspect grain at harvest to make sure that it is dry enough to keep and that the quality is acceptable under HMG's current seed standards.

b. Integrated Cereals Project (ICP)

The ICP was under preparation for about three years and has been an active project since October, 1976. During the project preparation stage, the GON established 5 coordinated, commodity oriented, research-introduction programs in wheat, rice, maize , potatoes and citrus. The ICP includes the three cereal programs and is studying these crops, and many minor crops, as part of the "farming systems" used inNepal, particularly the systems used by the small farmers in the hills. Under this project, research on new varieties and new techniques to fit Nepal's physical and cultural conditions are being developed and tested on farmer's land and foundation seed is being released for increase.

c. Extension Service

The Extension Service has an Agricultural Development Officer (ADO) in all of the districts having a viable agricultural sector. Eight to ten districts have very little arable land or the cultivable land is 12,000 to 15,000 ft. or more in elevation so that agriculture, except for a little grazing, is not a profitable enterprise. In these districts where ADO's are not stationed, there are a few JTs and JTAs in place to provide help to the few farmers living in these isolated areas.

A new idea is now being tried in Nepal to strengthen the extension service and to bring the results of research to the village. Sons of successful farmers are trained at experiment stations, seed farms or other centers and are then employed as Agricultural Assistants. After training, they return to their villages to work as part time extension workers at a salary of Rs.50 ($4.20) per month. Their appointments are for two years, after which they are replaced by other village workers.

It is the function of the extension service to teach farmers to use new technology in their farming systems; to work with seed growers to help improve their product, and to make estimates of the amount of seed and other inputs needed by area farmers and report these to the DAgr and AIC for action.

2. Agricultural Development Bank (ADB).

The ADB is the financier of the Agricultural Sector and in Nepal, it helps to foster and manage the cooperative movement. It has branches in almost all of the cities and towns of Nepal and makes special arrangements for providing loans through cooperatives in those areas where it does not have offices. It also helps to organize cooperatives and finances the management of new cooperatives until they are strong enough to pay their managers themselves. The bank is now financing village/panchayat level storage buildings to supply the local cooperative's sales of agricultural inputs, kerosene, candles, soap and other consumer necessities and for storing excess production while sales, transportation and other marketing arrangements are being made.

3. Cooperative Department (Coop.D)

The Coop.D is in charge of helping to set up cooperatives in all districts, most of which are "compulsory", i.e., farmers must belong to them if they want to borrow money, buy inputs or secure help from official sources. The department trains the cooperative members and management and sets up special cooperatives for people having an interest in achieving a common goal - medical associations, milk producers or seed producers and processors are examples. They are financed by the ADB and by the government from funds collected under the compulsory savings plan and from resources available to the ADB. As mentioned above, the ADB supports the management of the Cooperatives.

4. Agricultural Inputs Corporation (AIC).

The AIC was formed about four years ago as one of the two survivors of the Agricultural Marketing Corporation. It is charged with the responsibility for importing and distributing fertilizers, tools, equipment and some pesticides. It is also responsible for having seed produced and distributed throughout Nepal. In cooperation with the Botany Division and the coordinated programs of the DAgr, it selects and supervises producers, furnishes foundation seed, purchases seed from producers and distributes it through the district and local cooperatives. In areas where cooperatives do not exist, the seed and other inputs are distributed through private dealers. The amount of seed it distributes depends upon estimates developed by the ADOs and upon the amount of seed found to be satisfactory by the Botany Division.

The amount of seed contracted for and distributed by the AIC, 1973-74 to 1975/76, is shown in the table below in metric tons.

Year	Rice	Wheat	Maize	Total
1973-74	434	1236	46	1,716
1974-75	326	1642	50	2,018
1975-76	183	1739	132	2,054
Average	314.3	1539.0	76.0	1,929.3

Most of the AIC;s seed production efforts have been concentrated in the Terai, probably because it was an easy (comparatively) area in which to work and because large blocks of land could be covered by contractors with fewer farmers/contractors involved. The table below shows the areas under the three major cereals and the amounts of improved seed used by types of terrain and crop.

	Rice				Maize				Wheat				Total			
	Area		Seed		Area		Seed		Area		Seed		Area		Seed	
	HA (000)	%	MT	%	HA (000)	%	MT	%	HA (000)	%	MT	%	HA (000)	%	MT	%
Terai	1024	82	257	85	141	32	28	34	174	60	1164	76	1339	68	1449	75
Hills	196	16	46	15	264	59	51	61	93	32	359	23	553	28	456	24
Mountains	20	2	1	-	42	9	4	5	23	8	9	1	85	4	13	1
Total	1240		304		447		83		290		1531		1977		1918	

It should be noted that about 68% of Nepal's crop land is in the Terai and that 75% of the seeds are used in these areas. It should be further noted that most of the seed not used in the terai was consumed in the Kathmandu and Pokhara valleys so that sales of seed in other hill and mountain areas from official sources are very small.

Put another way, in the terai, 1.08 MT of seed was supplied for each 1000 Ha of crops. In the hills, including Kathmandu, .82 MT of seed was supplied for each 1000 Ha and in the mountains, only 0.15 MT of improved seeds were used on each 1000 Ha of crops.

Factors reportedly restraining the consumption of seed from the AIC include a lack of confidence on the part of farmers that: (1) it will be of good quality, (2) that it will be delivered on time, or that (3) it will be available at all. Recent questioning of a limited sample of farmers in Rupandehi, Bara/Parsa and Kathmandu Valley revealed that 93% of the rice farmers would prefer to buy improved seed. 90% of the wheat growers and 85% of the maize farmers interviewed made the same assertion, In this

research, it was found that quality was of primary consideration and that farmers were willing to pay more for good seed and seed of new varieties.

5. The Farmers (Seed Producers).

The AIC has contracted with farmers to produce seed for a number of years and in some areas, there are groups of farmers who state that they are anxious to form seed production cooperatives or groups. Two of the consultant groups working on the design of this project interviewed such groups at Birgunj and Bhairahawa and were much impressed by the sincerity of the participants and did not feel that normal requirements for drying, roguing, cleaning etc. would prevent these groups from taking part in the project on a fairly large scale. However, it was doubted that they could finance such an enterprise centered on the large seed houses in the terai. The fixed costs and transportation costs of seed processed in these installations will be high enough that GON will probably find it necessary to subsidize these groups.

In the hills and other areas where very small or subsistence farmers are predominant, every village has one or more farmers who are regarded as being honorable men, who try out new varieties and who produce seed for their neighbors. A recent limited sociological study revealed that in many areas, women are responsible for selecting and saving seed for the family/village and exchange of seed between families are very common. There is a suspicion, in fact, that exchanging, borrowing or bartering seed may be the normal way for poor farmers to get enough seed to plant their land and that the seed sold by the AIC may in fact be only a very small proportion of the seedprocured by farmers each year to fill their requirements.

In view of the above, it is evident that in the Terai, there are groups capable of producing seed for the large seed plants but they may not be able to take over the management or finance the ownership of these plants at present. It is also evident that there are individuals in every village who are capable of and do, produce seed for their neighbors. In both cases, these "seed producers" are well regarded by their neighbors and are believed to be honest. Both characteristics are essential ingredients for a seed program.

D. Project Strategy

I. History of the Project's Development.

During the development of the ICP, it was planned that a seed element should be included. However, AID/W asked the mission to separate the seed element from the research element and to present it as a separate project to 'follow-on' the ICP to help Nepal capitalize on the new varieties being developed under that project. The foundation seed element of the original ICP proposal was maintained, plans have been drawn up for the foundation seed houses and seed processing equipment has been ordered for them.

In the meantime, some old equipment has been salvaged and, by using makeshift physical arrangements, the crop coordinators are producing foundation seed for the AIC for distribution to seed producers as well as seed for distribution under the research/production kit program being conducted with the cooperation of the extension service (see ICP-PP).

The GON established a Central Seed Production Committee (CSPC) consisting of senior officers of the Ministry of Agriculture, the DAgr, the Botany Division, the Seed Inspection service, the AIC, APROSC and other organizations supported by the government under the chairmanship of the Director General of the DAgr. This committee prepared a report which outlined a possible seed production program in early 1977 and suggested to AID that the GON would be interested in such a program supplemented by an increased capability to store and transport seed and other inputs to the remote areas.

With the help of this committee, a Project Review Paper was prepared and approved by GON and AID/W. The International Agriculture Development Service (IADS), the Seed Laboratory at Mississippi State University (MSU) and the Tennessee Valley Authority's International Fertilizer Center were asked to help prepare the project. Unfortunately, these groups did not come to Nepal at the same time so that, other than reading previous reports, interaction among the groups was impossible. Therefore, the Central Seed Production Committee has assumed a lead role in coordinating the development of this project.

Several agencies will have responsibilities for implementating this project; the AIC, the Botany Division of the DAgr, the Crop Coordinated programs, the ADB, the cooperatives etc. Other agencies will be filling an advisory role although at times they may also have an an active part to play in the production of seed and distribution of all inputs.

2. The Project

a. Staff

Compared to the 2000 to 2500 M.T. seed production effort of the mid 1970s the GON expects the seed industry to be producing, processing, distributing and selling good seed of the three major crops at the rate of 1500 M.T. of Paddy, 6,000 M.T. of wheat and 600 M.T. of maize per year by 1980 or 81. The rate of production is expected to increase at a rate of about 15 to 30% per year so that by 1985/86, Nepal will be producing about 8000 M.T. of paddy seed, 6000 M.T. of wheat seed, 2800 M.T. of maize seed and 800 M.T. of other seed. In order to accomplish these objectives, a number of changes will be made in the organizations now engaged in promoting the seed industry.

First, the staffs of the AIC, the seed division and the districts must be strengthened, both by bringing in new personnel and by training. Below is an estimate made by the CSPC of the additional staff required.

	Additional Staff Requirements for Seed Production			
	1980		1985	
	Officers J	JTS & JTAs	Officers	JTs & JTAs
Seed Division	6	9	10	17
AIC	6	20	15	31
District & Region Seed Staff	18	39	22	45
TOTAL	30	68	47	93

In addition to the above, secretaries, drivers, clerk-typists, peons, etc. will be needed as part of the permanent staff. Short term help will also be needed to perform field inspections, storage inspections and to collect seed samples to be sent to the nearest analysis laboratory.

b. Division of Labor

Secondly, assignments for seed production and input distribution by the GON have been altered to include new agencies and the private sector.

The Seed Division staff of the DAgr will be responsible for field inspections, seed testing, issuing tags, (labels) enforcement and seed regulation under the guidance and supervision of the CSPC.

The AIC will arrange for contract production where and when needed; will balance demand and supply in individual markets; do long distance seed moving; make seed production tools, equipment, foundation seed, supplies and spare-parts available to private producers; assist with, and where necessary, distribute seed; assist with seed drying, processing, storing (both seasonal and long term) and other seed handling and distributing activities.

The Agricultural Research Service and Crop Coordinators will develop, test and release new varieties and techniques; provide seed, instructions and other supplies needed for the kit program; produce foundation seed and other seed for distribution by the AIC; control variety releases as instructed by the CSPC; and maintain constant surveillance of all crops, checking for disease and insect attack and helping to control them by biological, physical and chemical methods.

The Extension Service and its seed production experts will popularize the new varieties, demonstrate how to use them, issue the kits and report on results of the kit program, estimate seed requirements, monitor seed distribution and report any shortages or market gluts to AIC and report complaints to the CSPC.

The CSPC will plan and implement seed production programs, confirm seed demand and supply, set standards, encourage private sector producers, supervise seed inspection, submit suggestions to the GON and recommend seed policies.

The ADB will provide capital to the Sajhas, the AIC and private individuals for among other things: seed production, purchase of equipment, supplies, construction and services; seed houses and warehouse; purchase of seed and other inputs; and the distribution of inputs. It will also help finance seed production and input distribution activities.

The private sector seed producers and distributors will purchase foundation seed of the AIC and increase it. This will involve careful handling to preserve quality and purity. At harvest, the seed will be dried and cleaned, either at the farmer's or his cooperative's own seed house or at one of the AIC seed houses. The producers will be encouraged and helped to sell their seed in their own locality but the AIC will assist in moving excess supplies to other areas or in making up shortages. The seed producers will also serve as model farmers to assist with the extension effort.

The Cooperatives (Sajhas) will be responsible for most end use sales except for seed sold by private producers themselves. They will assist in the input storage program as well as in seed production and distribution wherever the membership is interested and willing to invest in these activities. Where the Sajhas are not in place, private dealers will be established.

c. The Expected Path of Seed Production

There are three paths of seed production open to the GON. Assuming that the foundation seed is produced by the crop coordinators, the following alternatives are open for developing a seed industry:

1) Production and processing on government owned farms

2) AIC contracts with private growers to produce seed which AIC will process and distribute.

3) Private seed producers purchase the foundation seed from AIC and produce, process and distribute improved seed to other farmers.

The government in the persons of numerous senior government officers has often said that it approves of alternative 3) and totally rejects alternative 1). The reasons for this view are that land is scarce in Nepal and purchases of farm land in order to create large seed farms would undoubtedly create resistance. Also, the government's seed efforts have become ineffective and very expensive so that the GON would like to shift as much of this cost as possible to the private sector.

On the other hand, it is highly unlikely that during the first few years of this project, private farmers would be able to find the resources or the personal interest to invest in a large seed house or the equipment needed to produce, process, store and distribute large quantities of seed unless heavily subsidized.

(1) Seed Production in the Terai

In the terai, UNDP has built and equipped a large, ultra-modern seed house at Hetaura and the German government has imported equipment for five additional seed houses, all but one (near Pokhara) being located in the terai. These six plants have capacities of 2 to 4 tons per hour with limited storage space. They are capital intensive and demand a permanent staff to maintain and operate the equipment, care for stored stocks, handle sales etc. This, along with the high capital cost of the plants and projected relatively small seed sales nationwide and low production levels would make seed produced in these installations quite expensive.

Another factor affecting the operation of these seed houses is the high cost of transporting commodities. A porter who can carry a 40 kilogram bag of seed or a 50 Kg. bag of fertilizer demands a price of Rs. 8 to Rs. 10 per day. For seed going only 3 days by porter from a seed house to a warehouse or Sajha, say 30 miles away, the cost of transport would be Rs. 750 per metric ton ($63.03). For higher elevations or

We are left with the task of giving monetary values to the differences arising from comparison. The FY 80 transport cost estimates for the hills of Nepal initially are assumed to be Rs. 16.00 per 40 Kg. per porter/day. (Transport by mule is not included in order to simplify the analysis. Transport by other means is not assumed.) The rate of Rs. 16 is a linear projection of the German Consult baseline contained in the GON/IBRD Trail Suspension Bridge Feasibility Study (Vol. 4, P. 21) and is basically the average financial cost for unskilled labor. (There are very few professional porters in Nepal, and no specialized skills are required in portage).

The assumption that transport by other than porter (ex. mule) is not employed is derived from the assumption that transport by truck, bus or ropeway into the hills results in cif roadhead product/transport cost ratios roughly the same as transport within the terai proper. This is consistent with the earlier assumption that most shipments from the available plants in Hetauda (to Kathmandu) and Gandaki (to Pokhara) are essentially comparable to terai shipments. To this is added the assumption that the sole proposed MT/hour plant incorporated into the analysis is located in an area of concentrated demand not readily accessible from one of the six available plants. In other words, the basis of comparison is shipments within the hills/high hills, not shipments from plants.

It is assumed in the first approximation, results of which are detailed in Table 13, that transport from the six available large plants or roadheads to the hills and high hills takes an average of five days, while transport from the 25 "mini" and one medium-size plant averages one day. Further, it is assumed that portage costs increase at an annual rate of two percent. In addition, it is assumed that packaging costs are constant regardless of source (type of plant). Finally, it is assumed that costs of transport are identical for the three principal seed grains.

The analysis results in two streams of costs: cost of transport from roadheads or six available large plants to the hills and high hills of Nepal, and cost of transport to the same areas from 25 small and one medium plant proposed under the project. The annual differences in the two cost streams can be considered as either: 1) Implicit subsidy costs which must be met by Nepal in shipping from the available six large plants or, 2) A gross benefit to be derived from construction and operation of 26 proposed plants. These annual differences are shown in Table 13. (The annual stream of costs used are developed in the Financial Analysis section for the "mini" and one medium plant, based upon Indian-source equipment, simplified construction and 3% annual increase in variable costs.) The initial three fiscal years shown so far for use in comparisons with actuals are excluded in this analysis, since the project-proposed plants could not come into production until FY 80.

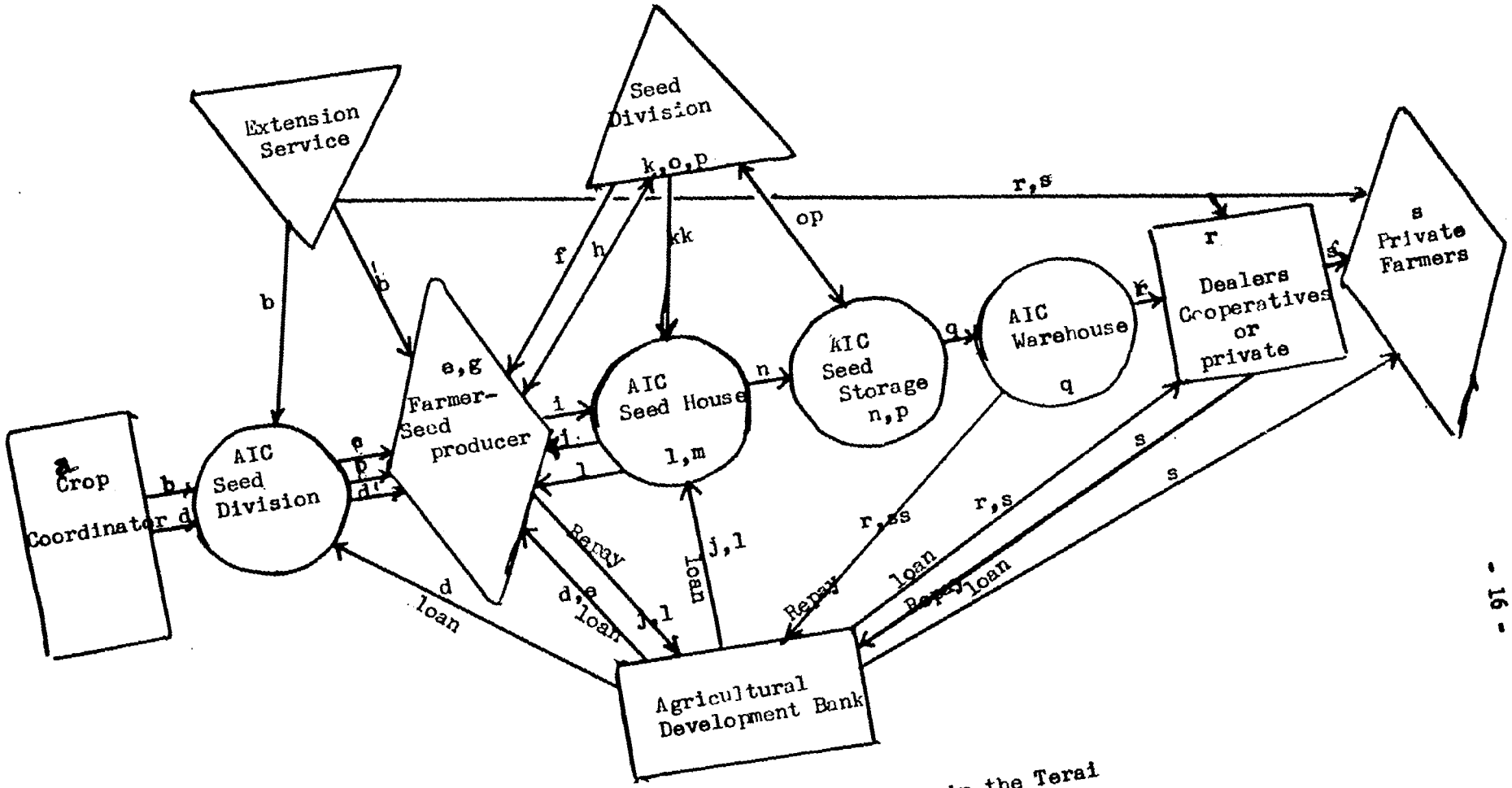


Fig. 1: Schematic Diagram-Seed Production in the Terai

The ADB supplies finances to the AIC when it issues seed and fertilizer (d), as it buys seed from producers (j-l) and helps to finances the input distribution system (cooperatives) (r-s). It finances the farmer-seed producers as they buy their inputs and plant and care for their crops (d-e). It provides money for farmer-customers as they buy seed for the following crops (s). The bank is repaid by the AIC as it places the seed (and fertilizer) in the distribution channels (r-s), the farmer - seed producers repay after they have been paid by AIC (j-l) and the dealers repay as they sell to farmers (s).

(2) Seed Production in the hills

In view of the high costs of delivering seed to farmers in the hills and mountains and the risks of losses, mixing, mislabelling and deterioration while being carried by porters or helicopter (at over $400 per hour), the GON has decided that the only viable solution to the problem of supplying seed to isolated farmers is to have the seed produced and processed near where it is to be used. Under this system, a farmer or a group of farmers in a remote valley or a "pocket of production" would be provided with a small, hand operated seed cleaner, that can be motor driven when electricity is brought to the village. A small seed house would be built which could safely store up to 40 tons of seed and would have enclosed and covered space for drying, cleaning and treating seed.

When a new variety or two were found to be better than the traditional varieties or when varieties being used seemed to be deteriorating, a kilogram or two of foundation seed of each of the better varieties could be brought in (instead of a ton or two) and grown locally under the supervision of the Extension Service, the AIC, Botany Division or the Research Service. These services could check on purity and growing procedures to insure a large increase of pure seed. At harvest and after drying, samples of the seeds (½ kilogram each) would be sent to the regional laboratory for analysis and to determine the permissable premium. As soon as it is determined that the grains are suitable for seed, the grower(s) is notified, the seed would be further cleaned and stored, and other farmers notified of its availability, price and terms of sale (barter, trade for grain, credit or cash). At the time of sale, the seed would be treated and bagged.

In case of a large eversupply, the AIC would either purchase the excess for movement to an area of scarcity, if requested to do so by the local producers, or it may be held over for the next crop season or consumed as food. If a scarcity develops, the AIC would bring in supplies from other areas to meet the demand.

This system would have much to recommend it.

(a) Low transportation costs.
(b) Labor intensive industry.
(c) Local participation.
(d) Demonstration of the value of a variety the year before its sale as seed to most farmers.
(e) Minimum dependence on official channels for seed. (The best variety in a variety demonstration could be used as a source of "starter" seed).

(f) Assured supply and fast increase.
(g) No need to rely on bazaar for seed which may be of unknown parentage.
(h) Offers the farmers a choice of varieties to grow.
(i) Less risk of mistakes being made.

The farmers would produce, process and sell the seed as individuals or as members of a cooperative. Their only contact with seed officials would be for the source of seed, supervision of production, seed analysis and authorization to sell as improved, inspected seed at a premium. This system, involving the farmers as growers, processors and distributors would include the following actions. (see fig. 2 below).

(a) Foundation seed produced by the crop coordinators.
(b) Seed cleaners and locally made treaters issued to interested, selected individuals, or groups and seed houses are constructed.
(c) Seed distributed in small lots (1 to 5 kilograms) by AIC to farmer-seed producers in isolated areas.
(d) Seed planted and crop grown and rogued by farmers.
(e) Technical assistance and field inspection service provided by Extension Service, AIC, Research Service or Botany Division.
(f) Seed crop harvested, dried and cleaned by farmers.
(g) Harvested crop inspected and sample taken for regional seed laboratory.
(h) Seed sample analyzed and results sent to producer/sajha and local agricultural officer.
(i) Price premium calculated and farmer authorized to sell under labeling provisions of seed law. He is guaranteed minimum price if selling to AIC.
(j) Seed stored until selling season - tags issued.
(k) Seed chemically treated as it is sold to dealers.
(l) Dealers sell seed to farmers.
(m) Surplus seed sold to AIC, held over for next year or consumed as food and shortages covered by AIC.

Here too, it should be noted that the Extension Service and the ADB will be even more important to the seed system than they were in the Terai.

The Extension Agent will help select the producers (b), recommend varieties and quantities of seed to be produced (c, d,), provide technical assistance (e, f), set AIC prices (i), select dealers (k) and make planting recommendations to farmers (l).

The ADB enters into the seed transactions at a smaller scale than in the terai but its contribution is very important. It will finance the AIC (if it buys seed from the farmers) (f, m,); the dealers (k) and the farmers (l).

As in the terai, the bank will be repaid as the AIC or the seed producers sell seed to dealers and they in turn sell it to farmers.

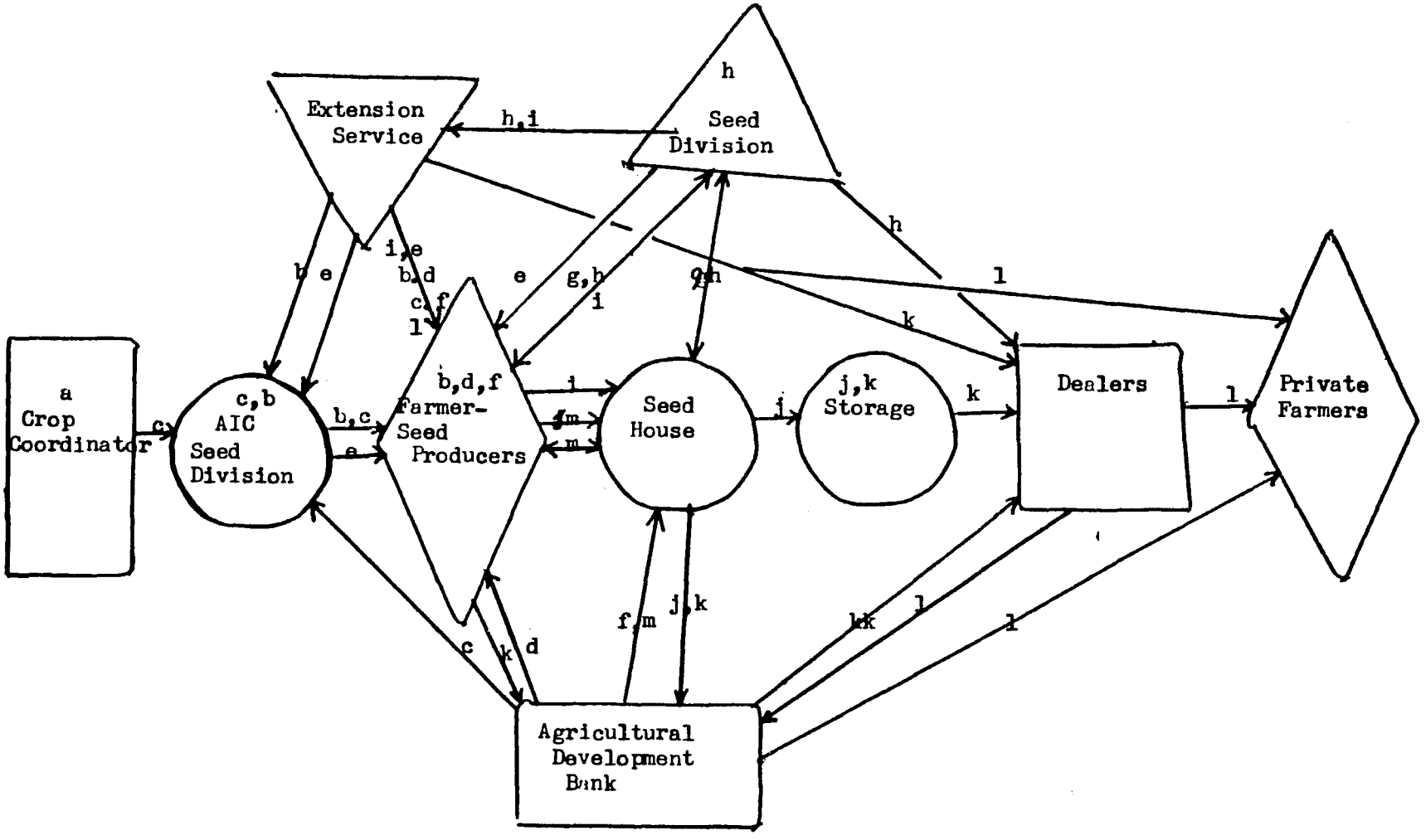


Fig. 2: Schematic Diagram-Seed Production in the Hills

Note: It should be noted that the seed house and the storage may belong either to the AIC or to the Farmer-Seedproducers.

d. Special Provisions of the Seed Program

During the development of the project, it has become evident that there are several of the proposal that are going to be slow to develop and some will require additional research in order to come to reasonable conclusions.

(1) Seed Certification.

Nepal has hoped to have a seed certification program for many years. A certification law has been drafted and some seed has met certification requirements and has been sold as certified seed. However, it is realized that if the seed needs of farmers are to be met, it would be impossible both to enforce a certification law and for all farmers producing seeds to meet strict certified seed standards although it is expected that the seed they produce would be far better than anything else available to the farmers in their neighborhood or vicinity.

Therefore, the GON is establishing minimum quality standards, somewhat lower than international certification standards, below which grain would not be salable as seed in a recognized market. However, in cases of emergency, farmers could sell or exchange small amounts of seed of lower physical quality with their neighbors. In all cases except these limited seed exchanges among farmers,samples, of the seed offered for sale must be collected and sent to the nearest seed laboratory for analysis. Then tags (labels) would be issued and fastened to all seed containers holding that lot of seed. In the case of small sales (less than one container), the tag must be explained to the purchaser. In other words all seed offered for sale must be labeled to indicate kind of seed, variety, germination, physical purity, year of production and weed content.

The plan is to gradually raise the standards under the labeling law so that in a few years (less than 10), the certification standards would be reached and Nepalese seed would then be salable any place in the world on other than a sample basis.

(2) Management and Production Training .

It is recognized that the shortage of trained manpwer may be a constraint to the successful completion of this project. It is also recognized that this constraint cannot be overcome by an unlimited amount of participant training in other countries. It is therefore essential that most of the training be done in-country. Provision has been made forup to 20 PM of short term consultants in the project, about half of which will be used in training programs covering all aspects of the seed production and input storage and distribution program. The AIC and DAgr regard the following areas of training for employees as essential to meeting the production goals established for this project.

Management of Seed Houses and Warehouses
Record keeping, inventory control.
Crop and grain inspections.
Enforcement of standards.

Equipment operation and maintenance.
Maintaining seed quality.
Seed production and processing techniques.
Seed analysis.
Extension techniques for seed producers, etc.

In addition to the employees of AIC and the DAgr farmer-seed producers, seed dealers, cooperative managers and community leaders all need training in seed production techniques, seed selling, management of warehouses, bookeeping and other skills associated with managing small industries in the rural areas.

(3) Premium Pricing for Seed

For a number of years Nepal has had a practice of paying a premium of up to 30%, depending on quality, for seed being produced under contract for the AIC or the now defunct Agricultural Marketing Corporation (AMC) Theoretically, the premium was to be paid for services rendered in producing seed and was added on to the average market price in the area as determined by a local pricing committee. This committee consisted of representatives of the DAgr, the AIC, the ADB and local farmers. It reviewed prices received in recent sales and generally established an average price that was in fact slightly higher than prices being received in the open market. The premium was supposed to be based upon the quality of the seed being purchased and extra work involved in its production. A premium of 15% was paid on the presumption that the farmer used foundation seed, rogued the field (destroyed off type plants), harvested the grain at maturity, dried it properly and otherwise handled it so as to protect its purity, quality and germination.

In fact, the estimates of seed needs submitted by the extension service generally arrive so late that it is impossible for the AIC to negotiate contracts with farmers who had offered to co-operate prior to planting the seed crop. Instead when the AIC receives an indication of how much seed it needs, its officers visit farmers whom they know have planted seed of the correct variety and offer to buy their produce even though their fields have not been rogued and some have already been harvested. In these cases, the seed producer (?) receives the premium for the production practices he is presumed to have done. As a result, it has become quite common for big and politically powerful farmers to demand a 30% premium even though no special work had been done to insure the quality of their grain as seed.

In order to correct this situation and to develop seed production as a precise business, the DAgr and AIC are considering a number of proposals for deciding how much premium should be paid. The system being tried in 1978 makes an allowance of 15% for roguing, pest control and other actions needed to produce good grain. A system of "marks" has been developed with 100 marks being given to each factor considered in seed quality. Minimum standards have been established and any superiority over the minimum earns a certain number of marks.

At the time the grain is bought by the AIC the farmer will be paid the predetermined market price and samples of the seed will be taken and analyzed at the central laboratory or one of the regional laboratories, After all the appropriate tests have been made, the premium is determined and the extra amount due the farmer is paid to him. If the seed is below any minimum standard, it is immediately sold as grain and no premium is paid to the farmer.

It is further proposed that producers delivering seed to seed houses having driers will be authorized to sell high moisture grain containing up to 4% more water than the minimum moisture standards with an appropriate penalty charge to pay the cost of drying.

Following is an example of the standards now used and the "marks" awarded for exceeding the minimum standards.

Minimum Standards and Marks for Determining Premium for Maize Seed Production

Factor	Min. Standard	Marks for Premium
1. Pure Seed	98%	5 marks for each 0.1 % increase
2. Other crop seed including other varieties	0.5%	20 marks for each 0.1% decrease
3. Total inert matter	2.0 %	10 marks for each 0.1% decrease down to 1 %
4. Total weed seed	0	100 marks for absence of weed seed
5. Germination	85%	6.67 marks for each 1.0% increase
6. Moisture	13%	5 marks for each 0.1% decrease in H_2O down to 11 %

Below are suggested changes in the above schedule of marks which penalize producers for high moisture content but provide a bonus for high germination and low moisture content. This schedule also reduces the "marks" for inert matter and weed seed. This schedule puts a premium on the most important quality factors.

Proposed Changes in Above Schedule

3. Total Inert Matter	2.0%	5 marks for each 0.1% decrease down to 1.0%
4. Total Weed Seed	0	50 marks for absence of weed seed
5. Germination	85 %	10 marks for each 1.0 % increase

6. Moisture	A	13%	5 marks for each 0.1 % decrease in H_2O down to 11%
	B	13%	A deduction of 5 marks for each 0.1% increase in H_2O from 13% up to 17%

Under the present system, a 15% premium is allowed for producing the seed, including passing all inspections in the field, on the threshing floor and in the seed house. An additional 15% premium above the average grain price is conditional upon the results of the seed analysis as indicated above. Forty marks are required for each 1% additional premium with a maximum of a 30% premium being possible.

The present grading system works as follows for an average sample.

Analysis	Grade	Marks
Pure seed	99.5%	75
Other crop seed	0	100
Total inert matter	0.5	100
Total Weed seed	0	100
Germination	92%	47
Moisture	12	50
	Total Marks	472

Calculation of Premium 15% + (472 ÷ 40) = 15 + 11.8 = 26.8% total premium.

Using the proposed rates, the following premium would be authorized for this same lot of average seed.

Analysis	Grade	Marks
Pure seed	99.5%	75
Other crop seed	0	100
Total inert matter	0.5	50
Total weed seed	0	50
Germination	92	70
Moisture	12	50
	Total Marks	395

Premium 15% + (395 ÷ 40) = 15% + 9.88% = 24.88% total premium.

Using the proposed standards, a better quality of seed would reward the producer more highly, at the same time reflecting a reduction in the seed house costs for processing while a poorer lot of seed would reduce the producers income and increase the seed house cost.

Analysis	Better Seed		Worse Seed	
	Grade	Marks	Grade	Marks
Pure Seed	99.5%	75	99%	50
Other crop seed	0.1%	80	0.25	60
Total inert matter	0.55	50	1.0%	50
Total Weed Seed	0	50	0	50
Germination	96%	110	88%	30
Moisture	10%	100	15%	-100
		465		140
Total Premium for Good Seed			26.63%	
Total Premium for Poor Seed			18.5%	

Other systems are being evaluated in search of a system that can be used by JTs and JTAs without requiring the use of mathematics.

(4) Research

As is evident from the proceding description of the situation existing in Nepal, neither the Nepalese nor the Americans are completely sure as to how the farmers can be organized to produce seed.
While we think that we have partial answers to many of the questions that have been raised about management, logistics, attitudes, village decision making etc., we do not have all of them. There is evidence that farmers in some areas will readily join and support special purpose cooperatives when such organizations are fully accountable to all the members and truely serve their needs. We also know that some common interest groups have formed themselves in areas where AIC has produced seed before but we don't know whether this would happen elsewhere in the country. How can small producers cooperatives be organized? Can co-operatives be organized to take over a household function such as seed production? How much of a premium is necessary in order to persuade honest and respected members of a community to produce seed? How can low ranking civil employees persuade powerful politicians that they are not entitled to receive large premiums for producing seed when they do not do the work necessary to insure that the seed is of high quality?

Research is needed on how the seed industry should approach the farmers in their effort to increase seed sales and on how to encourage seed producers to not only do a better job of seed production but to take over the job of seed distribution and demonstration.

Other aspects of the problems needing research and new solutions involve the motives and incentives needed to encourage government workers to approach the farmers within their jurisdiction to do a better job of farming. What kind of an advertising program is needed to persuade farmers to use good seed? And how much expected extra income is needed to convince farmers of the value of new varieties? These questions and others need answers and the

project makes available up to $55,000 to be used by public and private researchers in Nepal under the direction of project authorities to find the answers.

(5) Vegetable Seed Production .

Most vegetables are a new crop for Nepal and farmers are beginning to produce them for home consumption and for shipping to the cities, principally Kathmandu where they are used to supplement the diets of the tourists with a little being consumed by local residents. Many vegetables do not grow well in parts of Nepal because of cold nights, cloudy days, excessive rainfall, infertile soils and the presence of diseases and insects.

However, in the drier parts of the country, conditions which prevent the production of good vegetables cause them to be prolific seed producers. Many of the biannual crops will bolt (produce seed stalks) in less than six months and the dry fall, winter and early spring make it easy to harvest good seed for about 9 months out of the year. The long growing season also makes it possible to make several plantings of most vegetables so that a seed crop can be assured.

While the GON and ourselves now regard vegetable seed production to be outside the present parameters of this project, we expect to import screens for the seed cleaning machines which can be used for vegetable seed processing. UNICEF and the Peace Corps are at present helping to develop a capability for producing and selling these seeds.

As population continues to expand in south and South-East Asia, the farmers will shift from cereal production to vegetable production and huge quantities of seed will be required. However, the climate and elevations in most of south Asia are such that seed production is much more difficult than in Western Nepal. For example, it takes two years to produce seed of beets, the cole crops and other biannuals in South India or Mayalasia while these same vegetables will produce seed in Nepal in 8 to 10 months or less. This should give the Nepalese farmer a very large economic advantage when developing an export market for vegetable seed a few years hence.

e. Input Storage and Distribution.

In addition to seed production, this project encompasses the whole function of agricultural input storage and distribution. While most of the fertilizer imported into the country is brought in under donor auspices and is distributed by the AIC, pesticides, tools, and other supplies generally are brought in under imports authorized for the private sector. We are not concerned with the effort involved in making these private imports under this project except as their absence may reduce the effectiveness of locally produced inputs and the ability of farmers to reap the greatest benefits from their land.

We are concerned that every farmer who needs them should be able to purchase all kinds of inputs at reasonable prices near to his farm. In order for this to be possible, warehouses must be constructed to link the major import centers and producers on the one hand with the local cooperatives or private dealers on the other. Private stockists or wholesalers also should be able to link into the system in order to reach farmers in all parts of the country.

The description of the physical characteristics of these warehouses is given below but their actual operation is a matter of great concern to the GON. Tests have shown that the greatest deterioration of fertilizer and seed quality takes place during transport from one distribution point to another and while in storage. Therefore, primary importance must be given to learning how and when to transport seeds and fertilizers, how to store them and under what conditions so as to maintain their quality.

The structures will be spaced so as to make it easy to transport inputs from one point to another and will be large enough to accommodate a season's supply so that movement during the rainy season should rarely be necessary. The warehouses will be constructed so as to be moisture proof, pest resistant and easy to inventory so that it will be feasible to maintain product quality and control in storage.

The logistics of this system will not be simple but it should make it much easier to move fertilizers, seeds and other inputs into warehouses close to where they will be consumed than ever before. This should result in better logistical support for farmers at lower cost with less diminution of quality and greater certainty of adequate quantities being on hand.

This logistics - warehousing system is designed to move seed and other inputs out to the remote areas through a chain of AIC or privately owned warehouses to those belonging to the local Sajhas (cooperatives) and to do it at low cost and expeditiously.

As the local seed producers form cooperatives and develop a capability to manage and finance the warehouses, they may purchase and use them not only to supply inputs including their seed to their neighbors but to store and finance excess production on its way to market.

And, the cooperative department and the ADB may want to finance these or additional warehouses as a part of their local supply and market development program. However, as can be seen from the above, the principal purpose of these warehouses will be to expedite the movement of agricultural inputs and to maintain their quality.

f. The Demand for Seed.

The basis for any seed project should logically be the demand for seed and in Nepal this can be answered by saying that the demand for Government supplied seed is very low except in times of emergency. Current estimates place the sales of "improved seeds" from government sources at about 3% of the total seed used.

The lack of demand may be caused by a (1) deficiency in knowledge on the part of the farmers, the varieties offered don't fill the farmer's needs the wrong varieties are being offered for sale, (3) failure to deliver seed on time, (4) price too high for the farmer to pay, (5) loss of confidence in the seed source and its quality and a host of other possible reasons.

Taking these factors one at a time, an analysis shows that farmers all over the country do know about good seed. They buy seed of new varieties from the AIC from their neighbors or from the bazaar. Alternatively,

they may take a little for increase from test or demonstration plots. Wheats of the new HYV are being used on over 80% of the wheat land in the country. Hence, it is safe to believe that almost every farmer knows of the value of improved seed and, all things being equal, will use it if available.

The wrong varieties or the absence of suitable varieties as a factor may have some validity since, in the case of maize and rice, these crops are grown as subsistence crops and the family tends to raise varieties in which they have confidence (less risky) or which they think have a better taste when cooked in their own kitchen.

The market oriented farmers are different. As soon as new varieties have been convincingly demonstrated, these farmers tend to adopt them in order to increase their income. Higher yields increase surpluses which enable them to enter the cash market. As more and more farmers enter the market, the demand for seed of the new varieties of rice and maize should increase.

Failure to deliver seed on time is a common failing in areas where storage at destination does not exist or where transport is difficult. Seeds (and other inputs) under these conditions tend to be delivered just before planting but because of rain, heat, high humidity and other factors, the quality deteriorates and the input arrives too late for maximum yields. This situation can be corrected by building warehouses at the expected destinations and by improving the packaging of the products for transport.

Prices may be too high but there is considerable evidence that in some areas of Nepal, the demand curve may have a backward slope. That is, the demand for high priced seed seems to be higher than for low prices seed of the same variety, This can be interpreted as meaning that even though government seed may be available at low, subsidized prices, many farmers prefer to buy better seed from India or from trustworthy farmers at higher prices.

A loss of confidence in seed can be tragic if it applies to all seed of all varieties. But in Nepal, there sappears to be a great deal of confidence in the new varieties and seed of wheat has spread from farmer to farmer very rapidly. However, it does appear that in the rural areas, most farmers are sceptical of the seed that they buy from the government. Recent research tends to indicate that farmers do not trust the seed supplied to them through official channels. They do not expect it to be delivered on time, and they do not believe that it will be delivered in sufficient quantity to answer their needs and are looking for alternative suppliers.

Most seem to be turning to their neighbors as sources of supply and even though government seed is cheaper, indications are that highly recommended, high priced seed sells better than low priced seed, an indication of quality preference. The same evidence indicates that farmers are willing to buy government seed if it is good. As noted before, most farmers interviewed in Rupendehi, Bara/Parsa, and Kathmandu districts would like to buy seed in which they have confidence. More than 85% of the farmers interviewed said that they would be willing to buy good improved seed. Steps need to be taken immediately to improve the quality of seed offered to farmers and to increase their confidence in seed sold through official channels.

The government has set a goal of producing enough improved seed by 1985 to plant about 15% of the total cereal hectarage instead of the 3% supplied now.

In order to accomplish this objective, a demand has to be created for the seed which means that several things will have to happen. Farmers willhave to be taught how to produce good seed. The AIC and the DAgr will have to be strengthened to perform their functions of arranging for and supervising seed production. Along with the other inputs, seed will have to be made available in all parts of the country at reasonable prices. Farmers will have to be taught its value and how to use it.

The experience with wheat in the terai and some limited experience with maize in the hills indicates that ammay farmers are willing to try new varieties. And a market exists for seed which is now being filled on an informal basis by private seed growers. The job of the AIC is to take advantage of end use the seed production skill which already exists. It will first, have to train the present seed producers in how to produce improved seed and second, contract with farmers for the production of seed where private producers are not now active.

With the facilities being provided under the project, the AIC will be in a position to: (1) convice government servants that they have a real function to perform in assisting seed production and distribution; (2) encourage users of improved seed to use good practices and (3) demonstrate to farmers that improved seed is better than other seed and can be used with confidence.

Then, demand will grow and it should be possible to increase the consumption of seed to levels approximating the levels desired by GON

Levels of Expected Seed Demand

	Average 1973-1976 M.T.	1980-81 M.T.	1985-86 M.T	1990/91 M.T.
Terai	1449	5870	12290	18000
Hills & Mts	469	2530	5310	7800
Total	1918	8400	17600	25800

It may be noted that this expected demand level, if met, will achieve a 25% replacement of wheat and maize seeds by 1985 and of rice and other seeds by 1990. This means that by 1985,one fourth of the maize and wheat seed will be replaced every year and the same goal will be achieved in terms of rice by 1990. As a matter of fact, it is likely that the actual achievement will be somewhat higher than indicated because of the seed movement from farmer to farmer as new varieties are introduced or as crop failures in various districts are encountered which result in the poorest farmers being forced to buy new seed for replacement because

they had eaten the grain they had saved for seed.

g. Sources of Varieties for Increase

In addition to the normal requirement for seed which may run as high as 25% of the self pollinated seed planted in any given year to as high as 100% for the hybrid crops, there are two other occasions when larger amounts of seed are required.

As new varieties are developed which answer specific needs, large amounts of seed are generally required very quickly to cover a large area.

As often happens in the United States and other countries, a variety may gradually, or perhaps quickly, become susceptible to a new disease and yields may fall from a very high level to practically nothing in the course of a few years. When this is first detected, efforts must be made to produce seed of a replacement variety at a rate which will protect the farmers. In either case, we have to think very seriously about where new varieties come from and how to introduce them into the seed program.

(1) Integrated Cereals Project:

In addition to developing new varieties and new technology, one of the functions of the Integrated Cereals Project is to test new varieties from any source and make recommendations to the government and to farmers as to their use. These tests include checks on the quality of the grain, the yield, disease and insect resistance and acceptability to farmers, its ability to adapt to the micro-climates of Nepal and other factors. In any event, it is the function of the Integrated Cereals Project to review the characteristics of new varieties, determine where they can be used and what their value may be to the country as a whole. To assist in this effort, the government is now conducting a broad based research-demonstration-production kit program that will spread the new varieties over wide areas for testing and to determine their acceptability on the farmers' land.

(2) Foreign Research and International Research Centers:

Many new varieties will come from the International Research Centers. These varieties will be specifically selected to answer special purposes. For example, the International Rice Research Institute is working on varieties that are resistant to blast disease, a common disease in Nepal. Other varieties may be resistant to insects and diseases or they may have a wider variety of kernel and grain textures or they may be high in oil and protein. Any number of possibilities exist for trials in Nepal.

(3) Demonstration and Research-Production Plots:

As mentioned above, the Integrated Cereals Project includes spreading new varieties and new technology all over the country on the farmers' land. These kits include such things as new varieties, fertilizers, tools, pesticide, etc. so that the extension service in conjunction with the research service can work with the farmers to test the technology coming out of the government's research stations. It very often happens that, because of many micro-climates and soil differences that exist in Nepal, a new variety may be adapted to a very small area and in this case, the farmers themselves may identify a good variety in a plot and use it as a source of seed for themselves and their neighbors. It is likely that a variety with a narrow range of adaptation such as this would not become a part of the nation wide seed program, it would continue to be a very important variety for the people in the small area where adapted. On the other hand, there are some areas where it is likely that none of the approved varieties which have been accepted on a national scale would really be better than existing local varieties. In either of these cases, the farmers have to be equipped to take care of their own seed needs.

(4) Local Varieties:

It is possible that many local varieties found in the hills and mountains may be better adapted to the area and better yielding than any other available variety. As these local varieties are identified by the farmers, they will increase them in their own seed production program. It is true that these varieties may be susceptible to diseases or have other defects which make them unsatisfactory for a nationwide program but, for the limited area in which adapted, they perform better than the new varieties.

(5) Other Seed Producers:

Other sources of varieties and seed for increasing in case of emergency are seed producers who produce new varieties in other locations. In this case, a variety which has been well adapted for an area may fail due to blight or rust, whereas in the other parts of the country, varieties would be available which are not susceptible to the same races of these diseases. Use can be made of the seed produced by these other seed producers to fill the country's needs for foundation seed. It may also be possible to import seed from producers outside the country if necessary.

The question often arises as to how many varieties are needed at any point in time. It is impossible to give a definite answer to this question. We know that there are hundreds of local varieties of rice, for example, in the country and there are dozens of wheat and maize varieties that are grown in small areas throughout the mountains. There are thousands of varieties being tested at the various international research centers and the Integrated Cereals Project is getting in a position where there are always eight or ten new varieties of each cereal under test which in case of necessity can be used to replace old varieties. As in the case of most biological activity, events in agriculture usually happen gradually so that we do not expect a variety to go out of production in one year. It generally takes two, three, four or five years for serious deterioration to take place in which case the alert plant breeder and pathologist will be able to identify problems as they begin to arise and will be able to select new varieties to take their place in the seed production program.

h. Beneficiaries of the Project

Broadly speaking, all the people of Nepal will be the beneficiaries of this project.

The primary beneficiaries will be the people working in the AIC, the DAgr and other agencies who are provided training and/or employment. They will be engaged in interesting occupations involving work with people and the scientific aspects of agriculture and will be very useful to the rural community.

Another group of primary beneficiaries will be the seed producers who will benefit both economically and psychologically. From the economic point of view they will be able to see that they are contributing to the welfare of the country. From the psychological point of view they will be able to achieve a degree of respect and honor in the community because of the work they are doing to improve the production of all the farmers; they will be making it possible for many farmers in the remote areas to escape from subsistence agriculture and enter the market economy.

And ordinary small farmers will be the biggest beneficiaries although considered as secondary ones. They are the target group for whom this project is designed. As shown below, all farmers should benefit regardless of size, wealth or condition of their land. All will have an opportunity to observe the new seeds being tested, they will be able to see them in the seed field, and they will be able to buy them from a dealer close to his own farm. As indicated in the project paper for the Integrated Cereals project, seed is the most

profitable input that a farmer can use. Whereas fertilizer gives a good return on soils that are well balanced with moisture and fertility, it may give a negative return under dry or very wet conditions, the returns to seed are almost always positive. For example, in farm management research conducted by the Nepal Rastra Bank in 1972, it was found that the returns to investments in improved rice seed by farmers were always positive. For larger farmers with irrigation, the returns on a one percent increase in seed investment ranged from Rs. 4.80 to 34.80. This means that large farmers investing an extra Rs. 1.93 per hectare would reap a benefit of 2.49 rupees to 18.03 rupees for every rupee spent. The returns to those without irrigation water were somewhat lower, ranging from a bare return of 1.02 rupees per rupee spent to 26.95 for each rupee spent for seed.

The small farmers did better in some respects. While their returns on irrigated land were larger than for the large farmers, on the non-irrigated lands, returns varied from 2.18 rupees to 11.81 rupees for each rupee spent.

In the case of maize, the big farmer's returns on irrigated land ranged from 15.65 rupees to 113.48 rupees return for every rupee spent on better seed. On unirrigated land, his returns varied from 4.91 to 43 rupees for each rupee spent. The small farmer's return varied from 3.91 to 90 rupees for each rupee spent for seed for irrigated land and on the unirrigated land, the returns were 13.7 to 74.35 rupees.

In the case of wheat, the return was considerably lower, ranging from 1.45 to 10.55 rupees return for larger farmers on irrigated land while on unirrigated land, the returns were mixed. Some farmers received small losses while others made a profit of 4 rupees for each rupee spent. The small farmers on irrigated land showed a profit of 0 up to 8.36 rupees and on rainfed lands, the returns to the use of good seed varied from 1.27 to 6.91 rupees return for each rupee spent.

It was discovered in the course of this research that, in the cases of the negative or zero returns noted above, the bad results were due to the fact that the seed was not properly sown (It was thrown instead of sown.) or cared for in the field.

Hence, it can be assumed that, as new seeds and fertilizers are made more readily available, the small farmer can make about as much profit per unit of cash spent on seed or on per unit of land area sown to improved seed as the large farmer.

After the 1977-78 and 78-79 crop years, every farmer in Nepal should be aware of the new varieties available to them and how they grow in their vicinity. The research/production kits are being widely distributed through out the country. Over two thousand wheat

kits were distributed in the fall of 1977. 6000 maize kits and 10,000 rice kits have been or will be distributed during the spring and summer of 1978. With this saturation, every farmer should be able to see several examples of each crop being grown in his vicinity and should be able to judge their usefulness for his conditions without having to risk his own land and food supply.

Another factor that enters into the beneficiary question for this project is the fact that the smallest and poorest farmers and their families may benefit the most from it, not from a total amount of earnings standpoint but from the fact that good seed will be available for them to use when they are forced to eat the seed they had saved for their own use because of the failure of another crop. For example, the failure of a wheat crop could force a farmer to use his maize seed as food during periods of drought, after a hail storm or when rain has damaged the crop at harvest time.

The next largest group of beneficiaries, of course, will be the consumers in Nepal; the people who do not produce their own food but depend on others to produce it for them as they contribute to the general welfare by contributing manufactured products or services.

Every ton of improved seed planted should yield at least 20 tons more grain than if ordinary farm-run seed had been used. Referring again to the research mentioned earlier, the use of good rice seed in the terai (about 55 Kg/ha) increased yields by 815 Kg/ha while in Kathmandu valley yields were increased by 2008 Kg. per ha, a factor of 35.

In the case of wheat, no local seed was reported as being used by the respondents in the terai but in Kathmandu, the increased yield attributed to improved wheat seed was over 2600, Kg/ha a factor of 45.

Using an average seeding rate of 60 Kg/ha and an increased production of 1200 Kg/ha, an input; return ratio of about 1:20 is indicated for seed. Therefore if the goals of the project are met in 1985, 17600 MT of improved seed will be planted, and over 350,000 MT of extra grain will be produced as a result of this project.

Another group of beneficiaries are the people whose job it is to harvest, store, process and plant seed. Less seed will be required as germination improves and chemical treatments are used to improve plant emergence. The job of harvesting, storing and treating seed will be done for them once every four years, and in much of Nepal, if not all, the job of seed handling and storing is assigned to women.

A final beneficiary of this project will be the country as a whole because production will be greater so that the level of exports can be maintained at levels of the past few years rather than having exports almost completely shut off by 1980 because of the increased population pressure.

i. The Use of Resources

The resources to be made available under this project will be used for six main purposes. These include the following:

(1) advisors and consultants.
(2) participant training.
(3) construction
(4) commodities.
(5) social science research.
(6) In-country training.

(1.) Advisors and Consultants (104 person months)

Most of the people working with seed in Nepal are not trained to be seed specialists. Some are plant breeders, some engineers, some general agricultural graduates. It has therefore been decided that two long term advisors and up to 20 person months of short term consultants should be supplied under this project.

Advisors - long term	Person Months (PM)
Seed Production and Management Specialist	60
Seed Processing Specialist	24
Advisor - short term	20

These specialists will help train the Nepalese needed as inspectors, managers, logistics experts, researchers, contractors, operators, etc. and would help the management of the seed sector in formulating rules and policies and governing the industry, encouraging the private sector to take over the business of producing and distributing seed.

The consultants/advisors supplied under the project are expected to cost about $1,105,000 of which $941,000 would be the US share.

(a) Peace Corps:

In addition to the above, the Peace Corps is being asked to supply 6 PCVs for 2 years each to help train farmers to produce good seed. This will involve all aspects of seed production from selection of foundation seed through to final treating and packaging. They will cost about $80,000.

(2.) Participant Training.

While a large amount of in-country training will be conducted in Nepal, it will still be necessary to send at least 37 people out of the country for training. On their return, these people will be used to train farm leaders and seed producers and to conduct the seed program for the AIC and the Department of Agriculture.

Following is the proposed training schedule. It must be adhered to very closely in order to insure that all trainees return to Nepal before the end of the project and that they are used effectively.

	Starting year				
Training	1979	1980	1981	1982	1983
Ph.D.	1	-	-	-	-
M.Sc.	2	4	2		
Long term, non-acad.	2	3	3		
Short term non-acad.	4	4	4	4	4

The non-academic trainees will be trained in India oand the US and will focus on seed technology, seed processing and equipment operation and maintenance. The academic training will focus on management, business administration, economics and research as well as on various aspects of seed production and processing. The Ph.D. candidate will be trained in the U.S. while the M.Sc. candidates may receive their training in India or the U.S.

The exact field of training will be agreed upon when the foreign technicians arrive to help implement this project.

The participant training program is expected to cost about $744,000 of which $679,000 will be the US contribution.

(3) Construction (See Annex H and I)

Estimated costs of construction done by the government of Nepal are based on average prices in Kathmandu valley augmented by a correction factor which depends on the remoteness of the area from the source of supply. E.g., the factor for the more remote areas is 200%

to 250% of the base price while in the terai, it generally varies between 90% to 110% - 150% for those districts more remote from Indian railheads and in the inner terai (See map, Annex I). The base price for Kathmandu is Rs. 75 per sq. ft. for standard warehousing and Rs. 100 per sq. ft. for other types of buildings. Since, all structures considered in this proposal demand special treatment, such as insulation, moisture barriers, pest resistance, temperature modification, etc., a base price of Rs. 100 per sq. ft. is used for the estimates. For the dehumidified seed storage, which demands a great deal of insulation, Rs. 100 per sq. ft. is used in addition to the cost of the building as a whole for the special areas.

The factors for remoteness applied in this proposal are as follows:

Terai	-	100%
Middle hills	-	175%
Remote areas	-	200%

The storage space required for seed is based on 60 cu. ft. per metric ton for bulk storage and 100 cu. ft. per metric ton for Bag storage. 40 cu. ft. per metric ton of fertilizer is used as a standard.

All buildings would have moisture barriers installed in the floor and foundations, would be rodent and bird proof, amenable to fumigation and insecticide application, would be properly ventilated and (those buildings intended for long term storage) would be insulated and dehumidified.

(a) Criteria for Locating Sites for Seed Houses and Warehouses

The criteria to be considered in deciding where the seed houses and warehouses are to be constructed will include but not be limited to the following:

(i) Amount of agricultural land.
(ii) Communication channels.
(iii) Needs of the farmers.
(iv) Variability of environment.
(v) Willingness of farmers to cooperate with the program (donation of labor, land etc. as well as to willingness to produce seed).
(vi) Desire for seed and fertilizer.
(vii) Distance from large plants.
(viii) Availability of labor for porterage.
(ix) Acceptability of seed from "outside source."

(b) Seed House Construction (See Annex H)

The large seed houses mentioned in the PRP have been constructed by the AIC and the equipment installed. They are not included in the following estimates although their use and management are considered as a part of the total project.

The six small seed houses proposed in the PRP have been dropped from the project because of their high cost of operation and the proximity of the large seed houses mentioned above which should be able to supply most of the seed needs of farmers in the terai. (See section II A, Economic Analysis and Annex J).

Village or mini seed houses (25)

These will be very small seed houses in the hills and remote inner terai having hand operated equipment although, if electricity is available, motors could be used for power. They will be very simple structures with a moisture barrier (plastic sheeting) in the floor, must be capable of being well ventilated and must be rodent and bird proof.

These seed houses will be located in the remote areas and in small valleys having access to other cultivated areas so that a few farmers could be supplied with foundation seed by the AIC or from other sources which they in turn would plant to produce seed for their neighbors. This would then be cleaned and treated in the village (or panchayat, Sajha, ward or private) seed house before being sold or bartered to other farmers.

Locations for some of these structures have been selected on a tentative basis but the final location for most will be selected as described above. Sites suggested to date are in the following districts:

Eastern Region	-	Kotang, Illam, Dhankuta
Central Region	-	Sindhuli, Kathmandu
Western Region	-	Baglung, Palpa
Far Western Region	-	Baitadi, Jumla, Rukum, Dang-Deokhuri

It should be noted that in some areas, local farmers or organizations are expected to supply the buildings needed for the small seed plants. This is the reason for the apparent discrepancy between 25 mini seed houses shown here and the up to 40 sets of equipment for them shown in the commodity section.

Specifications are as follows:

Processing Storage	-	2 MT
Post processing storage	-	40 MT
Drying processing area	-	24' x 25'

Total size of building: 12' (to eaves) x 40" x 25' = 1,000 sq. ft.

The storage area will be enclosed to promote seed protection and preservation and so that the work area can be ventilated and cleaned during the seed drying, processing and treating operations.

Dryers and Dehumidified Areas for Seed Houses (two each).

Two small drying units will be constructed, one each at Bhairawa and Rampur, to be used in conjunction with the foundation seed plants, at these locations.

These structures will be about 14' (to eaves) x 25' x 30' = 750 sq. ft. and will be equipped for both bag & bin drying using the IRRI designed trash fired burners.

The dehumidified areas will be located in existing structures in Bhairawa and Rampur.

(c) Warehouse Construction: (See Annex H)

Two different sizes of warehouses are visualized under this project. None of them are to be located in the terai proper although one or two might be placed in the inner terai. They are to be located so as to promote seed, fertilizer and other input preservation and distribution. They will be designed to have separate areas for storage of seeds, pesticides and fertilizers and will have provision for offices and living accommodations for a limited staff. All would be rodent and bird proof, moisture proof and capable of being ventilated and fumigated. Two will have a limited amount of storage space dehumidified for longer term seed storage.

Each of the larger units would be located on main trade arteries feeding the middle hills and the mountainous areas. The small units would be located at the entrances of mountain valleys so that they could feed seed and other inputs to farmers in three or four valleys from one location.

Larger Warehouses: (Up to four)

These warehouses would be located farther out (up) in the distribution system than the existing large units so as to feed inputs into the agricultural production system in the hill areas of Nepal. They would be located in major branches of the watersheds and would be served by the already existing warehouses and would service the small warehouses described below.

The specifications for these warehouse complexes are as follows:

Number of warehouse complexes	-	4
Number of bldg. per complex	-	3
Size of each building	-	14' high (to eaves) x 40' x 62'

Capacity:

No. 1 Seed	-	250 M.T.	2480 sq. ft
No. 2 Fertilizer	-	600 M.T.	2480 sq. ft
No. 3 Fertilizer	-	140 M.T.	580 sq. ft.
Pesticides	-	7 M.T.	300 sq. ft.
Implements	-	40	300 sq. ft.
Laboratory/store	-	1	150 sq. ft.
Office - 2 desks	-	1	150 sq. ft.
Quarters	-	3 sets	900 sq. ft.
Fumigation	-	1	100 sq. ft.

Small Warehouses: (Twenty five)

Each of these warehouses would be located nearer the farmers than those described above. Most sales from these buildings would be to Sajhas (cooperatives) but sales could be made to individuals buying as groups so that there would be no necessity for splitting bags while the inputs are in the distribution channel.

The specifications for this warehouse type follows:

No. of storage complexes	-	25
No. of Bldgs.	-	1 per complex
Size of Bldg.	-	14' high (to eaves) x 40' x 75' (3000 sq. ft.)

Capacity:

Seed	- 50 M.T.	- 500 sq. ft.
Fertilizer	- 50 M.T.	- 700 sq. ft.
Pesticides	- 4 M.T.	- 150 sq. ft.

Larger Warehouses: (Up to four)

These warehouses would be located farther out (up) in the distribution system than the existing large units so as to feed inputs into the agricultural production system in the hill areas of Nepal. They would be located in major branches of the watersheds and would be served by the already existing warehouses and would service the small warehouses described below.

The specifications for these warehouse complexes are as follows:

Number of warehouse complexes	-	4
Number of bldg. per complex	-	3
Size of each building	-	14' high (to eaves) x
	-	40' x 62'

Capacity:

No. 1 Seed	-	250 M.T.	2480 sq. ft
No. 2 Fertilizer	-	600 M.T.	2480 sq. ft
No. 3 Fertilizer	-	140 M.T.	580 sq. ft.
Pesticides	-	7 M.T.	300 sq. ft.
Implements	-	40	300 sq. ft.
Laboratory/store	-	1	150 sq. ft.
Office - 2 desks	-	1	150 sq. ft.
Quarters	-	3 sets	900 sq. ft.
Fumigation	-	1	100 sq. ft.

Small Warehouses: (Twenty five)

Each of these warehouses would be located nearer the farmers than those described above. Most sales from these buildings would be to Sajhas (cooperatives) but sales could be made to individuals buying as groups so that there would be no necessity for splitting bags while the inputs are in the distribution channel.

The specifications for this warehouse type follows:

No. of storage complexes	-	25
No. of Bldgs.	-	1 per complex
Size of Bldg.	-	14' high (to eaves) x 40' x 75' (3000 sq. ft.)

Capacity:

Seed	- 50 M.T.	- 500 sq. ft.
Fertilizer	- 50 M.T.	- 700 sq. ft.
Pesticides	- 4 M.T.	- 150 sq. ft.

Implements	- 20	- 200 sq. ft.
Laboratory Storage	- 1	- 100 sq. ft.
Office	- 1	- 150 sq. ft.
Quarters	- 2	- 600 sq. ft.
Extension Room	- 1	- 350 sq. ft.
Fumigation Room	- 1	- 100 sq. ft.
Halls & Walls	- 1	- 150 sq. ft.

Regional Laboratories

No. of laboratories	- 3
Size of each laboratory	- 35' x 50' = 1750 sq. ft.
Rooms to be set up for	- 3 offices Size & moisture testing lab Germination laboratory Sample preparation from Purity analysis lab Storeroom

Central Laboratory

Size of addition	- 30' x 50' = 1500 sq. ft.
Rooms to be set up for	Store-receiving Seed Sample Storage Germinator Laboratory

(f) Payment for Construction

A version of the fixed amount reimbursement method (FAR) will be used to pay for these buildings. Under this system, designs and construction standards for the seed houses, warehouses, and seed laboratories and their locations will be agreed upon between HMG and USAID/ Then the construction schedule shall be decided and final estimates made of the costs for each of the buildings to be constructed the first year. At that point, USAID will release 50% of the estimated total cost for the first year's work to HMG who will then contract for the construction of the first year quota. As buildings are completed, USAID and HMG will inspect them to determine that they are as agreed upon and meet the standards. If they do, USAID will reimburse the HMG for the full amount for that building. Any reimbursement overages accrue to the GON. Any cost overruns must be paid by the GON.

The total construction program is expected to cost about $2,252,000 of which $1,418,000 would be furnished by the U.S.

(4) Commodities:

Six types of commodities will be needed for this project (1) seed production equipment, supplies, (2) seed and fertilizer handling equipment and supplies for protecting and monitoring inputs while in storage, (3) a limited amount of seed analysis equipment, (4) vehicles for AIC and the Botany Division, (5) construction supplies such as plastic sheeting, reinforcing steel, roofing, cement, ventilators and fans etc. and (6) expendable items such as seed treating chemicals, rodenticides, insecticides, fumigants, plastic and jute bags, ties, fuel, etc., all lists below are illustrative of the requirements. The total cost of the commodities is expected to be about $1,098,000 of which $793,000 would be the US share.

(a) Seed Equipment:

The following list of items is illustrative of the kinds of equipment which will be needed for each of the mini seed houses, for the grain driers and for the dehumidified rooms in existing seed plants.

The equipment for the mini or village size seed houses is very limited.

Air-screen cleaner-hand powered with 20 screens
Seed treater (made in Nepal out of an oil drum)
Beam balance scale
Maize sheller -hand powered
Bucket, shovels, brooms, sprayer etc.
Rag Doll Germinator
Moisture tester at 1/5 of seed houses

Cost - equipment for 40 mini seed houses

Seed equipment	$52,000
20% spare parts	10,400
Frt. and handling @ 40%	24,960
Inflation factor @ 10%	8,736
Grand Total	$96,096

In addition to the above processing equipment, equipment for two seed driers will be required. These will be of the type developed at IRRI and will use rice hulls, corn cobs and other trash as fuel for the heating unit. The controls and fans are electrically operated, so they must be used where electricity is available. It is likely that they will be installed at the experiment stations at Rampur and Bhairawa.

2 drier units	$ 900
2 Furnances	1250
20% spare parts	430

Frt. & Handling @ 30%	774
Inflation factor @ 10%	335
Total cost	3689

Two of the large seed houses now functioning will be equipped with cold, dehumidified rooms for long term storage of seed, particularly wheat and maize.

Equipment for two rooms	$18,200
Power Units (2-25 KVA)	20,000
Spare parts @ 20%	7,640
Frt. and handling $ 40%	18,336
Inflation factor @ 10%	6,418
	$70,594

(b) Warehouse Equipment:

The larger warehouses will each need some or all of the following equipment in order to effectively move and protect the seed, fertilizer and pesticides stored in them.

- Moisture tester
- Platform scale
- Exhaust fans where applicable
- Germination box
- Bag trucks - 2 and 4 wheel
- Spare bags
- Buckets, brooms, shovels etc.
- Therometers
- Hygrometer
- Bag closers
- Office furniture & equipment
- Air conditioner and dehumidifying equipment
- Electrical generation equipment as needed

Cost - Equipment for 4 large warehouse complexes.

Equipment	$24,000
Two air conditioned rooms	18,200
Two power units (25 KVA)	20,000
20% spare parts	12,440
Frt. and handling @ 40%	29,856
Inflation factor @ 10%	10,450
Grand total =	114,946

The small warehouses will need bag trucks, rag doll germinators and some office equipment, scales and spare bags and other containers.

Cost - equipment for 25 small warehouses

Equipment	$18,000
20% spare parts	3,600
Frt. & handling @ 40%	8,640
Inflation Factor @ 10%	3,024
	$33,264

(c) Seed Analysis Equipment

While some equipment has been imported for these laboratories, the following is needed to speed up the work, protect genetic stocks, and to make the Botany Section most useful to the seed industry.

Air conditioning equipment	Aspirator
Insulation materials	Dessicators
Vapor barrier material	Model Seed Cleaner/Screens
Dehumidifier	Small Electric Seed drier
Germinators	Heat Sealer for Bags
Torsion balance	Hygrometer
Seed Divider	Psychrometer, Sling
Hand Testing Sieves	Thermometers
Walk in Germinator	Miscellaneous

Cost - equipment for 3 regional seed testing laboratories and a central laboratory:

Central laboratory	$12,500
3 regional laboratories	25,000
20% spare parts	7,500
Frt. and handling @ 40%	18,000
Inflation Factor @ 10%	6,300
Total	69,300

(d) Genetic Seed Stocks Storage Equipment

The following equipment is needed to set up a facility for the preservation of genetic seed stocks of varieties of plants found to be native in Nepal or found in isolated areas.

Equipment	$4,000
Refrigeration System	4,000
Dehumidifier	3,000
Emergency power unit	10,000

Spare parts @ 20%		4,200
Frt. & handling @ 40%		10,080
Inflation factor @ 10%		3,528
	Total	$38,808

(e) Transportation:

In order to conduct a reasonable inspection/advisory service, the AIC and the Botany Section both need additional vehicles. The following are recommended:

AIC	- Pickup Trucks (U.S.)	- 6
	Motorcycles (Japan)	- 6
	- Jeep (Indian)	- 5
	Motorcycles (Japan)	- 6

It should be noted that some of these vehicles are non U.S. in origin and that the approval of the project should include the waiver required for their purchase.

Cost-vehicles

6 Pickup trucks - 3/4 ton	$40,000
5 Jeeps	40,000
12 motorcycles	12,000
20% spare parts	18,400
Frt. and handling @ 40%	44,160
Inflation Factor @ 10%	15,456
Total	$170,016

(f) Construction supplies:

These items are essential for the construction of weather and moisture proof seed plants and warehouses that are at the same time rodent and bird proof, easy to clean, cool and capable of being aired out. This will require the following:

Insulation material	Glass
Plumbing supplies	Cement
Plastic sheeting	Screening
Roofing-insulated	Structural steel
Electrical supplies	Rodent/moisture proof doors
Moisture proof doors	Solar heating etc.
Reinforcing steel	

Cost-commodities for construction program

Seed houses	$60,000
Warehouses	85,000
Laboratories	100,000
Cold Storage	30,000
Frt. and Handling @ 40%	110,000
Inflation Factor @ 10%	38,500
Total	$423,500

(f) Expendable items:

These items, mostly used in the seed business, are used while the inputs are being processed, moved and stored.

Plastic and Jute bags	Rodenticides
Ties	Fuel
Pesticides	Lubricants
Seed treatments	Spare parts
Fumigants	Paint, etc.

Cost-Expendables

Expendables	$50,000
Frt. & Handling	20,000
Inflation Factor @ 10%	7,000
Total	77,000

(5) Social Science and Physiological Research

As can be noted from the discussion above and from the section on Seed Analysis, there are questions that have not yet been answered regarding how this project can be managed and how it will operate. To solve these questions, we propose that money be set aside for research in the social sciences. We need to learn more during the next three to five years about how villages and individuals make decisions; how villagers organize themselves for tasks such as seed producing, management of warehouses, sales of surpluses, and other problems that are bound to arise as they develop their capabilities and their production increases.

We know that in some parts of Nepal, co-operatives are formed for all kinds of activities from financing the upkeep of shrines, to weddings, funerals and other activities, but it is not known whether these same types of co-operatives can be organized for economic production purposes. Neither is it known what basis should be used for organizing co-operatives. Should they be organized on a community basis or would it be better to organize them within more traditional social groups?

Another area for research is the development of an economical transportation system needed to move seed from the large seed houses in the terai to the inner terai and elsewhere as required. Can seed be moved as and when needed securely and safely?

Among questions that need answering are the following:

A. What does it take to increase the confidence of farmers in organizations such as the AIC and their products?

B. How can the extension service be most effective in promoting the seed industry?

C. Can the ADB and the agricultural credit system be used to support the construction of warehouses and seed houses?

D. What criteria should be used for selecting seed producers in the isolated areas?

E. What kind of training programs will be most effective in teaching farmers to produce quality seed?

F. How much of a price premium would farmers pay for good seed?

G. How large a premium is needed in order to encourage good farmers to produce seed?

H. Are there any cultural or traditional constraints to farmers accepting new varieties or new crops? If so, how can they be circumvented?

I. What is needed to stimulate the movement of seed and fertilizer?

J. How can seed packaging be improved for movement in Nepal?

There will be many other questions that need answers as this project takes shape and is implemented and maximum use should be made of local individuals and local organizations in seeking solutions for them. If absolutely necessary, additional help will be sought from American and Indian institutions. (Plans for such a research program are attached as Annex G.)

The cost of the Social Science research will be $110,000 of which the U.S. share will be about $100,000.

(6) In-country Training

The GON recognizes that they do not have enough gazetted officers to handle a seed program such as this. At the same time they recognize that training of large numbers of participants in India or the U.S. is wasteful of resources and takes too many people out of the country at one time. They do recognize that some out-of-country training is required but they also recognize that much of the training, if properly conducted and if participants are properly used can be done just as effectively in Nepal as it can be done in India, the Philippines or the U.S. It has therefore been decided to conduct a number of training programs in Nepal in cooperation with the Science Faculty and the Institute of Agricultural and Animal Science and the principal research stations.

Topics such as the following will be taught:

a. Management of Seed Processing Plants
b. Management of Warehouses and Logistics of Agricultural Inputs
c. Seed Analysis
d. Maintaining Seed and Fertilizer Quality
e. Commodity Management and Inventory Control
f. Sales Techniques
g. Agricultural Extension Techniques
h. Helping Farmer Seed Producers
i. Estimation of Seed Requirements
j. Field and Seed House Inspection, etc.

All of these topics and many others are important to the management of a seed industry and the training must be done in terms of Nepalese conditions. Storage conditions, transportation systems, communications, and production in Nepal are different. Therefore care must be taken in selecting trainers and in preparing training materials to make these in-country training programs as effective as possible.

The estimated cost will be $120,000 of which $100,000 will be the U.S. contribution.

II. Project Analysis

A. Economic Analysis

The economic analysis of the project as detailed in the project Review Paper (PRP) of 12/76 is contained in Annex J. The analysis considered Nepalese demand for improved major cereals seed over the next 15 years, the incremental nature of project - proposed seed processing and warehousing capacity, and the social returns to increased processing capacity. The analysis concluded that, "... the project - proposed seed processing facilities represent an increment to available processing capacity which is not required to serve even the highest levels of projected demand. The least cost alternative for Nepal to meet projected demand in the hills and high hills is to subsidize the transport of seed from the six large facilities already available." The analysis further concluded that social returns to the project cannot"... be ascribed to further capacity indicated as additional to that required by the most optimistic projection of demand. "In considering the phasing of investment, the analysis noted that,? It is likely that there are some demand foci at which it would be more efficient to place a small or "mini" plant than to transport demanded quantities from some distance.... the possibility that seed for processing would be so highly location-specific that special handling requirements might impose very high costs unless processed at or near the growing site might exist. If quantities involved were substantial (e.g. Jumla), a small or "mini" plant at site might be feasible. Each such proposed location would require careful analysis, basically in the context of unique agronomic conditions."

The modified project design, as detailed in this Project Papaer, reflects conclusions and recommendations agreed to by USAID/N and the GON following consideration of implications of the economic analysis of the "PRP design". Much of the incremental processing and storage capacity has been deleted. Increased emphasis has been placed upon institutional development. The linkages between varietal development and input supply have been further detailed. Complementary development of village level storage (in particular for farm households) is to be investigated for possible support to an appropriate technological innovation or innovations (able to be implemented profitably throughasmall-scale private activity). Specialized, supplementary inputs to the public seed industry have been included. These deletions/ modifications are consistent with the thrust of the economic analysis, because the value of project investments are maintained or increased while project costs have declined significantly.

The revised project design includes provision for up to 25 "mini" seed processing facilities with associated storage. Siting of the facilities may be suggested by the GON, local leaders, AID or other donor personnel, etc. As a first step, a preliminary screening or reconssisance of each suggested site should be undertaken to establish whether or not it would be reasonable to proceed with detailed site analysis. Following the decision to proceed, the detailed site analysis should be completed, following a methodology to be worked out in initial stages or project implementation and refined by experience.

Site selection should be based upon the following major variables:

1. Agronomic conditions - Are they suchthat seeds multiplied in the terai or the Pokhara or Kathmandu Valleys could not perform well?

2. Varietal purity - Is the plant essential to process small lots of foundation and/or breeders seed that could get "lost" or adulterated if processed through a large plant?

3. Cost/benefit - Would the volume of seed to be processed over the life of the facility (15 years) bring a standard cost/benefit analysis up to at least unity, following the same methodology as used in the Economic Analysis Annex?

Factors such as isolation and farmer confidence should not be considered as definitive, given the fact that the farmer can be qualified (and must be inccalculation of cost/benefit) and the latter is predicated upon the present system (which this project is designed to change drastically). (See Annex J).

For additionl economic analyses of this project, see the PRP dated 12/76 and "Seed Production and Supply in Nepal, Part II" by the Seed Technology Laboratorys Mississippi State University.

II. B. Social Soundness Analysis:

This section addresses issues relating to the Seed Project's social feasibility and distribution of benefits. The cultural and environmental diversity of Nepal, when combined with the number of government institutions which will be involved in the project and the relative paucity of data on agricultural innovation in Nepal, suggests that any discussion of these issues must be considered a preliminary assessment. The predictive accuracy of a social soundness analysis in these conditions is necessarily limited as is its ability to deal with the incremental aspects of the project. Thus this analysis should be considered as the first stage of the social science research which is to accompany the project's implementation, even as the project's social soundness will depend to an important extent on the incorporation of the findings of the social science research into the project's on-going implementation.

1. General Social Feasibility Considerations:

a. Traditional Seed Practices:

The very low percentage of seed which is presently purchased from public and private institutional sources indicates that most farmers in Nepal are still using traditional methods for obtaining and handling seeds. As far as can be determined, these traditional methods are, throughout most of the country, based on individual farm households processing and storing their own seeds which are selected from their own grain harvests. The vital necessity for a guaranteed supply of seed for planting in the next season has led farmers to store their own seeds whenever possible so as to eliminate the possible uncertainties of having to obtain seeds from outside the household economic and social unit. There is evidence of a strong reluctance on the part of farmers to consume their seed, even in times of food scarcity, unless he has an assured alternate source of seed in the form of wealtheir relatives or patrons.

Throughout most of Nepal, selecting, drying, storing, and planting of all kinds of seed is primarily done by women. While women and men work interchangably in many aspects of agricultural production, the handling of seeds - particularly seed planting - is considered women's work in the same way that plowing is defined as men's work. Thus, to a greater degree than may be true for many other kinds of agricultural inputs, it would appear necessary to involve women in the extension training which is concerned with seeds.

With the seed supply primarily confined to individual household economic units, there are few, if any, traditional cooperative systems involving seed collection, processing, and storage in Nepal. Although there are a number of traditional cooperative institutions concerned with managing community resources such as irrigation water, bridges, trails, forestry products, grazing, herding, etc. in many communities, these have not been extended to

seed storage. A few farmers with greater access to consumer goods have started to use empty kerosene tin containers for seed storage, but most still use traditional storage facilities which range from bamboo and mud containers to large clay pots and wooden boxes plastered with mud and cowdung. Many of these containers are only moderately successful in controlling humidity, insects, and rodents.

Despite this trong tendency to rely on self-production and storage of seed, however, there is also evidence that a relatively large volume of seed is exchanged, loaned, and/or purchased by and between farmers in all areas of the country. While there is a pressing need for research on this subject, it appears that most of these exchanges take place within local kinship and social networks. This type of distribution system assures the farmer of the quality of the seed by virtue of the seed supplier's social accountability to the seed-taker. The occasions upon which farmers utilize these networks to obtain seed from outside their own production appear to fall into four categories: a) when their own crop is destroyed by hail, lack of rain, excessive rain, rodents or disease and they produce no seed of their own, b) when their own seed is of inferior quality due to poor harvest, problems occuring during storage, inadequate drying, etc., c) when their seed is eaten with the certain knowledge that they will be able to replace it or when they face absolute starvation and are forced to consume it, and d) when they are convinced that the seed obtainable from outside sources will be more worthwhile for them to plant than their own because of higher potential yields, greater insect or disease resistence, etc. That the last reason for obtaining new seed has been extensively used when farmers are convinced of its value is demonstrated by the fact that in the last 15 years, over 80% of the land planted in wheat was planted to new high yielding varieties while less than 15% of the seed used has been distributed by the government. Additional evidence (see Economic Analysis Section) of extensive farmer-to-farmer seed distribution of a historical nature can be aduced from the fact that maize, which was unknown in Nepāl prior to its importation from the Americas, is now the most significant food crop in the hilly country despite the lack of promotion by any government or private agencies.

b. Recent Patterns of Innovation:

On the basis of the relatively scanty evidence at hand (part of which is based on findings reported by J. Ashby and D. Pachico, Ph. D. candidates at Cornell University), it seems clear that village level experimentation with new varieties is almost exclusively done by the wealthier farmers. Although the critical variable has not yet been established, this positive correlation between wealthier farmers and innovation can be attributed to their greater access to information, their higher levels of education, their greater managerial and planning skills, and perhaps most importantly, their relative economic security which allows them to take risks on some small part of their land.

Significantly, however, new higher yielding varieties which have been proven appropriate to the farmer's cropping system and soil conditions by the wealthier farmers are often adopted more extensively by the smaller farmers who are less concerned with factors such as taste than with overall economic return. Thus, if a variety has proven its value and the related inputs such as fertilizer that are required are available to him on an economically sound basis, the small farmer has demonstrated that he too will adopt it on a wide scale. Estimates of the gestation period for this diffusion of innovation are in the 6-8 year range for any particular area of the country. So far, this kind of extensive use of new varieties has been confined to wheat, suggesting to some researchers that the lack of appropriate varieties of other crops and the unavailability of related inputs is a more important constraint to adoption than the lack of an effective extension service charged with increasing the rate of diffusion. This is supported by evidence from Sindhupalchowk where 62% of the surveyed farmers have previously tried new varieties of maize but are not presently using them.

To the extent that this analysis of the process of agricultural innovation is supported by further research, it justifies a project approach which relies heavily on the larger farmers (who may in fact be very small) at the outset as the most effective present means for reaching the smaller farmers. AIC's previous attempts to contract with a large number of small farmers for the production of seed have not been very successful. For example, in one area of Kathmandu valley, out of 19 farmers who had contracted to grow paddy seed for the AIC, the only farmer whose produce was taken had planted 5 acres for seed while the average acreage planted for seed by the other 18 farmers was only 3/4 of an acre. Similarly, the four farmers from whom AIC had purchased maize seed had planted an average of 11 acres each while the remaining 54, who also had contracts averaged only ½ acre planted for AIC. Regardless of whether this has been due to poor management on the part of AIC, it seems evident that: a) it is much more efficient in terms of supervision and transportation for AIC to meet its production targets through a few large farmers; b) the greater influence of these farmers makes it politically expedient to buy their seed; and c) only farmers planting large areas can make sufficient profit to make them willing to sell to AIC, given the transportation difficulties and bureacratic procedures which are involved. Thus, according to this understanding of the patterns of agricultural innovation, the reliance on larger or better farmers for the production of seed may be the most practical and manageable method at the present for diffusing new seed to small farmers through the farmer-to-farmer exchange system.

2. Main Feasibility Issues:

a. Confidence:

Beyond extending the production and use of new varieties of seed, this project envisions increasing farmer use of seed which is not processed and stored by individual household economic units. Since it is probably safe to assume that most farmers will, at the initial stages at least, continue to store their own seed until they are convinced of the reliability and value of another system, the problem can be seen as one of inducing the farmer to use a new system which will increase his net food production and income. Phrased in other terms, the problem becomes one of designing and operating a system which is sufficiently reliable and beneficial to the farmer that he will want to adopt it. Since all the solutions to the various aspects of this problem are not yet known, it will be the responsibility of the social science research component to address them so that the findings can be incorporated into the on-going project implementation plan. For present purposes, a brief look will be taken at the main social issues involved.

In large part, these issues revolve around the problem of farmer confidence. As noted earlier, the traditional farmer-to-farmer system of seed exchange works because the seed seller is socially accountable to the buyer and the buyer is assured that the seed will be at least as good as his own. In addition, the lack of bureaucratic procedures insures the farmer that he will obtain the seed at the time he needs it. By contrast, the experiences of many farmers who have contracted with AIC to produce seed and of farmers who have contracted to purchase seed has shown that they cannot always rely on AIC to pick up or provide the seed on time and that the quality of the seed can be questionable. Thus, for farmer confidence to be increased, the project will have to be successful in improving the management of seed procurement and delivery, in improving the standardization of quality, and in providing seed varieties which are demonstrably beneficial to farmers within the constraints of their cropping systems. Particularly in the Terai where the larger production units are located, the AIC will also have to be successful in improving the coordination between itself and local outlets as well as sources of supply.

The problem of management is thus central to the success of the project in providing new varieties of processed seed to farmers on a wide scale. For this reason, the participant training and the provision of a seed logistics and management expert are key ingredients in the project. Furthermore, since management efficiency in Nepal will be constrained by the lack of adequate transportation and communication facilities for the forseeable future, the distribution of seed units throughout the country so as to minimize the requirement for complex management operations is partially justified by the necessity for building and maintaining farmer confidence. By locating the seed units

and warehouses closer to the farmers, the possibility of delayed distribution is reduced--thereby reducing the possibility of losing the farmer's confidence which is so crucial to project success. In addition, farmer confidence can be increased by having the local seed producers also serve as farmer-demonstrators.

b. Local Organization:

In both the hill areas where mini-units are going to be constructed and in the Terai, farmer confidence will depend heavily on the mode of local organization employed for procurement, processing, transportation, storage, and distribution of seed. If the present policies are continuedd it is most likely that the local organizations will be the Sajha Cooperative Societies which have been set up throughout much of the Terai and are in the process of being extended into the hills. While these Societies may, under good management, be the best vehicle for organizing mini-seed processing and storage units, their pre ent "top-down" orientation and dominance by local elites could also prove to be an obstacle to wide participation.

This suggests that it would also be appropriate for the project to explore other types of cooperative local organizations for the management of seed operations. These cooperative groups might be formed along the lines of the small farmer groups presently being set up by the Agricultural Development Bank or even utilize a traditional cooperative model within the area concerned. The need for some flexibility in this regard during project implementation is clear if an attempt is going to be made to create farmer confidence and the participation that is required to induce him to adopt new seed practices. Fortunately, the traditional pattern of household's saving their own seed does not necessarily have to be dropped during the period while a new method is being organized and introduced, as this "saved seed" can always be consumed or sold as grain after new seed is purchased. Thus, the risk of trying new methods does not fall too heavily on the individual farmer, but can be borne in part by the project.

3. Beneficiaries:

The initial beneficiaries will include: a) those farmers who contract to grow improved seed, and b) those farmers who p urchase the improved seed.

For reasons elucidated above, the farmers who contract to grow seed will necessarily be primarily the relatively less poor farmers who have more than one acre to farm. In addition, the availability of transportation facilities and the location of the large seed units and warehouses in the Terai and Inner Terai, will mean that, at least for the present, the largest acreage of seed production plots will necessarily be located in these regions rather than in the hills. As smaller units are set up

in the hills and workable local organizations established, the non-availability of farmers with large landholdings will require AIC and local cooperatives to utilize a larger number of relatively smaller farmers to produce the seed. However, the necessity for supervising all the different plots, and in the case of non self-polinating crops such as maize, the necessity for isolating plots, places practical restrictions on the possibility of incorporating a large number of small farmers in the seed production process.

Given the patterns of larger farmer innovation discussed above and the shortage of cash resources among smaller farmers, the initial buyers of seed will also tend to be the relatively better-off farmers. However, to the extent that new varieties are introduced and accepted and to the extent that farmer confidence can be built and maintained with socially accountable, local organizations and responsible management, the numbers of small farmers who purchase processed seed will definitely increase.

The second group of rural beneficiaries will be all the small farmers who obtain new seed through farmer-to-farmer exchanges. This group is second in the sense that they will start to receive the benefits of the project a year later in time than the initial group; however, in terms of numbers it is anticipated that this group will eventually constitute the overwhelming majority of beneficiaries. The widespread farmer trade in seed and the willingness of small farmers to adopt seed that has been proven acceptable by other farmers, discussed earlier, indicates that it is possible for a large group of small farmers to be reached in this manner. Since this sort of distribution of benefits will not show up on seed sale statistics and data is unavailable for economic analysis, it will be important for the social science research to monitor the processes involved and the benefits received in order to increase project support of this spread effect.

The third group of beneficiaries will be those non-farm personnel who receive training and obtain employment through the project. At the higher levels, the necessity for improving quality control and management, make these beneficiaries necessary to the success of the project. At the lower level, the generation of employment through the construction and maintenance of the seed plants and warehouses is beneficial to the employees and laborers who will receive wages.

Women will participate in the benefits of the project principly in two ways. On the one hand, to the extent that the use of new seeds increases production and income, they will participate in the greater household prosperity and increased level of food consumption. On the other hand, to the extent that more farmers start to use the new units for processing and storing seed, the labor women used to put into home processing and storage will be reduced. Since new varieties of seeds often require new grain and food processing practices, however, it will be necessary to monitor the impact of their introduction on women's roles.

4. Summary:

In summary, the seed project is socially feasible and can ultimately provide important benefits to the poor majority in addition to the wealthier farmers, so long as farmer confidence is established and maintained. This requires that the following conditions are effectively met:

-- new varieties aside from wheat are proven acceptable to farmers either through development of new strains, adjustments in cropping systems, better provision of related inputs, and/or more effective farmer education and training.

-- the management of AIC and the Sajha cooperatives are improved to insure better quality control, more effective farmer relationships, and timely delivery of seeds and services.

-- socially accountable and effctive local organizations are developed to manage and control mini-seed plants in the hills so that seeds are produced and demonstrated in the farmer's own areas.

-- methods for monitoring and increasing the spread effect of new seeds through farmer-to-farmer diffusion are developed and related problems, such as the improvement of home storage, are addressed.

C. Technical Feasibility:

The possibility of establishing a viable seed industry has been under investigation in Nepal for many years. In 1974, the Mississippi State University's seed laboratory made a study of the feasibility of a seed industry in the country and made a large number of recommendations as to infrastructure, regulation and research support needed for such an industry.

In March 1975, the IBRD financed an Identification Mission to Nepal which pinpointed the lack of seed as a major constraint to agricultural development and recommended the establishment of a very large seed farm (10,000 ha) in the terai near Rampur to produce all of the seed needed in the country. The suggestion was made that this location should be selected so that the staff of the Institute for Agriculture and Animal Sciences could be used to supply the technical assistance and guidance needed for such a huge enterprise.

The GON examined this suggestion and eliminated it because of its complexity, the logistical problems created by such a farm, and the disruption of local agricultural development caused by the purchase of 10,000 ha in a land hungry country such as Nepal.

The U.S. was asked to consider a seed enterprise as a part of the Integrated Cereals Project but this aspect of the project was turned down, except for the production of foundation seed, by AID/W.

The first plans for a separate seed project were submitted to AID/W in the form of a PID. After the PID approval, USAID/N, with the help of the GON's Central Seed Production Committee prepared a PRP which was accepted in early 1977. Since then, the Central Seed Production Committee, the International Agriculture Development Service, Mississippi State University and the International Fertilizer Development Center have studied the situation in Nepal. All have come to the same general conclusions as to the establishment of a seed industry in this country, which are:

1. The establishment of a viable seed industry is absolutely essential;

2. The very large seed plant at Hetaura and the five German supplied plants should be incorporated into the seed industry but, considering the transportation problems of Nepal, they probably could not be used efficiently to supply seed for the hills or even all of the terai and they probably are too expensive to be operated by private seed growers unless the fixed costs and the operating and transportation costs are heavily subsidized.

3. Seed grown in the terai should be grown in the private sector under contract to AIC with the Botany Division maintaining an inspection and analysis function to insure adherence to quality standards, Later, the whole seed industry except for enforcement and regulation should be taken over by the private sector.

4. Seed for the hills should be grown in the hills by local farmers and processed in small, labor intensive, hand powered seed equipment owned by the farmers or a local cooperative with the AIC, the Botany Division and the Extension Service supplying technical assistance and foundation seed.

5. Certification standards should be relaxed and a labelling law temporarily put in its place so that new seed producers can produce seed of better quality than is available now but not of the impossibly high quality demanded of certified seed in the international market. However, certification standards should be met at some future date such as 1985.

6. Warehouses should be sited so as to promote distribution of inputs--not to be "dead" storage.

7. The goal of the project should be eventual placement of the seed industry in the private sector with the Botany Division fulfilling an inspection-regulation-analysis function; the AIC filling a supply/market-balancing function; the cooperatives performing the marketing function; the ADB financing seed industry and marketing activities; the extension service providing information and training materials, and the research service making available technical assistance, new varieties and the breeder/ foundation seed.

8. Much of the effort involved in the project should be focused on establishment of facilities and training.

9. All parts of the seed production--input distribution system should be labor intensive.

10. Research is needed on storage requirements, management, transportation, social aspects, packaging, chemical treatments, optimum planting dates for seed production, particularly for vegetable seed, and maintenance of seed quality.

Many other conclusions were reached in these reports and in some respects there was a difference of opnion - minimum storage requirement, source of technical information for the farmer (researcher, extension worker or AIC employee) and other minor points. However the general consensus was, and is, that the project is feasible, is needed and will be very useful to Nepal.

For further information, please see the following reports:

Seed Program Consultation in Nepal
TA 74-02 (Feb. 1974)
by Seed Technology Laboratory,
Mississippi State University

Seeds Project-Nepal
Identification Mission Report
by Dr. D. P. Singh for IBRD-IDA
March 1975

Report of the IADS Seed Team
by J. E. Douglas, G. M. Dougherty, J. R. Huey
IADS New York
October 1976

Seed Production and Supply in Nepal
in two Volumes,
by James C. Delouche and W. C. Couvillion, Mississippi State Univ.
Nov. 1977

Fertilizer Bagging, Storage and Distribution
Recommendations for Nepal
by Fred Kiem and Bill Barnett
International Fertilizer Development Center
Dec. 1977

Seed Program
by Pradhanang, Regmi, Rana, Rajbhandari and Wilson
Ministry of Agriculture, HMG of Nepal
August 1976

D. Administrative Feasibility:

Several organizations are to be involved in the implementation of this project but all but one of them (the cooperative department) are physically and administratively located within the Ministry of Food, Agriculture and Irrigation (MFAI) and even then, the management of local cooperatives is financed and controlled by the ADB. It is expected, therefore, that the administration of the project can and will be coordinated through the MFAI and no serious administrative conflicts are expected between departments or between departments and the semi-autonomous organizations supporting the project. Individually, the organizations to be involved in this project vary widely in their staffing and their administrative capability. However, it can be said of all of them that while the senior administrators are strong, the second line and middle level officers are not as competent as their seniors and all organizations need additional staff and training for the existing staff.

1. The Department of Agriculture

This department is probably one of the best staffed in the whole government but even then, about 40% of the positions in the department are not filled. However, the Director General and the Deputy Director General for crop research are both senior officers and experienced administrators. The chief of the Botany Section's Seed Division is a senior employee and a very capable officer with a master's degree in seed physiology and additional training at the Seed Technology Laboratory, Mississippi State University. An assistant has been assigned who is fully capable of analyzing seed samples and three other exployees are undergoing training at the present time.

2. The Agriculture Inputs Corporation:

The AIC is a relatively new organization, being one of the descendants (the other being the Nepal Food Corporation) of the old Agricultural Marketing Corporation. The Managing Director of the AIC is a senior, very experienced officer from the Agriculture Department. However, his supporting staff are not very experienced and the seed section is understaffed although its senior officers are well trained. At the present time, several positions in the AIC are not filled although the organization has staff in about 40 of the districts. Sales to farmers are made through local cooperatives but it is the responsibility of the AIC to deliver inputs to the district cooperative warehouses and they in turn, deliver to the local stores.

Seed purchasing arrangements and regulations affecting the relationships between the DAGr, the AIC and farmer--seed producers are being revised to permit faster purchase of seed and to provide a greater incentive to the growers to do a better job of production.

The AIC, especially the seed section, does not have the administrative strength of the DAgr but it is in a position to hire more people and a large part of the training component of this project will be devoted to strengthening this organization. As indicated in the social analysis section of this project paper, management of the project has been one of our main considerations in its design and the lack of strength in the sections responsible for buying, storing, moving and selling seed has been of paramount importance. Therefore, it is intended that, in addition to the training mentioned above, the technical assistance supplied to this project will consist of good administrators as well as seed technicians and that at least five man months of short term consultancies will be filled by experienced managers.

3. The Agricultural Development Bank

The ADB is one of the largest banks in Nepal and until recently, its loans were largely made to medium to large farmers. However, in the last two years, the government and the ADB have started to focus their attention on the small farmers. The GON has instituted a system of compulsory cooperatives (sajhas) financed through the ADB and money collected under the compulsory savings plan. It has offices in most districts and in districts having more than one fair sized town, two or more offices are in operation.

The administrative capability of the ADB is highly regarded although many loans are given after several months of delay. In most respects, the ADB's reputation is very good and its collection record, when compared to other Asian Agricultural Credit Banks, is excellent.

4. The Extension Service

The Extension Service of the Ministry of Food, Agriculture and Irrigation is a large organization divided into 4 regional organizations, each headed by a very competent, efficient, Regional Director of Agriculture. Only 65 of the 75 districts have Agricultural Development Officers (ADO) but those not having ADOs are usually unimportant agricultural producers and are staffed with JTs and JTAs. While the junior officers are not well trained, the ADO's are college graduates and the JTs and JTAs are usually trained in some aspect of agriculture. Therefore, we expect that, especially in the hills, these lower level workers will be trained under the project and will be able to advise the seed producers while the other staff members will promote seed sales and improved production practices with the farmers.

5. The Cooperative Department

The cooperatives are charged with the responsibility for making all input sales to farmers in those areas where they exist . In other areas, private dealers have been selected to furnish this service. Where there are cooperatives, the ADB finances and trains managers for them and supplements the funds available from the compulsory savings program for their operation. While cooperatives are being pushed by the GON at the present time, they do not seem to be receiving much support from the farmers, and are weak organizations.

6. Other Organizations

Other organizations expected to make a contribution to this project all suffer from the same problems as those listed above. All are government supported and all are short of funds and personnel in view of the job they have to do. Among those in this category are the Soil and Water Conservation Dept., APROSC, and the Food and Agriculture Marketing Dept.

Lastly, a great amount of thought is being given to the farmers and how they can be organized to handle the job of producing and selling seed. To help solve these problems, a social science research component has been built into this project and the Agricultural Development Council working with APROSC is studying the whole question of administration with emphasis on job satisfaction.

In summary, it may safely be said that while the organizations to be involved in this project are generally not strong, training programs, both in-country and participant training, are expected to result in a higher degree of efficiency in the operation of the organizations cooperating in producing seed and distributing agricultural inputs.

E. Environmental Concerns

This project is expected to cause no impact on the environment. As indicated in the accompanying "Impact and Evaluation Form", the only impact will be on the economic and employment patterns of the rural people. It is estimated that perhaps up to 1000 people will find long term employment, operating and working in the warehouses, seed houses and seed industry constructed under this project. Another five hundred will be employed by seed producers to help care for the seed fields, assure purity, dry the seed etc. It is likely that most of these people would be members of the producer's family and would be more fully employed than they are now. Perhaps up to 100 more people will be employed by the DAgr as inspectors, analysts, etc., some on an intermittent basis.

It is also likely that one or two thousand people will find temporary employment in the construction of the warehouses, seed houses and regional laboratories. Thousands more will be required to carry equipment, supplies, building components and machinery to the building sites during the construction phase and when completed, more porters will be required to move fertilizer, seeds and other inputs into the hills.

A few people will be affected by the provision of adequate living accommodations for them in the rural areas at the warehouse sites.

The largest effect on the economic environment, however, will be the increased production resulting from the produce of the project. As better seeds and other inputs spread to more isolated areas, increased production will result which will largely be consumed on the farmer's home farm and in his village. It is not likely that considerable quantities of the grain will be exported to lower areas such as to Kathmandu valley because of the costs involved and the negative price differentials for cereals moving from the high areas to the valley.

The most obvious impact of this project will be on the producers of seed, the farmers using the seed and the consumers purchasing the increased grain resulting from the use of improved seed. All of these people will be better off but it is not likely that such improved status will be inflationary or disruptive of the market place.

As noted in section 5, c on P22, of the PRP, proper steps will be taken to eliminate any chance of chemical pollution of the air or water, and treated but unsold seed will be buried to remove the possibility of consumption by humans or livestock. Dust will be controlled and noise pollution will be minimal but individuals exposed to high noise levels will be protected by ear plugs.

Therefore, it is our opinion that the total environment of Nepal will not be damaged in any way by this project.

IMPACT IDENTIFICATION AND EVALUATION FORM

Seed Production and Input Storage
Project No. 367-0118

Impact Areas and Sub-areas

A. LAND USE

1. Changing the character of the land through:

   a. Increasing the population ---------- N

   b. Extracting natural resources ---------- N

   c. Land clearing ---------- N

   d. Changing soil character ---------- N

2. Altering natural defenses ---------- N

3. Foreclosing important uses ---------- N

4. Jeopardizing man or his works ---------- N

5. Other factors

B. WATER QUALITY

1. Physical state of water ---------- N

2. Chemical and biological states ---------- N

3. Ecological balance ---------- N

4. Other factors

Symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

C. ATOMOSPHERIC

1. Air additives ---------- N
2. Air pollution ---------- N
3. Noise pollution ---------- N
4. Other factors

D. NATURAL RESOURCES

1. Diversion, altered use of water ---------- N
2. Irreversible, inefficient commitments ---------- N
3. Other factors

E. CULTURAL

1. Altering physical symbols ---------- N
2. Dilution of cultural traditions ---------- N
3. Other factors

F. SOCIOECONOMIC

1. Changes in economic/employment patterns ---------- L
2. Changes in population ---------- N
3. Changes in cultural patterns ---------- N
4. Other factors

G. HEALTH

1. Changing a natural environment ---------- N
2. Eliminating an ecosystem element ---------- N
3. Other factors

H. GENERAL

1. International impacts ---------- N
2. Controversial impacts ---------- N
3. Larger program impacts ---------- N
4. Other factors

See attached Discussion of Impacts.

III. Financial Analysis and Plan

A. Estimated Project Costs

The project is expected to last five years and is estimated to cost a total of 5,509,000 dollars. AID's share of this total will be 4,031,000 dollars (about 73.2%), and the GON will contribute 1,398,000 dollars (about) 25.4%). The U.S. Peace Corps will provide services of volunteers valued at approximately 80,000 dollars (about 1.4%). AID's contribution will be on a grant basis.

Table No. 1 below provides a cost breakdown of project inputs and outputs, and the amount AID, Peace Corps, and GON will contribute toward each.

Table No. 2 shows the amount each party will contribute toward the inputs and breaks the contribution into foreign exchange and local currency costs.

Estimated expenditures by each contributor for Fiscal Years 1978 through 1982 are shown in Table 3.

B. Analyses of Implementing Agencies

1. Agricultural Inputs Corporation (AIC)

AIC is an autonomous corporation wholly owned by the GON with its central offices located in Kathmandu. It has three regional offices, four main branch offices, several other branch and sub-branch offices and sales depots throughout the country. AIC was established to sell agricultural inputs such as planting materials, farm equipment, fertilizers, and insecticides at low cost. To date, most of its sales volume has been in chemical fertilizers.

Table No. 4 presents comparative Income Statements of AIC's operations for FY's 1973, 1974, and 1975, and Table No. 5 presents AIC's Statements of Financial Condition for the same fiscal years. Financial statements for FY's 1976 and 1977 are not yet available. AIC management stated that the 1976 statements will be completed by August or September 1978, and 1977 statements will be ready about March or April 1979. Presented below are several ratios calculated from data shown on the financial statements.

TABLE NO. 1

COSTING OF PROJECT OUTPUTS/INPUTS
(In $000 or equivalent)
Project Paper

X New

____ Rev #____

Project # 367-0118 Title: Seed Production and Input Storage

Project Inputs	Project Outputs # 1	# 2	# 3	# 4	TOTAL
AID Appropriated					
Contract Services	140	530	260	11	941
Training Participant	118	228	160	173	679
Commodities	-	428	230	135	793
Construction	-	273	1108	37	1418
Social Science Research	40	20	20	20	100
In-country Training	20	30	30	20	100
Other U.S.					
Peace Corps	20	20	20	20	80
Host Country	50	400	840	108	1398
Other Donors					
Total	388	1929	2668	524	5509

Outputs Key:

#1. Trained farmer groups capable of and organized to produce and distribute seed.
#2. Seed processing system functioning in terai and hills.
#3. Input distribution system established.
#4. Seed testing system in operation.

TABLE NO. 2

SUMMARY COST ESTIMATE AND FINANCIAL PLAN
(US $ 000)

PROJECT PAPER

Seed Production and Input Storage, 367-0118

Source 1/	AID		Host Country		Other(s)+		Total
	FX	IC	FX	IC	FX	IC	
Use							
1. Contract Services	941			164			1105
2. Commodities	793		30	275			1098
3. Participant Training	679			65			744
4. Social Research 3/	100			10			110
5. Seed Assistants (PCV)					80		80
6. Construction 2/	1418		40	794			2252
7. In-country Training	100			20			120
Inflation Factor 4/							
Contingency 1/							
	4031		70	1328	80		5509

1/ Contingency included in line - item estimates.

2/ FAR to be used on construction.

3/ Local organizations to be used if possible to conduct research.

4/ Included in line items at rate of 10% per year.

TABLE NO. 3

PROJECTION OF EXPENDITURE BY FISCAL YEAR
(US $ 000)

Fiscal Year	AID**	Host Country	Other(s)+	Total
1978	25			25
1979	963	346	20	1,329
1980	1,689	353	20	2,062
1981	1,006	353	20	1,379
1982	348	346	20	714
Total	4,031	1,398	80	5,509

TABLE NO. 4

Agricultural Inputs Corporation
Comparative Income Statements
for FY 1973 through FY 1975
($ 000)

Account	FY 1973		FY 1974		FY 1975	
Gross Sales		4,488		4,466		6,555
Less: Sales Commission		317		338		321
Net Sales		4,171		4,128		6,234
Cost of Goods sold						
Beginning Inventory	1,706		4,425 1/		4,385	
Purchases	6,473		3,319		14,574	
Available for Sale	8,179		7,744		18,959	
Ending Inventory	4,419	3,760	4,385	3,359	10,349	8,610
Gross Profit on Sales		417		769		3,376
Other Revenues						
Settlement of claims		13		7		42
Trucks & Transp. Subsioly		5		-0-		162
Commissions & others		9		57		21
Total Revenues		438		833		2,151
Operating Expenses						
Administrative Costs	268		367		405	
Interest Expense	88		174		420	
Reserve for Losses	42	398	41	582	30	855
Net Operating Income Before Taxes		40		251		3,006
Non-operating Expenses						
Rejected Claims		37		-0-		-0-
Net Income, before taxes		3		251		3,006
Reserve for Income Taxes		-0-		137		-0-
Net Income or (Loss)		3		114		3,006

1/ Inventory adjustment made but was not carried back to adjust prior year income.

TABLE No. 5

Agricultural Inputs Corporation
Comparative Statements of Financial Condition
for Fiscal Years 1973 through 1975
($ 000)

	FY 1973		FY 1974		FY 1975	
ASSETS						
Current Assets						
Cash and Bank Account		604		1068		774
Trade Accounts Receivable		1868		2645		1517
Acc/Rec. Food Mgt. Committee		93		-0-		-0-
Inventories	4420		4385		10349	
Less Revenue for Loss	76	4344	75	4310	75	10274
Total Current Assets		6909		8023		12565
Investments		149		153		40
Fixed Assets						
Net Fixed Assets		797		793		387
Construction in Process		30		19		26
Total Fixed Assets		827		812		413
Total Assets		7885		8988		13018
LIABILITIES & CAPITAL						
LIABILITIES						
Current Liabilities						
Trade Account Payable		3365		3457		4707
Acc/Pay. Food Mgt. Comm.		-0-		529		1943
Beanch Accounts Payable		18		59		41
Short-term Notes Payable		1995		2110		7743
Total current liabilities		5378		6155		14434
Long-Term Liabilities						
Note Payable		241		426		-0-
Total Liabilities		5619		6581		14434
CAPITAL						
Capital		2244		2250		1457
Reserves						
Capital		4		24		-0-
Price Stabilization		16		16		16
Total Reserves		20		40		16
Retained Earnings		2		117		2889
Total Capital		2266		2407		1416
Total Capital & Liabilities		7885		8988		13018

Ratio	Fiscal Year 1973	1974	1975
Current	1.3	1.3	.87
Acid Test	.48	.60	.16
Return on Equity	0.12%	4.75%	(212.27%)
Inventory Turnover	1.23	.76	1.17
Working Capital	$1,531	$1,868	($1,869)
Working capital to Total assets	19.4%	20.8%	(14.4)

In 1973 and 1974 AIC realized small profits from its operations. Since the objective of the AIC is to sell at low cost, maximizing profits is not a goal and small profits are not alarming. However, in FY 1975 substantial losses were incurred and AIC's financial condition changed dramatically. The Current and Acid Test Ratios are generally accepted measures of an entity's short-term liquidity or ability to pay its debts in a timely manner. AIC's 1973 and 1974 Current Ratios indicate it had sufficient current assets, including inventories, to cover its short-term debt, but in 1975 Current Liabiities exceeded AIC's total assets. At that time, according to AIC's financial statements, it was technically insolvent.

AIC's losses in 1975 were, for the most part, beyond the control of its management. Because of the petroleum crisis, world prices of chemical fertilizers sky-rocketed upward. AIC was forced to pay going market prices, but the GON did not permit AIC to raise its prices to consumers, reasoning that higher prices would cause decreased use of fertilizer and national production of agricultural commodities would suffer. According to AIC's General Manager, the GON has promised to subsidize the losses incurred by AIC. Since 1975, the GON has contributed an additional 45 million rupees (3.6 million dollars) to AIC's capital. However, during FY's 1976 and 1977, AIC suffered additional operating losses and expects losses from its FY 1978 operations as well.. Without the financial statements for those years, it is difficult to estimate the magnitude of the losses, but they were probably substantial.

AIC, in its role as principal GON implementing agency for the project, will be expected to provide sufficient working capital to increase its staff and begin operations of the seed houses and warehouses. At the end of its FY 1975 operations, AIC had a working capital deficit of nearly 1.9 million dollars. if the project is to achieve any measure ofsuccess, the GON will have to make a strong commitment to provide adequate working capital to AIC. preferably as capital contributions because there is no repayment obligation. Another means could be through long-term loans at preferential interest rates.

Another matter of concern is AIC's financial management procedures. In order to make sound financial decisions, management must have current information on the entity's financial operations and condition. Financial statements prepared nearly two years after the close of an operating year do not provide current financial data. AIC's management procedures should be reviewed under the project, and if required, technical assistance should be provided to improve its performance.

In the absence of current AIC financial statements, no attempt was made to prepare projected financial and cash flow statements. Once the statements are available and analyzed, projected statements can be prepared.

2. Botany Division

The Botany Division of the Department of Agriculture is a GON agency, and, as such, receives its operational funds through the GON's budgetary processes. Table No. 6 shows Botany Division budgets and expenditures for Fiscal Years 1975 through 1978, and the proposed budget for FY 1979.

Amounts budgeted have been fairly constant through FY 1978 with most significant increases and decreases being in the line item for Construction and Improvements. Expenditures for 1977 were made through the agriculture research services and were not available. FY 1976 expenditures were about 91% of the amount budgeted.

The Botany Division will be responsible for monitoring seed quality under the project. To carry out its responsibility, additional staff will be required and its budget will have to be increased correspondingly.

3. Agricultural Development Bank (ADB)

The ADB is the main source of credit for the agriculture sector and is the principal creditor of AIC. About 97.4% of ADB's outstanding capital is owned by various GON entities, and the remaining 2.6% is owned by private investors.

Table No. 7 presents ADB's Income Statements for Fiscal Years 1971 through 1977, and Table No. 8 contains comparative Statements of Financial Condition for the same periods.

The ratios below show that ADB appears to be a financially sound institution with steadily increasing profits and improving return on equity.

TABLE NO. 6

Botany Division Budgets
For FY's 1975 to 1979
(US $)

Sl. No.	Budget Title	FY 1975 Budget	FY 1975 Expenditure	FY 1976 Budget	FY 1976 Expenditure	FY 1977 Budget	FY 1977 Expenditure	FY 1978 Budget	FY 1978 Expenditure 1/	FY 1979 Budget	FY 1979 Expenditure
1.	Salary	15108	12749	18313	15655	21285	N/A 1/	24032	12258	2[illegible]4	
2.	Allowance	-0-	-0-	-0-	-0-	-0-		-0-	-0-	-0-	
3.	T.A./D.A.	1365	1058	1446	1706	803		1446	1489	1928	
4.	Services	482	406	482	622	643		683	501	803	
5.	Rent	-0-	-0-	-0-	-0-	-0-		-0-	-0-	-0-	
6.	Repair & Maintenance	321	321	643	642	723		2008	358	3213	
7.1	Office Supplies	402	412	482	411	643		643	572	803	
7.2	Newspaper & Magazines	402	401	402	377	402		402	40	442	
7.3.1	Fuel for transport	562	538	643	642	803		803	459	1606	
7.3.2	Fuel for other purposes	241	43	161	101	160		160	91	555	
7.4	Clothes & Foodgrains	40	40	40	29	402		160	-0-	201	
7.5	Other Goods	2410	2321	2008	3574	3534		3614	3203	5622	
8.	Grant-in-AID, Contribution & Reward	482	803	603	562	683		683	787	953	
9.	Unforseen	32	310	32	32	40		80	34	241	
10.1	Furniture	-0-	-0-	80	76	-0-		201	200	763	
10.2	Transport Devices	-0-	-0-	-0-	-0-	-0-		-0-	-0-	-0-	
10.3	Tools & Machinery	-0-	-0-	2008	1941	2409		1205	1122	5412	
11.	Purchase of head & Building	-0-	-0-	-0-	-0-	-0-		-0-	-0-	-0-	
12.1	Building Construction & Improvement	-0-	-0-	803	793	-0-		-0-	-0-	-0-	
12.2	Other Construction & Improvement	10442	98	14056	11475	-0-		-0-	-0-	18072	
		32289	19500	42201	38638	32530		36120	21114	68458	
	Percent not expended		(40%)		(8%)				(41%)		

1/ FY 1977 budget was executed by Agriculture Research Services. So, separate expenditure for Agriculture Botany only not available.

2/ represents expenditure through March 13, 1978.

Ratio	1971	1972	1973	1974	1975	1976	1977
Current	5.2	3.0	4.2	1.6	1.7	2.8	2.7
Acid Test	5.1	2.9	4.1	1.6	1.6	2.6	2.5
Net Worth	$2,018	$2,875	$3,852	$6,574	$6,765	$9,489	$10,599
Return on Equity	0.5%	0.14	0.18%	1.23%	2.56%	2.16%	4.43%

The current and Acid Test Ratios indicate ADB has remained liquid during the years shown above. Undoubtedly, the ADB will play a major financing role in this project.

Financial Feasibility of Seed Houses

a. Projected Returns

Under the project, equipment will be imported and installed, and facilities constructed for up to 25 mini seed houses with a capacity of ½ MT per hour each. AIC will initially operate these seed houses, but they will eventually be transferred to private operators, assuming the operation is profitable and private investors or cooperatives are interested.

In November 1977, the Seed Technology Laboratory of Mississippi State University issued a report on its study of seed production and supply in Nepal. The study was made under AID contract No. TA-77-7A. Part 2 of the report was an economic/financial analysis which included projected earnings and internal rates of return for a model ½ MT/hour seed house and a 4 MT/hour seed house. Capital investment, fixed and variable costs, and revenues were estimated for each. Revenues were estimated at seed selling prices 150% 170% and 190% of grain price. MSU concluded that neither size seed house would be profitable unless seed prices are at least 190% of grain prices, which according to MSU would be about the maximum price farmers would pay for quality seed. Internal rates of return for the two seed houses, selling at 190% of grain price, were 20% for the ½ MT, and 16% for the 4 MT.

We made similar calculations for ½ MT and 1 MT seed houses. The method and assumptions used by MSU were used in our models, with two changes:

1) MSU showed each seed house operating only twelve days a year, whereas actual operating days may be closer to 80 days for the ½ MT seed house, and 100 days for the 1 MT seed house; 2) our estimate of initial capital investment for equipment and facilities construction is higher for both seed houses than amounts used by MSU.

TABLE NO. 7

Agricultural Development Bank
Comparative Income Statements
For FY's 1971 through 1977
(US $000)

	Fiscal Year						
	1971	1972	1973	1974	1975	1976	1977
Revenues							
Interest from Loans	181	223	310	901	1,350	2,135	2,263
Other Revenues	2	10	26	88	84	299	312
Total Revenues	183	233	336	989	1,434	2,434	2,575
Expenses							
Interest	31	29	36	358	579	648	391
Personnel Costs	90	121	169	332	-386	551	848
Office Expenses	34	51	60	123	168	245	382
Others	18	28	37	54	72	662	482
Coop Management Expenses	-0-	-0-	27	41	56	123	-0-
Total Expenses	173	229	329	908	1,261	2,229	2,104
Net Income	10	4	7	81	173	205	471

TABLE NO. 8

Agricultural Development Bank
Comparative Statements of Financial Condition
For Fiscal Year 1971 through 1977
(US $ 000)

	1971	1972	1973	1974	1975	1976	1977
ASSETS							
Current Assets							
Cash and Bank Balance	221	182	532	744	676	1115	1444
Stocks	9	13	38	25	226	491	534
Interest Receivable	125	153	231	555	902	1139	1723
Accounts Receivable	17	13	648	1699	1345	2612	3274
Branch Account	-0-	4	20	-0-	-0-	306	404
Total Current Assets	372	365	1469	3023	3149	5663	7379
Investments							
Government Bonds	162	162	162	1318	1318	1308	1067
Fixed Deposits	8	9	3	1980	3	84	96
Shares	-0-	-0-	-0-	34	325	365	365
Total Investments	170	171	165	3332	1646	1757	1528
Loans and Advances							
Loans	2522	3316	4557	9726	18207	17823	23309
Advances to Employees	25	44	74	180	399	767	1040
Total Loans & Advances	2547	3360	4631	9906	18606	18590	24349
Fixed Assets	70	87	128	242	314	457	836
HMG Guarantee & Others	-0-	-0-	-0-	542	43	-0-	-0-
Total Assets	3159	3983	6393	17045	23758	26467	34092

	1971	1972	1973	1974	1975	1976	1977
CAPITAL and LIABILITIES							
Liabilities							
Current Liabilities							
Accounts Payable	63	123	347	1574	1580	2018	2749
Branch Account	8	-0-	-0-	287	293	-0-	-0-
Total Current Liabilities	71	123	347	1861	1873	2018	2749
Deposits							
Compulsory Savings	-0-	-0-	-0-	4133	4728	7137	5958
Consumer Deposits	428	383	406	506	592	745	4130
Total Deposits	428	383	406	4639	5320	7882	10088
Long-Term Debt							
Loan from HMG	-0-	-0-	705	1764	1741	3016	3473
Refinance from N.R.B.	532	521	1002	1993	7892	4062	7183
Loans Secured by Bonds and Fixed Deposits	110	81	81	214	167	-0-	-0-
Total Long-Term Debt	642	602	1788	3971	9800	7078	10656
Total Liabilities	1141	1108	2541	10471	16993	16978	23493
CAPITAL							
Provisions	28	68	62	1132	1197	1394	1454
Guarantee for H.M.G. & Others				542	43	55	103
Equity and Reserves							
Shares	1836	2658	3601	4678	5301	7774	8650
Reserves	154	149	189	222	225	266	392
TOTAL CAPITAL	2018	2875	3852	6574	6765	9489	10599
TOTAL LIABILITIES AND CAPITAL	3159	3985	6393	17045	23758	26467	34092

Other basic assumptions used are:

(1) Seed houses operate seven hours daily at 75% efficiency;
(2) Grain is purchased at an average of 20% premium over average grain prices;
(3) Life of project for both seed houses is 15 years;
(4) Output of ¼ MT house is ½wheat, ½ maize;
(5) Output of 1 MT house ½ wheat, ½ rice;
(6) All output is sold.

Projected results for operation of the ¼ MT/Hr seed house are shown below.

¼ MT Seed House Operations
(US $ 000)

Year	Total Costs	Revenues @ 150 % of Grain Price	Net Benefits 150%	Revenues @ 170% of grain Price	Net Benefits 170%	Revenues at 190% of grain Price	Net Benefits 190%
1	52.0	29.1	(22.9)	33.0	(19.0)	36.9	(15.1)
2	33.1	29.1	(4.0)	(33.0)	(0.1)	36.9	3.8
3-15	430.3	378.3	(520)	429.0	(1.3)	479.7	49.4
Sub-total	515.4	436.5	(78.9)	495.0	(20.4)	553.5	38.1
Residual Value	-	-	6.9	-	6.9	-	6.9
Total	515.4	436.5	(72.0)	495.0	13.5	553.5	45.0

The table above shows that positive returns can be expected when seed prices are 190% of grain prices. The Internal Rate of Return for the model above is 24.25%.

Projected returns and Internal Rate of Return for operations of a 1 MT/Hr seed house gave similar results.

1 MT Seed House Operations

(US $ 000)

Year	Total Costs	Revenues at 150% of grain Price	Net Benefits 150 %	Revenues at 170% of grain Price	Net Benefits 170%	Revenues at 190% of grain price	Net Benefits 190%
1	370.6	152.2	(158.4)	1725	(138.1)	192.8	(117.8)
2	172.6	152.2	(20.4)	1725	(0.1)	192.8	20.2
3-15	2243.8	1978.6	(265.2)	2242.5	(1.3)	2,506.4	262.6
Sub-total	2727.0	2283.0	(444.0)	2587.5	(139.5)	2,892.0	165.0
Residual Value	-	-	30.8	-	30.8	-	30.8
Total	2727.0	2283.0	(413.2)	2587.5	(108.7)	2,892.0	195.8

The Internal Rate of Return for the 1 MT/Hr seed house is 15.6%.

The above projected returns and Internal Rates of Return were calculated on the basis of seed house equipment being imported from the United States. In order to minimize initial capital investment costs, the equipment could br procured from India at an estimated 40% savings, and several simplifications can be made in construction of facilities which could save 15% of construction costs. We calculated the projected returns and Internal Rates of Return with the decreased capital investment costs. Results are summarized below.

½ MT/Hr Seed House Operations
At Reduced Capital Investment
(US $ 000)

Year	Total Cost	Revenues 150%	Net Benefits 150%	Revenues at 170%	Net Benefits 170%	Revenues at 190%	Net Benefits 190%
1	48.4	29.1	(19.3)	33.0	(15.4)	36.9	(11.5)
2	32.4	29.1	(3.7)	33.0	0.2	36.9	4.1
3-15	426.4	378.3	(48.1)	429.0	2.6	479.7	53.3
Sub-total	507.6	436.5	(71.1)	495.0	(12.6)	553.5	45.9
Res. Value	-	-	5.8	-	5.8	-	5.8
Total	507.6	436.5	(65.3)	495.0	(6.8)	553.5	51.7

I.R.R. = 39.4%

1 MT/Hr Seed House Operations
at Reduced Capital Investment

(US$ 000)

1	266.1	152.2	(113.9)	172.5	(93.6)	192.8	(73.3)
2	169.1	152.2	(16.9)	172.5	3.4	192.8	23.7
3-15	2198.3	1978.6	(219.7)	2242.5	44.2	2506.4	308.1
Sub-total	2633.5	2283.0	(350.5)	2587.5	(46.0)	2892.0	258.5
Res. Value	-	-	24.2	-	24.2	-	24.2
Total	2633.5	2283.0	(326.3)	2537,5	(21.8)	2829.0	282.7

I.R.R. = 36.5%

Although projected returns and Internal Rates of Return increase for both seed houses, positive returns are still not realized unless seed prices are 190% of grain prices.

The preceeding projected returns and IRR's were calculated without taking into account an inflation rate. Grain prices in Nepal have increased by about 5% a year over the past 14 years, and other costs of seed production can be expected to rise by an average of 3% annually. The tables below summarize the projected costs, revenues, net benefits, and IRR's for the ½ MT/Hour and 1 MT/Hour seed houses using an inflation rate of 5% per annum for seed costs and 3% per annum for other production costs. All other assumptions remain unchanged.

	½ MT/Hr Seed House Operations (US $ 000)		
	Equipment Procured in the U.S.		
	150%	170%	190%
Revenues	634.8	719.3	802.9
Total Costs 1/	718.6	718.6	718.6
Net Returns	(83.8)	.7	84.3
I.R.R.	N/A	Under 1%	33%
	Equipment procured in India		
Revenues	633.7	718.2	801.8
Total costs 2/	711.6	711.6	711.6
Net Returns	77.9	6.6	90.2
I.R.R.	N/A	3.6	41.25%

1/ Costs based on procurement of seed house equipment in United States

2/ Costs based on procurement of seed house equipment in India and simplified construction.

1 Mt/Hr. Seed House Operations
(US $ 000)

	Equipment Procured in the U.S.		
	150%	170%	190%
Revenues	3313.8	3751.8	4189.8
Total Costs 1/	3790.9	3790.9	3790.9
Net Returns	(477.1)	(39.1)	23.5%
	Equipment Procured in India		
Revenues	3307.2	3745.2	4183.2
Total Costs 2/	3692.4	3692.4	3692.4
Net Returns	(385.2)	52.8	490.8
I.R.R.	N/A	4.74	39.8%

1/ Costs based on procurement of seed house equipment in United States.

2/ Costs based on procurement of seed house equipment in India and simplified construction.

By including an inflation factor in the calculation there is a slight positive return over the life of the project if seed selling prices are 170% of grain prices, but the Internal Rate of Return is under 5%. Positive returns for seed sales at 150% of grain price are not shown for any of the situations thus far presented.

Another possible situation would be to have the seed houses owned and operated by the grain producing farmers, most likely as cooperatives. In this case the cost of grain would not have to include the 20% premium paid by AIC or other operators to seed producers. This would significantly reduce grain cost and increase profitability of the seed houses. Projected returns for a ½ MT/hour seed house, the size most likely to operate in this manner, are shown below.

	½ MT/Hr. Seed House Farmer/Cooperative Operated (US $000)		
	150%	170%	170%
Revenue:	443.4	501.9	560.4
Total costs	441.9	441.9	441.9
Net Returns	1.5	60.0	118.5
I.R.R. Less than	1%	34%	83.75%

Note: Based on 15 year life of project revenues and costs.

Reducing the cost of grain through farmer operation of the ½ MT/Hr. seed house would make it possible to realize a profit selling at 170% of grain price, and the Internal Rate of Return, 34%, is acceptable.

2. Conclusions

The preceeding projections indicate that only by selling seed at prices around 190% of grain prices will a seed house operator realize a reasonable profit, except in the case of farmer operated seed houses. If GON policy will be to keep seed prices low, it appears some sort of government subsidy will have to be provided the seed house operators, whether private or the AIC. The amount of subsidy required is difficult to establish at this time without a clearer idea of GON price policy. A possible area of subsidization is the cost of transportation, which can be quite high.

IV. The Implementation Plan

Since this project involves a large amount of construction as well as seed production and the movement of agricultural inputs to the rural areas ahead of both the monsoon and the planting season, the design of the project performance network chart is rather complicated.

Briefly, we expect the project to be approved in July 1978; then it would be advertised and RFTPs issued in early August. The technical proposals should be received in October and the contractor selected in November and staff should be in place by January. Selection of participants appropriate university by June of 1979 with the Masters candidates put on line in 1979, 80 and 81. Construction should start as soon as possible with actual sites selected for the first year's construction (Feb 1, 1979). Selection and organization of the seed growers should be started by April 15,1979. In-countrytraining programs on seed production should be started by June or July, 1979 for seed analysts, inspectors, operators and others.

The implementation during the second to fifth year would largely be a duplication of the first full year. The CPI and the network follow.

PPT FORM

Country:	Project No:	Project Title:	Date:	/ Original / Revision #	Approval:
Nepal	367-0118	Seed Production and Input Storage	6/14/78	X / Original / / Revision #	

CPI DESCRIPTION

1978

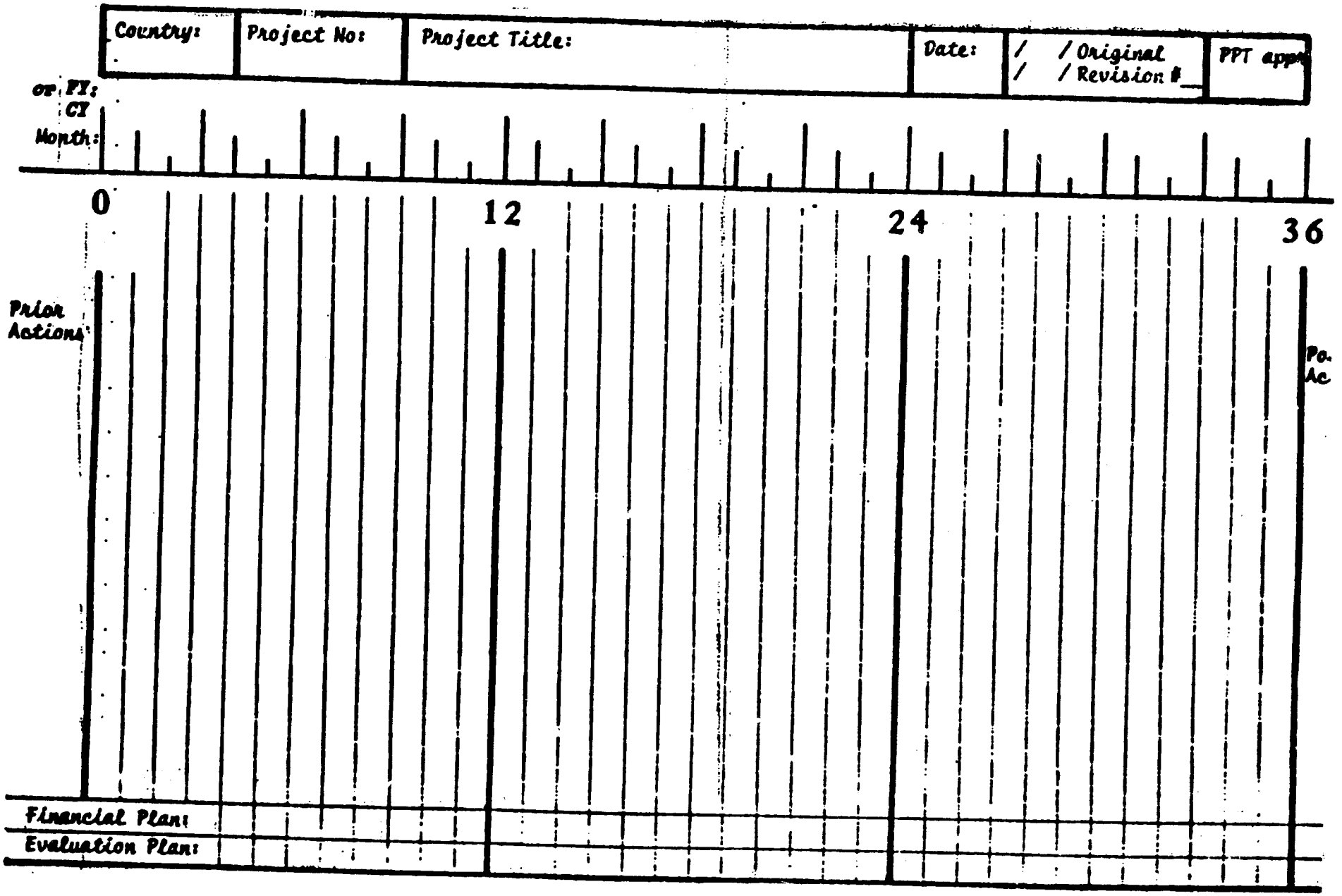
1. 7/15 Project approved; AID/W-USAID
2. 8/1 Project advertised and RFTP issued; USAID
3. 8/15 ProAg and PIO/T prepared; GON, USAID
4. 8/30 ProAg and PIO/T negotiated/signed; GON, USAID
5. 10/15 Technical Proposals received; GON, USAID, AID/W
6. 10/25 Proposals evaluated; GON, USAID, AID/W.
7. 10/30 Potential contractor notified; GON, AID/W, USAID
8. 11/10 Negotiations start between GON and Contractor; RLA, ACO and USAID observe
9. 11/30 Contract signed between GON and Contractor; GON, Contractor, AID.
10. 11/30 Financing Arrangements completed; GON, USAID, AID/W

1979

11. 1/1 Contractor Team arrives; AID, GON and Contractor
12. 1/15 Long term and annual program of work; Contractor, GON, USAID
13. 1/25 Participant program agreed upon; Contractor, GON.
14. 1/25 Annual commodity procurement initiated; Contractor, GON, USAID.
15. 1/30 Annual construction program agreed upon, sites selected; Contractor, GON.
16. ~~2/1 6 PCVs recruited; PC~~
17. 3/1 PCV Training starts; PC, Contractor.
18. 3/1 Local training begins - Inspection and analysis; Contractor, GON
19. 3/1 Construction program started; GON Contractor
20. 4/5 First maize seed growers selected; GON, Contractor
21. 4/30 Seed equipment ordered; GON, Contractor
22. 6/30 Seed production training started; GON Contractor
23. 7/31 Annual participant program prepared; GON, Contractor
24. 7/31 Ph.D. candidate ready to start program; GON, Contractor,
25. 8/30 Social Science Research Plans; Contractor, GON
26. 9/30 Other participants depart; GON, Contractor.
27. 9/30 PCVs arrive; PC, Contractor.
28. 10/5 Annual construction program starts; Contractor, GON, USAID
29. 10/31 Annual program of work submitted; GON, Contractor
30. 12/15 Annual Report submitted; Contractor, GON.

1980

31. 1/15 Annual commodity procurement initiated; Contractor, GON, USAID
32. 2/1 Annual construction program agreed upon; Contractor, GON
33. 3/15 Local training program started; Contractor, GON
34. 4/15 First annual seed school; contractor, GON.



PROJECT PERFORMANCE NETWORK

PPT FORM

Country:	Project No:	Project Title:	Date:	/X / Original / / Revision #	Approved:
Nepal	367-0118	Seed Production and Input Storage Project			

CPI DESCRIPTION

35. 4/30 Annual commodities ordered Contractor, GON.
36. 7/30 Annual participant program prepared; Contractor, GON.
37. 8/30 Social Science Research Review and Plans; Contractor, GON.
38. 9/30 Participants depart; Contractor, GON.
39. 10/15 Annual construction program starts; Contractor, GON.
40. 10/31 Annual program of work submitted; Contractor, GON, USAID.
41. 12/15 Annual Report submitted; Contractor, GON, USAID.

1981

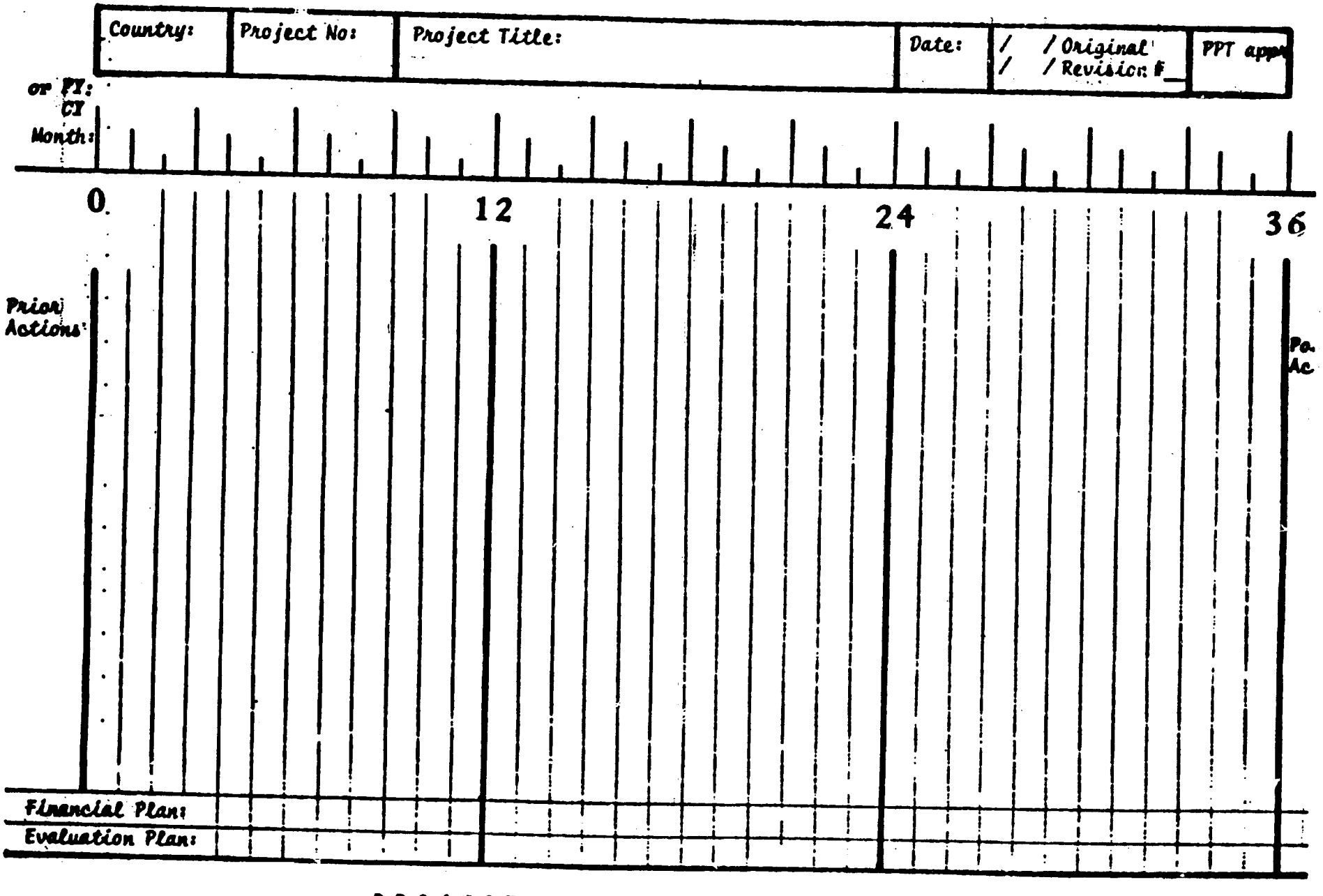
42. 1/15 Commodity procurement initiated; Contractor, GON.
43. 1/30 Annual construction program agreed upon and sites selected; Contractor, GON.
44. 3/1 Local Training program corn/prod; Contractor, GON.
45. 4/15 Second annual seed school; Contractor, GON.
46. 4/30 Annual commodities ordered; Contractor, GON.
47. 7/30 Annual participant program prepared; Contractor, GON.
48. 8/30 Social Science Research Review and Plans; Contractor, GON.
49. 9/30 Participants depart - Last M.Sc. candidate; Contractor, GON.
50. 10/1 Annual construction program starts; Contractor, GON.
51. 10/31 Annual Program of work submitted; Contractor, GON.
52. 12/5 Annual Report submitted; Contractor, GON.

1982

53. 1/15 Annual commodities procurement planned; GON, Contractor.
54. 1/30 Annual construction program agreed upon and sites selected; GON, Contractor, USAID.
55. 3/1 Local training planned for year; GON, Contractor.
56. 4/15 Third annual seed school; GON, Contractor.
57. 4/30 Commodities ordered; GON, Contractor.
58. 7/30 Annual participant program Prep; GON, Contractor.
59. 8/30 Social Science Research Review and Plan; GON, Contractor.
60. 9/30 Participants depart - last long term; GON, Contractor.
61. 9/30 PC finish assignment; PC, GON.
62. 10/1 Annual construction program starts; GON, Contractor.
63. 10/31 Annual program of work submitted; GON, Contractor.
64. 12/15 Annual Report submitted; GON, Contractor.

1983

65. 1/15 Last commodity procurement planned; GON, Contractor.
66. 1/30 Plans completed to finish construction; GON, Contractor, USAID.
67. 4/15 Fourth annual seed school; GON, Contractor.
68. 4/30 Last participants depart for training (short term); GON, Contractor.



PROJECT PERFORMANCE NETWORK

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PPT FORM

Country:	Project No:	Project Title:	Date:		Approved:
Nepal	367-0118	Seed Production and Input Storage Project		X / Original / / Revision #	

CPI DESCRIPTION

69. 8/30 Construction finished; GON, Contractor.
70. " Final Review of Social Science Research; GON, Contractor.
71. " All participants returned; GON, Contractor.
72. " All commodities in country; GON, Contractor.
73. " US financed technicians returned to U.S.A.
74. 10/30 US financial contribution finished; USAID.
75. 11/30 Final Report submitted; Contractor, GON.

US participation finished -
Seed production system in operation.
Storage and distribution system functioning.
Private sector producing all but foundation seed.
All but large seed houses under private management.

Country:	Project No:	Project Title:	Date:	/ / Original / / Revision #_	PPT appr

of FY:
CY
Month:

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Prior Actions

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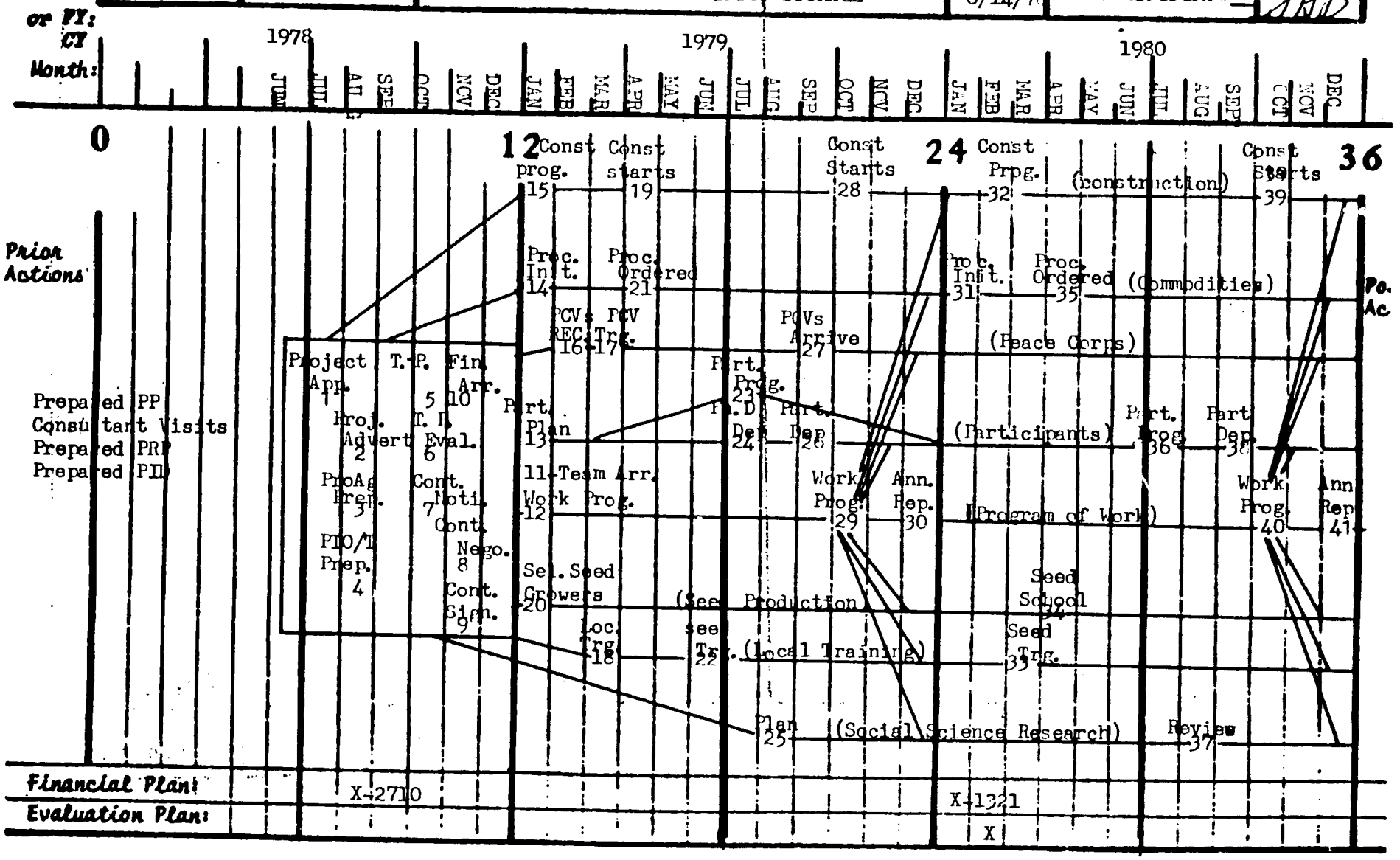
Ac

Financial Plan:

Evaluation Plan:

PROJECT PERFORMANCE NETWORK

Country:	Project No:	Project Title:	Date:	/ X / Original / / Revision #	PPT approved
NEPAL	367-0118	SEED PRODUCTION AND INPUT STORAGE	6/14/78		



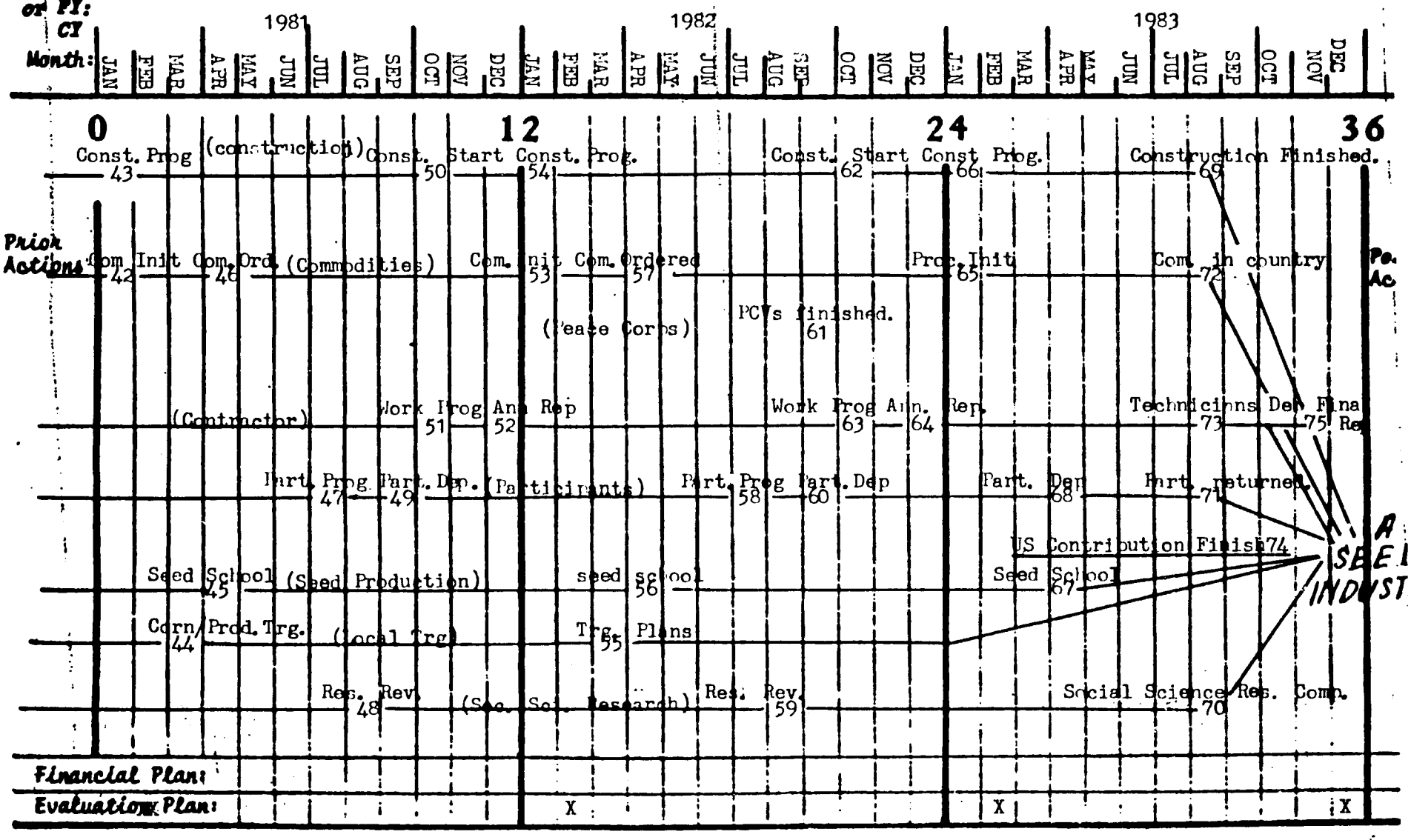
PROJECT PERFORMANCE NETWORK

PPT FORM

Country:	Project No:	Project Title:	Date:	/ / Original / / Revision #	Apprvd:

CPS DESCRIPTION

Country:	Project No:	Project Title:	Date:	/ X / Original / / Revision #	PPT approved
NEPAL	367-0118	Seed Production and Input Storage			



PROJECT PERFORMANCE NETWORK

BEST AVAILABLE COPY

PPT FORM

Country:	Project No:	Project Title:	Date:	/ / Original / / Revision #	Apprvd:

CPI DESCRIPTION

V. Evaluation Arrangements for the Project:

It is expected that at least two and possibly three types of evaluation will be conducted on this project:

A. Routine Evaluations

These evaluations will be held annually, usually in February as mutually agreed by the contractor, the GON and USAID. The annual reviews will include an evaluation of the following:

1. Construction: The construction program outlined in Section I, D, 2, h, (3) and as visualized in Annex H will be reviewed and progress against the entire scope of the project will be measured. Proposed sites will be discussed, quality of construction, appropriateness of moisture proofing and bird and rodent proofing and security will be checked.

2. Commodities: Commodity lists and procurement practices will be reviewed for appropriateness and to insure that U.S. procurement regulations are being observed, that labor intensive equipment is being secured where ever possible and that procurement is being done on a timely and efficient basis. The equipment must be such as can be managed and operated by farmers, is easy to maintain and effective in processing the seeds used in Nepal.

3. Participant Training: The one Ph.D. Candidate and two of the M.Sc. candidates should be sent out of the country for training during 1979. All other M.Sc. candidates and all of the long term non-degree participants should be sent for training during 1979, 1980 or 1981 to insure that the trainees return prior to the completion of the project In fact, it would be desirable for all long term trainees to be back on the job at least one year before the completion of the project in late 1983. The short term trainees can be sent in any year but in 1983, they should return early to be sure to be in-country prior to the first of September of that year.

In addition to timing, suitability of training, capability of training institution, job to be done on the trainee's return, appropriateness of their educational background, availability of in-country training and job performance should also be considered in evaluating the participant program.

4. Advisors and Consultants: The ability of the contractor to supply long term advisors and short term consultants should be evaluated along with the ability of the MFAI to absorb the services offered. The ability of the GON to supply counterparts to the consultants should also be looked at in detail, both in terms of numbers of counterparts and in terms of their ability to absorb the on-the-job opportunities offered to them. Fully half of the short term consultant's time should be used for conducting training programs for Nepali employees of the AIC, D Agr, and other organizations engaged in this project.

5. Social Science Research: Funds are available to conduct research on the social, economic and anthropological aspects of the project. This research should be aimed at finding the constraints to the usage of improved seed and what has to be done to persuade farmers to use the new varieties and the seeds produced under official aid supported programs. Included in this research should be such topics as who makes decisions regarding the varieties and quality of seeds to be used in the village or the farm or by the family? What are the main determinants? How much affect does price have on seed purchases. How does the farmer judge quality? How can farmer - seed producers be organized to manage a seed business? How much of a margin do they have to have in order to produce seed successfully and many others. Will farmers use seed not produced in their own vicinity? Can a transportation system be made to move large quantities of seed effectively in Nepal.

6. Seed Analysis and Standards Enforcement: One of the current hindrances to the production and distribution of good seed is the inability of the seed section of the Botany Division to travel about the country to conduct field and seed house inspections and to deliver analysis of seed samples expeditiously. The section should be able to enforce the proposed labeling law and to help farmer-seed producers with their production problems. Operation of equipment, drying, cleaning, packaging, maintenance of germination, control of seed house pests and other aspects of seed processing and production must be inspected. Three regional laboratories are to be constructed under this project and a central laboratory is to be added to and partially re-equipped.

7. Seed Production: It is expected that two or three seed production groups will be functioning in the terai and many small cooperatives or evenindividuals will be producing seed in the hills. Representative sampes of these producers should be checked along with their produce to assertain the quality of their merchandise, the attitude their customers have toward them and their product and their ability to operate a seed business.

The amount of seed available to the farmers of Nepal, its price, its quality the varieties offered for sale as well as demand in the various regions should all be considered when evaluating the efficiency of the seed producers in responding to the demands of the farmers in the area. Finally, it may be necessary to evaluate the government's ability to subsidize the seed industry in order to keep prices low enough that farmers will buy the seed offered for sale.

8. In-country Training: The GON has discovered that training within Nepal is much cheaper than sending technicians outside the country for training at a foreign institution. Therefore, about half of the short term consultant's time is to be devoted to training activities. Balance between analysis, enforcement, extension, production and other aspects of seed production should be checked for adequacy, reasonableness and value to the industry and to the farmers of Nepal.

9. Warehouse Operation: Regardless of the quality of the structures in which seed is stored, the management of the system can negate any possible benefit stemming from the superior buildings. Failure to stack properly, to ventilate the building when required, to maintain adequate records, toprotect from moisture, insects, moulds, birds and rodents, and other derelictions of duty can cause seed and fertilizer to deteriorate very rapidly. Evidences of poor management include the following easily read signs: (a) off odours, (b) dampness, (c) mixtures, (d) material on floor, (e) broken windows and ventilators (f) broken containers, (g) damaged equipment (h) unlabeled material, (i) broken equipment (j) signs of rodents, insects and birds etc. Training programs should be conducted for the operators of these units and the FIFO policy should be observed

10. Maintenance: One of the surest indications of the quality of operation of a unit, regardless of whether it is a vehicle, a building or a system, is the maintenance it receives. The equipment, the buildings, the fertilizer, other supplies and even seed must all be taken care of - or maintained. Without maintenance, losses are bound to occur and costs to rise. Inadequate lubrication, moisture, or loose connections can all cause losses and depreciation in values. Torn bags, loose bolts and belts,lost labels and many other signs will indicate poor maintenance and poor control of the whole input supply system.

In addition to the routine evaluations enumerated above, some special attention will be paid to various aspects of the seed business that would not respond to annual review. Among these are the following special concerns:

1. What special actions are necessary to encourage farmers to take over the seed industry? How much of a subsidy for private industry is required?

2. How fast can the industry be shifted to the private sector?

3. What activities should be carried on to lead to a certified seed system in about ten years.

4. How do farmers view "improved seed" after four years of the project? Do they have confidence in their seed supply?

5. Is seed actually moving from the large seed houses to other parts of the terai and lower hills?

At the conclusion of the project, all aspects of the project's activities will be evaluated and a report prepared on why it did or did not accomplish its objectives.

It is not anticipated that outside help would be required to conduct the evaluation except for representatives of the contractor and the mission's AID/W backstop officers.

AID 1020-28 (7-71)
SUPPLEMENT I

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

(INSTRUCTION: THIS IS AN OPTIONAL FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. IT NEED NOT BE RETAINED OR SUBMITTED.)

Project Title & Number: Seed Production & Input Storage, 367-0118

Life of Project:
From FY 78 to FY 83
Total U.S. Funding $1,031,000
Date Prepared: 6/78

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: Sector Goal To achieve the national objectives of (1) increasing food grain production, (2) improving income distribution and (3) raising the nutritional status of the Nepalese people. Project Goal To increase the productivity of Nepal's cropping systems, particularly those used on small hill farms.	Measures of Goal Achievement: 1. Improved varieties used on 20% of the maize hectarage, 50% of the rice hectarage and 80% of the wheat hectarage. 2. Improved seed used on 10-15% of the land planted to cereals. 3. Good seed of appropriate varieties available in every district of Nepal 4. Rising food consumption levels in hill areas. 5. Extension service personnel trained to assist in seed production and use. 6. Seed production and distribution partially in hands of private sector. 7. Small seed houses located in mountainous areas. 8. Warehouses established on paths of distribution. 9. Dept. of Agriculture delivering foundation seed to Hill areas.	1. MFAI records and visual observation. 2. MFAI and AIC records 3. AIC and MFAI records. 4. Improved nutrition and decrease in nutrition related diseases. 5. Training records of MFAI. 6. Records of Department of Agriculture and AIC and performance of producers and cooperatives. 7. MFAI & AIC Records. 8. MFAI & AIC Records. 9. MFAI & Crop coordinator Records.	Assumptions for achieving goal targets: 1. That HMG will budget for enlarged seed program. 2. That improved varieties are developed by MFAI. 3. That AIC establishes distribution outlets in all districts. 4. That seed producers are encouraged to produce seed as individuals and as associations, especially in hills. 5. That HMG is willing to place responsibility for seed production in hands of private farmers and to support such an effort. 6. That an effective demand for seed will continue to develop. 7. That MFAI & AIC personnel will supervise seed production.

AID 1020-25 (7-71)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 78 to FY 83
Total U.S. Funding $4,031,000
Date Prepared: 6/78

Project Title & Number: Seed Production & Input Storage. 367-0118

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Purpose: To assist the MFAI in establishing a labor intensive system ultimately based on private growers for producing, testing, processing, storing and distributing seed of the major food crops cheaply and effectively for the small farmers.	**Conditions that will indicate purpose has been achieved: End of project status.**		**Assumptions for achieving purpose:**
	1. A seed production system has been established.	1. On ground.	1. All of the above.
	2. Seed standards established and enforced for all commercially sold seed.	2. In place.	2. That panchayats and cooperatives are willing to conduct/supervise seed production in isolated areas.
	3. Contracts for seed production by farmers being drawn up and enforced.	3. Samples available.	3. That MFAI and AIC can develop an arrangement for jointly determining seed needs and promoting seed sales.
	4. Farmers producing seed for sale to neighbors, the government or to cooperatives and panchayats.	4. MFAI Records.	4. That farmers are willing to cooperate in seed production effort.
	5. Seed houses in operation processing farmer produced seed.	5. On ground inspection	5. That necessary seed and labeling laws and/or regulations are passed.
	6. All seed safely stored with carry over seed in dehumidified atmosphere.	6. Visual Observation.	6. That price policies will be established to promote production and use of improved seed.
	7. Increased crop yields.	7. MFAI Records.	
	8. Seed testing system operable.	8. On ground inspection	
	9. Hand powered equipment used in most locations.	9. MFAI Records.	

AID 1020-25 (7-71)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 78 to FY 83
Total U.S. Funding $4,031,000
Date Prepared: 1/78

Project Title & Number: Seed Production & Input Storage, 367-0118

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Outputs: 1. Trained farmer groups capable of producing seed. 2. Seed processing plants set up in Terai and Hills 3. Seed cleaning and treating machines moved to remote hills 4. Model seed contracts developed 5. Trained production and processing staff. 6. Storage buildings - some humidity controlled 7. Distribution system and staff 8. Seed laboratories established to assist seed producers and warehouse operators manage their operations and to control quality 9. Seed packaging system developed 10. Seed Research conducted to improve keeping quality 11. Workable and fair system developed for paying seed premiums 12. Seed preservation unit for genetic stock preservation	**Magnitude of Outputs:** A. Seed production and distribution system established including: 1. 1 large seed house (4 ton/hr) (UNDP) 2. 5 medium sized seed houses (2 to 3 tons per hour). (GA) 3. Upto 40 seed cleaners in mini sized installations (.25 ton per hour) mostly hand operated. B. Storage - Capacity: Seed / Fertilizer 1. 4 medium warehouses 1,000 / 3,400 2. 25 small warehouses 1,250 / 2,500 Total 2,250 / 5,900 C. Infrastructure and staff in place D. Seed production increasing 15% per year during life of project E. One central and four Regional seed testing laboratories in operation F. Contract format developed G. Improved packaging and storage system developed H. Seed supplied through local Sajhas or other outlets I. Cold storage vault in operation	A. Visual Observation B. MFAI Records C. MFAI Records D. MFAI Records E. MFAI Records F. MFAI & AIC Records G. Visual observation H. MFAI RECORDS I. MFAI records	**Assumptions for achieving outputs:** 1. All of above. 2. That suitable publicity is given to use of seed and other inputs. 3. That adequate foundation seed is released to seed producers concurrent with releases of variety for production. 4. That existing seed houses and equipment are incorporated in project. 5. That staff is made available and trained. 6. That seed testing capability is developed.

AID 1020-20 (7-71)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 78 to FY 83
Total U.S. Funding $4,031,000
Date Prepared: 6/78

Project Title & Number: Seed Production & Input Storage, 367-0118

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs: 1. U.S.G. A. Advisory Assistance - Long Term 1 - Seed production specialist 1 - Seed processing specialist Short term Seed Production Seed processing Seed storage Seed protection B. Participant Training Advanced degree Non-academic long term Non-academic short term C. Commodities Seed processing equipment Air conditioning or dehumidification equipment structural components of seed houses and storage buildings which are not available in country D. Construction Seed houses Storage buildings Laboratories E. Peace Corps 6 Volunteers	**Implementation Target (Type and Quantity)** A. Advisors - long term Seed Production 60 PM (Dec. 78-Nov.83) Seed Processing Storage and Logistics 24 PM (Mar 79 - Feb 81) Short term - 20 pm B. Participant training starts: FY 79 80 81 82 83+ Ph.D. 1 - - - - M.Sc. 2 4 2 - - Long term N/A 2 3 3 - - Short term N/A 4 4 4 4 4 C. Commodities: 40 seed cleaners & treaters 3 air conditioner - dehumidifier sets for seed houses and genetic seed storage 2 driers for seed houses 2 dehumidified & air conditioned rooms for warehouses Equipment for Storage Bldgs Laboratory equipment for seed analysis D. Construction 4 large storage complexes 25 small storage building 25 mini (two room) seed houses 3 Seed laboratories - Regional 1 Seed laboratory Central E. P.C. Volunteers - 6 for 2 yrs.	MFAI Records USAID and contractor records	**Assumptions for providing inputs:** 1. All of the above 2. That individual consultants are accepted by HMG 3. That a suitable contractor is willing to accept the project as a technical assistance activity. 4 That HMG makes inputs available on time 5. That HMG supplies land and counterparts 6. That PC can recruit suitable volunteers

AID 1020-20 (7-71)
SUPPLEMENT 1

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY _____ to FY _____
Total U.S. Funding $4,031,000
Date Prepared: 8 6/78

Project Title & Number: Seed Production & Input Storage, 367-0118

NARRATIVE SUMMARY		OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Inputs:		Implementation Target (Type and Quantity)		Assumptions for providing inputs:
HMG				
	($'000 equivalent			
Incremental Staff				
Counterpart personnel	64			
Equipment/materials supervision/maintenance	38			
Construction supervision/ maintenance	316			
Construction materials and contingency	451			
Equipment and materials	267			
Contractor support	100			
Participant trainees' costs	65			
Land	67			
Training in-country & research	30			
Total estimated	1,398			

STATUTORY CHECKLIST

1. Country Checklist

A country Checklist for FY 1978 was presented in the project paper for project number 367-0123 entitled Radio Education Teacher Training. No changes or modifications of information provided therein are required for this project.

II. Project Checklist

A. GENERAL CRITERIA FOR PROJECT

1. App. Unnumberd: FAA Sec. 653(b) (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or interna tional organization allocation reported to congress (or not more than $1 million over that figure plus 10%)?	(a) Project was included in FY 1978 ABS and FY 1979 Congressional Presentation. (b) Yes.
2. FAA Sec. 611 (a) (1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance a and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	(a) Technical and economic analyses were conducted by Mississippi State University IADS and other contractors. (b) Yes.
3. FAA Sec. 611 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	(a) A labeling law is under consideration by the GON cabinet. Labeling regulations have been introduced and are beginning to be enforced.
4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per memorandum of the president dated Sept. 5, 1973 (replace Memorandum of May 15, 1962; See Feb. Register, Vol 38, No. 174 Part III, Sept. 10, 1973)?	Not applicable.

5. FAA Sec. 611 (e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Project includes a construction component estimated at over 1.4 million dollars.

The Mission Director has certified host country ability to effectively maintain and utilize the project.

6. FAA Sec. 209,619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?

No.

7. FAA Sec. 601(a); (and Sec.201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

(a) Import of project equipment and possible vegetable seed exports in the longer-term will make a modest contribution to international trade.

(b) Competitive private sector seed production and storage input operations should result from the project.

(c) Use of cooperatives will be increased and strengthened in areas where project operations are set up. Savings will be increased through Cooperative and Agricultural Development Bank Programs.

(d) Wide dispersion of numerous privately or cooperatively owned seed plants geared predominantly to local needs will effectively tend to counter any monopolistic practices.

(e) Production, processing, and distribution of higher quality and better adapted seed and other inputs in areas where they were not previously available and upgraded operations in other areas should result in improved agricultural efficiency, higher rural incomes and a modestly improved commercial atmosphere.

(f) No discernible effect.

8. FAA Sec. 601 (b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

No discernible impact at present on US private trade and investment, but US contractor will be employed to manage the project and some commodities will be imported from the U.S. Eventually, a U.S. seed firm may be able to develop a working relationship with a local firm to export vegetable seed to other places in Asia.

9. FAA Sec. 612(b): Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

US/GON agreements contain provisions which assure use of GON currencies and US-owned foreign currencies for project support costs to the maximum extent practicable.

10. FAA Sec. 612 (d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a

Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level increasing labor-intensive production, spreading

(a) Availability of improved seed and other agricultural inputs at low prices and establishment of an improved seed production and storage input capability in the rural areas should permit

the rural poor to increase agriculture output and allow a modest entry to a more monetized economy through seed sales, increased labor utilization related to production processing and storage of the improved seeds and other inputs as well as increased production resulting from the use of these inputs.

(b) Cooperatives will be one of the primary vehicles used to transmit and institutionalize the improved technology provided by this project and to distribute seed and fertilizer to people in their communities.

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) 103 for agriculture, rural development or nutrition; if so, extent towhich activity is specifically designed to increase productivity and income of rural poor; 103A if for agricultural research, is full account taken of needs of small farmers;

(1) 103 for Agriculture, rural development and nutrition. Availability and use of improved seed should result directly in increased agricultural productivity and higher nutritional standards for the rural poor and should enhance income opportunities through saleable food surpluses, production of seed for sale, or employment in construction, maintenance and operation of the seed plants and storage units themselves.

c. FAA Sec.110(a); Sec. 208 (e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively

Although Nepal is classified as an RLDC, the value of the combined host country contribution to the project(9% in foreign exchange and 19% in local currency) will exceed 25%.

least-developed"country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

Yes. Justification has been provided in the PID (FY 78 ABS) and in the PRP (12/17/76) and Nepal is relatively least developed.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker power in the country; (4) programs designed to meet the country's health need (5) other important areas of economic,political, and social development, including industry; free labor unions, cooperatives, and voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

The project is aimed directly at stabilizing the country's long term agricultural production and providing the base, not just for consistent gross production increases, but more particularly increases in remote and isolated traditionally food deficit hill areas. A small but widely dispersed and critically important seed and storage input into the commercial sector should provide multiple economic and social benefits to a significant percentage of the rural population during the life of the project as well as later to a continually growing percentage of the rural people.

f. FAA Sec. 281 (b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training insskills required for effective participation in government and political processes essential to self-government.

Efforts to build and sustain a seed supply and storage input sector, eventually to be privately owned, meets vital agricultural and economic 'felt needs' of the vast majority of Nepal's rural population.

g. FAA Sec. 201 (b) (2) - (4) and - (8); Sec. 201 (e): Sec. 211 (a) (1)-(3) and - (8). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or

o of educational or other institutions

The project is designed to improve agricultural sector resource use and to contribute substantially to long term agricultural needs. It is a logical follow-on to durrent efforts to develop and test improved food grain varieties and promote better farming systems

directed toward social progress? is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?	as developed in the US-sponsored Integrated Cereals Project (367-0114). The project paper presents the findings of economic and technical soundness studies conducted for this project.
h. FAA Sec. 201(b) (6); Sec. 211 (a) (5), (6). Information and conclusion on possible effects of the assistance on US economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.	No discernible effects.

III. Standard Item Checklist

All items on this list and other relevant questions have been considered. No specific items need special discussion for purposes of this project.

Annex C

Nepal - Seed Production and Input Storage Project
Certification Pursuant to Section 611 (e) of the
Foreign Assistance Act of 1961, as amended

I, Samuel H. Butterfield, principal officer of the Agency for International Development in Nepal, having taken into account, among other things, the capacity of the Government of Nepal and its agencies to properly utilize the commodities being imported under this Grant, its ability to use the technical assistance and training as well as to construct, use and maintain the buildings to be funded, do hereby certify that in my judgement, Nepal has both the financial and human resource capability to utilize effectively the inputs for this Seed Production and Input Storage Project.

This judgement is based partly on the fact that the Government of Nepal is using effectively the resources made available to it for technical assistance, training, commodities and construction under an ongoing agricultural project; is maintaining the research and storage buildings and equipment supplied under previous projects and is using the people trained in the positions for which trained or in superior positions.

It is also based in part upon the analyses as detailed in the project paper.

Samuel H. Butterfield
Samuel H. Butterfield
USAID/Nepal

May 18, 1978
Date

Annex E

LEGAL REQUIREMENTS AND WAIVERS

I A Section 611 (e) certification is included in this paper as Annex C.

II Four waivers are requested as follows:

1. Life-of-Project Waiver

A life-of-project waiver is requested to extend the project from three years to five years to permit adequate time for full and proper utilization of capital inputs to construct and equip the 31 seed houses, 36 warehouse complexes and 3 laboratories programmed. The job of constructing and equipping will be difficult and time consuming, the more so since most of the units will be located in hill areas not easily accessible and where skilled labor may have to be brought in. Estimated total cost of the construction component of the project is $3,698,000. Estimated total for commodities and equipment is $2,108,000.

2. Vehicle Source and Origin Waiver

The project calls for ten jeeps and twelve trail bikes to support field operations of the Agricultural Inputs Corporation and the Botany Section of the Department of Agriculture. Plans are to purchase ten diesel jeeps from India and twelve Honda trail bikes from Japan. The predominant areas of use for these vehicles are remote sections of Nepal where neither the expertise nor the spare parts and tools needed to maintain and repair American vehicles are available. Additionally, Mission believes that lightweight trail bikes needed for the rough, steep trails of Nepal are not available from US sources, a requirement set forth in Handbook 15, Chapter 2, Section 7a(2). Section 2A7a(4) on price differential considerations may also apply since purchase of all jeeps and bikes from Indian and Japan will result in an estimated saving of $66,000 (38.8 percent) from the $170,000 estimated needed for US purchase. Further considerations are long lead time for delivery of US vehicles, superior fueld conservation of diesel engines, non-availability of gasoline in more remote areas of Nepal, economy of diesel operations (operating costs of diesel in Nepal are about one-fourth per mile those of gasoline engines), and, for the Honda trail bikes, a low speed transfer case which permits safe use at low speeds while maintaining high pulling power, an important feature for load management in Nepal's mountainous terrain.

3. Source and Origin Waiver for Equipment and Commodities

Because of its land-locked status, transit limitations imposed by Indian market conditions and bilateral agreements with India, and the long and uneven lags in deliveries from the US, it is believed necessary to purchase nearly all construction materials locally or from India and most equipment for the seed houses, warehouses and laboratories from India. Some equipment will be purchased from the US, but a waiver is requested to permit large equipment and commodity purchases from India and other 941 countries, as necessary. Estimated total value of equipment and commodity purchases is $1,938,000 (excluding vehicles).

4. Origin of Technical Assistance Waiver

The contractor for this project will be American. This waiver is requested to allow the contractor to hire, when necessary, non-American contract team members and/or consultants from 941 countries as well as to sub-contract with bona-fide international organizations. The contract with the contractor will include provisions for prior approval by AID of such hires and sub-contracts.

Annex F

PID Approval Message

Relevant parts of the message follow:

"1901437 AUG 76
FM SECSTATE WASHDC
TO AMEMBASSY KATHMANDU 0247
BT
UNCLAS STATE 20612
AIDAC
E.O. 11652: N/A
TAGS:

SUBJECT: FY 78 PROJECT PIDS

SUMMARY: ASIA Project Advisory Committee approved PIDS for suspension bridges, Seed Production and Input Storage, and consulting services on July 16, 1976. Mission should prepare PRPS responsive to committee concerns note below. Potential for participation by women is common interest for all projects and should also re addressed in PRPS per final para below."

- - - - - - - - - - - - - - -

"2. Seed Production and Input Storage:

(A) APAC expressed Major concerns regarding the timing of the project both for preparation of PRP this fall and actual project implementation in FY 78. The committee noted that project design will depend on (1) experience gained through the integrated cereals project and in the use of equipment only recently ordered: (2) the results of a pilot project which will only be completed in FY 78, and (3) the results of additional further studies yet to be undertaken. The committee also wondered whether sufficient information was either in hand or could be developed on which to prepare a meaningful PRP. Despite these reservations the committee agreed the Mission could develop PRP, but this PRP should demonstrate how the project can be ready for implementation as scheduled. Alternatively Mission wish to defer this project until FY 79.

(B) The PRP should describe the beneficiaries of the project in some detail. The committee noted that hill farmers are identified as particular beneficiaries of the project. This highly desireable in view their mandate relationship and should be described in PRP. If however, the hill tribes will not in fact be beneficiaries the clause relating to them should be dropped from the purpose.

(C) The PRP should contain realistic cost estimates. It was noted that depending on the type of storage envisioned, this alone could require a high percentage of the funds projected for the project.

(D) The PID was not clear on reason for or nature of the additional studies noted as necessary in part II of the PID or on the problems to be addressed by IADS as noted in Part III. If this technical assistance is necessary to prepare the PRP and is to be funded with project development and support funds the Mission should provide AID/W ASAP PIO/Ts for the assistance required. PID indicates all technical inputs to PRP will be provided through HMG contract with IADS. Please confirm. The PRP should identify additional assistance necessary to prepare the PP.

....AID/W believes Mission better able to prepare those parts of the PRP dealing with cultural and social impact, financial and economic analysis etc, than AID/W through TDY help. Assistance necessary in the area of environmental impact will be provided by AID/W if necessary on the basis of the PRP which should outline environmental considerations (which will be subject of Septel) and provide a recommendation for assistance in this area."

- - - - - - - - - - - - -- -- - - - - - -

"4. Women in development: As Mission is aware, PrP and PP for each activity should, in discussing beneficiary groups, note the present state of knowledge, and predicted level and degree to which rural poor women will be affected by and/or have direct participation in project activity. At project design stage, would wish have criteria for evaluating these projects as they impact on women. AID/W is prepared to participate through TDY assistance in investigating potential role of women in these projects, and in the design of the projects to the extent relevant, if Mission requests such assistance."

COMMENT:
Most of the comments raised in this message were answered in the PRP which was submitted to AID/W in December, 1976 and considered by APAC in January 1977. At that time additional questions were raised for the APAC meeting. We believe that all of the questions raised in the PID approval message and those considered by APAC are further considered and a response given to them in this P.P.

SOCIAL SCIENCE RESEARCH COMPONENT

Purpose:

As discussed in the PP, the purpose of this component is to increase the effectiveness of the Seed Production and Input Storage (SPIS) project in raising the productivity of small Nepalese farmers through investigative and adaptive social science research. This research would be aimed at increasing the project's social feasibility and spread of benefits to the rural poor. The research will examine socio-economic dimensions of present systems of seed production, processing, storing and distribution (traditional and modern, private and public) as well as monitor the implementation of project inputs in order to identify problems more clearly and to recommend solutions so that the rural poor can receive and sustain the benefits of the project more successfully.

Rationale:

A number of the potential constraints to project success identified in this paper relate to issues of socio-economic feasibility. These include, but are not limited to, the problems of farmer acceptance of higher yielding seed varieties, the interface between government institutions and farmers, the organization of local cooperative and private seed enterprises, the mechanisms for increasing the distribution of seed to poorer and more remote farmers, the coordination of necessary inputs, and the contractual arrangements involved. If these constraints are going to be effectively overcome, their dimensions must be thoroughly investigated through problem-solving research aimed at developing more socially and economically acceptable strategies.

Main Tasks:

Since this research will be closely coordinated with other on-going research (such as the farming systems study being conducted by ICP and the status of women study being conducted by CEDA/AID) and will utilize the results available from this and other research (such as the sociological study of agricultural innovation conducted by Ms. J. Ashby of Cornell University), its exact design cannot be specified at this point. However, it is anticipated that the main research tasks will be as follows:

A. Conduct research on present organization and approaches used by public sector/government sponsored institutions in the production and distribution of seed with particular regard to their effectiveness, degree of local participation and social soundness.

B. Conduct research on private institutions presently involved in seed production and distribution with regard to their general effectiveness, organizational and financial structure and social soundness.

C. Carryout case studies on 1) existing systems of seed production, storage and distribution used by Nepali farmers and 2) representative traditional co-operative group institutions and village level private enterprises which could serve as vehicles or models for seed production and distribution. The latter (2) might include: water distribution systems, labor exchange systems, local village grain mills, privately owned and rented threshers, irrigation pumps, bullocks, cane presses, etc.

D. Monitor small scale mini seed production and distribution systems implemented by the project in order to identify and investigate problem areas encountered.

E. On the basis of the research findings of A through D above, develop possible modifications and new approaches to implementing more successful and self-sustaining systems of seed production and distribution among the Nepalese farmers.

Specific Tasks (Detailed Description of Above)

A. Conduct research on the system of seed production and distribution presently used by public-sector institutions to determine how responsibilities for various aspects of the process are distributed and coordinated among the involved institutions and to make preliminary suggestions as to how the system could be made more efficient and responsive to the farmers. Specifically this research would involve:

1. Investigation of the interface between AIC and the farmers. Through examination of the many component parts of the present seed production and distribution system (i.e. demand estimation and setting of production targets, recruitment of farmer-growers, contracts used, profit margin allowed, farmer supervision, seed testing, liftment and transportation, packaging, storage, payment of premium and final distribution of improved high yielding varieties seed through sajhas, AIC outlets such as Bij Bhandar,) an attempt will be made to evaluate the effectiveness of the system, locate its social and managerial constraints and to record recommendations from both AIC officials oand farmers for improving it. Recommendations of previous researchers such as the M.S.U. Seed Program Consultants in 1974, Dr. D. P. Singh (IBRD Report) in 1975, IADS Seed Team Consultlants in 1976, for possible improvements of AIC will also be reviewed. Research should be carried out not only in Kathmandu valley but in Hetaura and if possible with some of the seed growers near Birgunj who participated in the successful seed production scheme supervised by Dr. Baumen of UNDP.

2. Examination of the role of government cooperatives (Sajha) and the Agricultural Development Bank in the present seed production system with particular attention to the interface between these institutions and the farmers.

3. Examination of the Agriculture Department's Extension Division at the district and local level to determine some of the social and managerial constraints which limit the effectiveness of JTs and JTAs as agricultural extension agents - particularly with regard to their role in the present seed multiplication program. Attention will be given to (a) the problem of coordination between JTAs, AIC personnel, and Sajha managers in the seed production and distribution process, as well as, (b) the problem of how these government servants might be made more responsive and accountable to the farmers.

4. Examine the seed production system operating the Gandaki project as an alternate model for the organization of a public sector seed industry.

B. Conduct research by means of case studies on two/three private seed production and distribution systems with regard to their effectiveness, constraints and social soundness. Case studies could be conducted on:

1. Ratna Feed Private Limited, Kathmandu,
2. Annapurna Seed Company in Asantole,
3. Kisan Bij Bhandar in Bhotahity,
4. G. M. Enterprises (Post Box 155, 25 Tripureswar, Kathmandu -2),
5. Mr. Dal Bahadur Khadka who runs an unnamed vegetable and flower seed business located in Baneswar (on the left at the beginning of the hill after crossing the Dhobi Khola bridge on the road to Pasupati),
6. A Jyapu farmer who runs a small seed vending business on the street between Ratna Park and Asantole,
7. Rupki Kishore Lacoul who runs a fairly large wheat seed business in Hati Amwa in the Terai near Bhairawa,
8. Other farmers or groups of farmers encountered during course of research who engage in production of food grain seed as a private enterprise.

C. Carry out case studies on 1) existing systems of seed production, storage and distribution used by Nepali farmers and 2) representative traditional co-operative group institutions and village level private enterprises which could serve as vehicles or models for seed production and distribution. Specific tasks would include:

1. Examination of literature on traditional co-operative group enterprises (like, Thakali Dhikur, Gurung rodi ghat, parma labor exchange, etc.) in Nepal.

2. Near the site of the scheduled seed processing plant in the Far West and in selected sites scheduled for location of mini seed processing and storage units, conduct case studies on: a) existing systems of seed production, storage and distributions b) traditional co-operative group institutions; c) local agriculturally related private enterprise such as village grain mills, privately owned and rented threshers, pumps, bullocks, cane presses, etc.

D. Carry out case studies ranging over at least one full agricultural year in 3 to 4 communities where the project has established its initial small scale mini-seed production systems. These sites would also become the locus of studies mentioned in A and C above. In other words whenever AIC, Sajha, ADB or Ag. Extension Services are involved in the implementation scheme, their functions and constraints could be studied within the frame work of the on going seed production system. Likewise existing systems of seed production, storage & distribution as well as traditional co-operative group institutions mentioned in C could also be studied first hand if they are found at chosen sites of long term monitoring study. Major objectives of the monitoring study would be:

1. To ascertain the relationship between the local community and those who are implementing the seed production scheme. If possible certain sites could use locally chosen and locally accountable managers to provide a comparison with sites where "outside" officials have been brought in to do the job.

2. Find out <u>who</u> is using and who is producing the new seeds (i.e. what socio-economic stratic they come from) and if certain groups are not participating what are the obstacles to their involvement in the system. (i.e. no perceived need; fear of risk involved; not enough profit; lack of access etc.). This aspect of the case studies will involve the fundamental questions about response to agricultural innovation and the factors which influence decision making at the individual, family and community level. It is anticipated that women, as those who traditionally manage seed production and storage in most communities, will need to be involved if these small scale mini seed production schemes are to be effective and locally accepted.

<u>Methodology</u>

In order to collect the kind of information specified above, a number of research techniques will need to be employed. While some of the research can be conducted in Kathmandu, most of the information will have to be gathered from outlying offices and the bulk of the research will be conducted in three or four selected field sites where mini-seed processing units are being installed. It is crucial that the research be closely coordinated with the ICP project and incorporate the expertise of the Seed Management Specialist. The primary research methods to be employed are:

Outside of Field Sites

1. Interviews with concerned government officials and extension agents, private seed enterprise personnel and farmers outside of the study areas who are participating in the private seed industry.

2. Review of relevant literature, government documents, and recent agricultural statistics regarding seed collection, storage, and distribution as well as the sale of other agricultral inputs.

3. Field visits to AIC offices, Sajhas Co-operatives, ADB offices, etc.

At field sites

1. Macro-level census and household economic survey of villages around field sites. In this survey special attention should be paid to seed production, procurement, and storage systems so that they can be correlated with other factors such as land-holdings, ethnic affiliation, distance from inputs supply office, seed prices, etc.

2. In-depth study of various types of households selected on the basis of the general survey. This study would continue over a whole agricultural year and would be the primary basis for obtaining information on farmer attitudes and practices regarding seeds, patterns of interaction with extension agents, constraints to change, beneficiaries, traditional forms of cooperation, etc.

3. In-depth study of public and private institutional mechanisms for seed production, collection, storage and distribution, in order to identify and investigate problem areas and recommend solutions.

In both (2) and (3) above, participant observation, survey research and structured interviews would be among the methods employed.

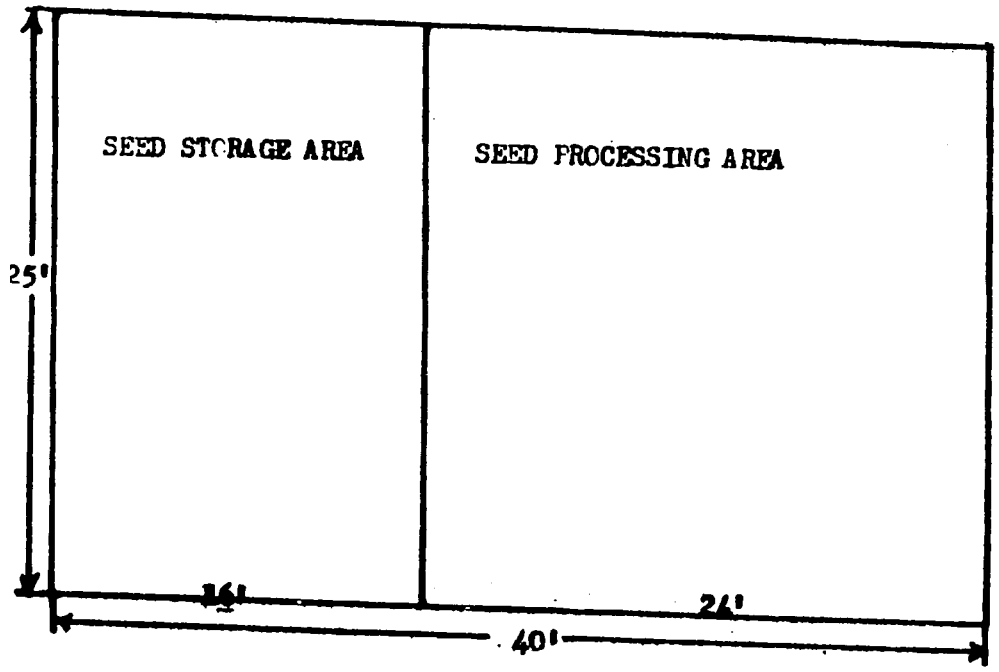
Annex H

Plans for Seed Houses Warehouses and Laboratories

Attached are plans for each type of unit to be constructed under this project. Of course, natural physical features of the terrain and the needs of the local community will determine the exact arrangement for each type of structure.

It should be remembered that these structures will be financed using the fixed amount reimbursement method (FAR) which demands that detailed site specific plans be prepared for each structure. These are then approved by USAID before construction can begin or an advance be authorized.

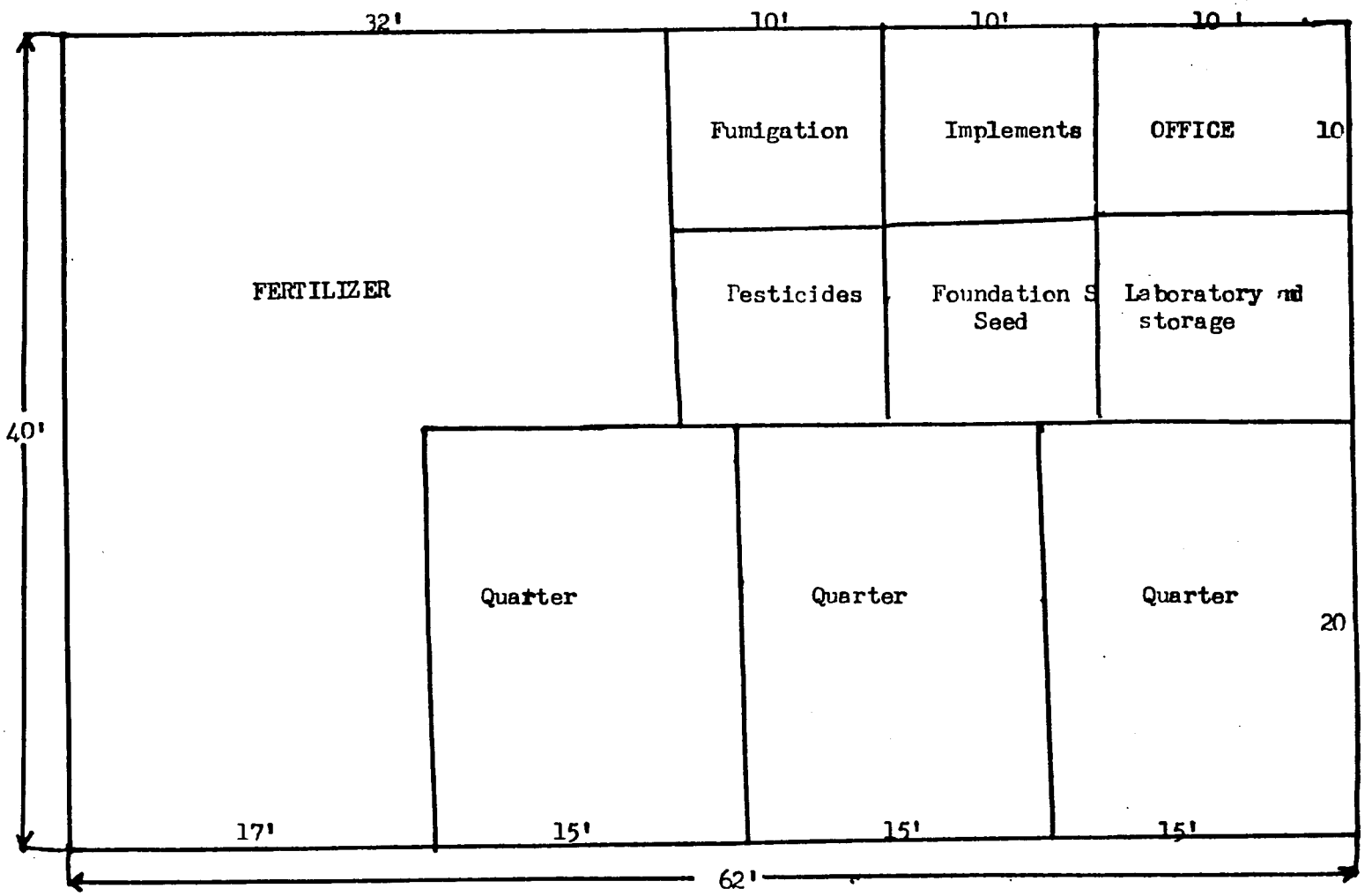
Mini/Village seed Houses
(At least 25 to be built in the Hill Areas)



Scale: One inch=8 Ft.

MEDIUM WAREHOUSE MODEL

This building would be essentially the same size and shape as the other two buildings in the complex except that the Fertilizer building would have no room divisions and the Seed building would have two rooms, if partly dehumidified.



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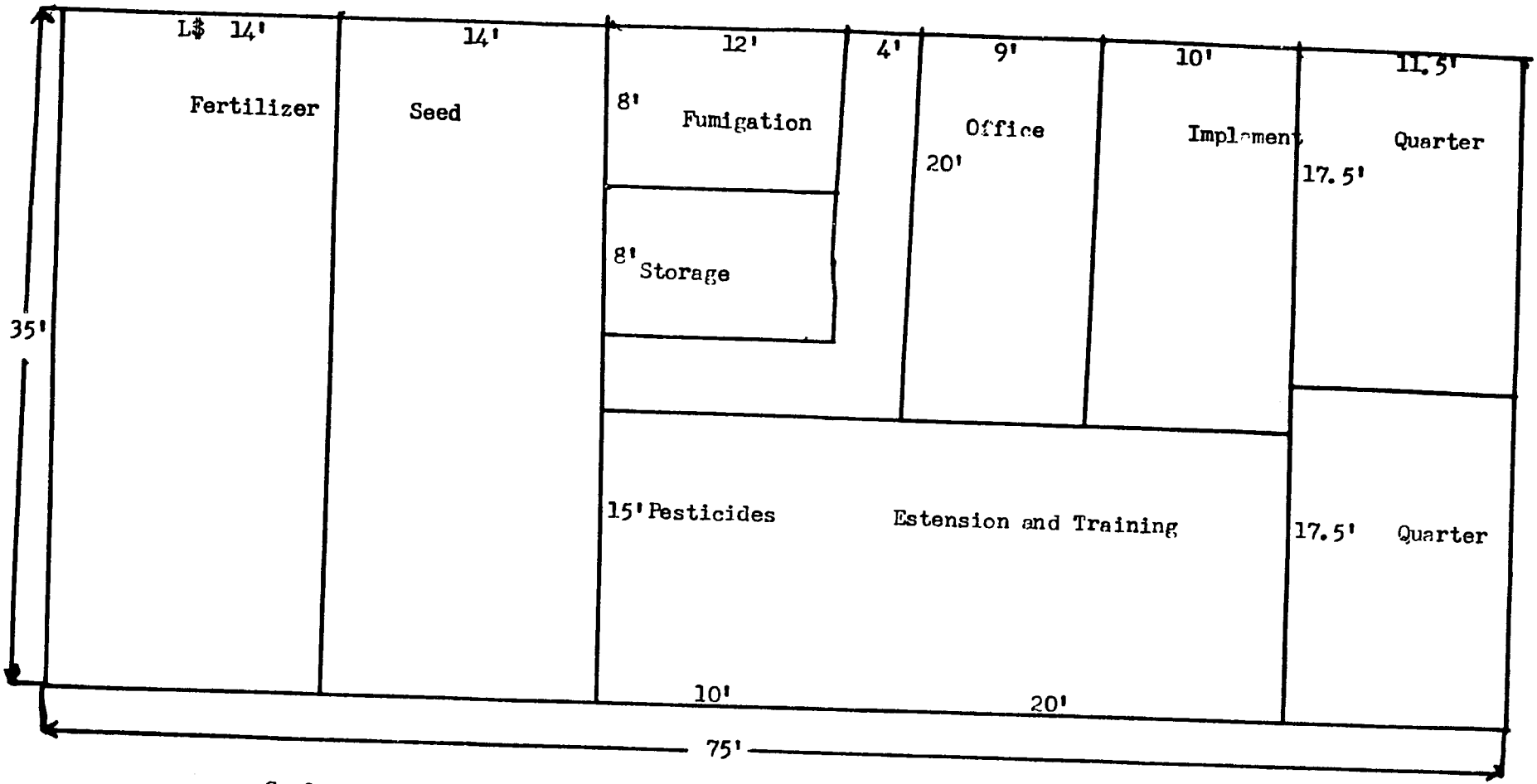
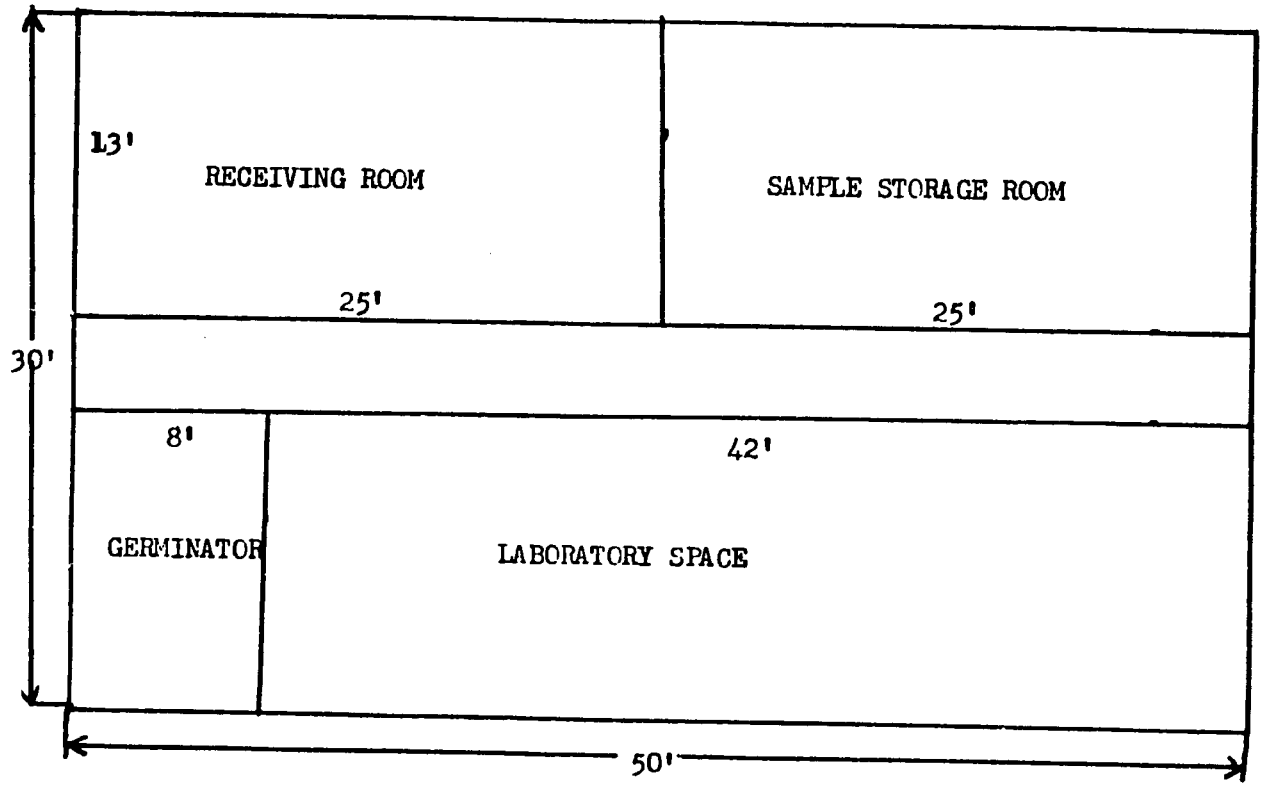
SMALL WARTHOUSE MODEL



Scale One Inch= 8Ft.

Central Seed Laboratory

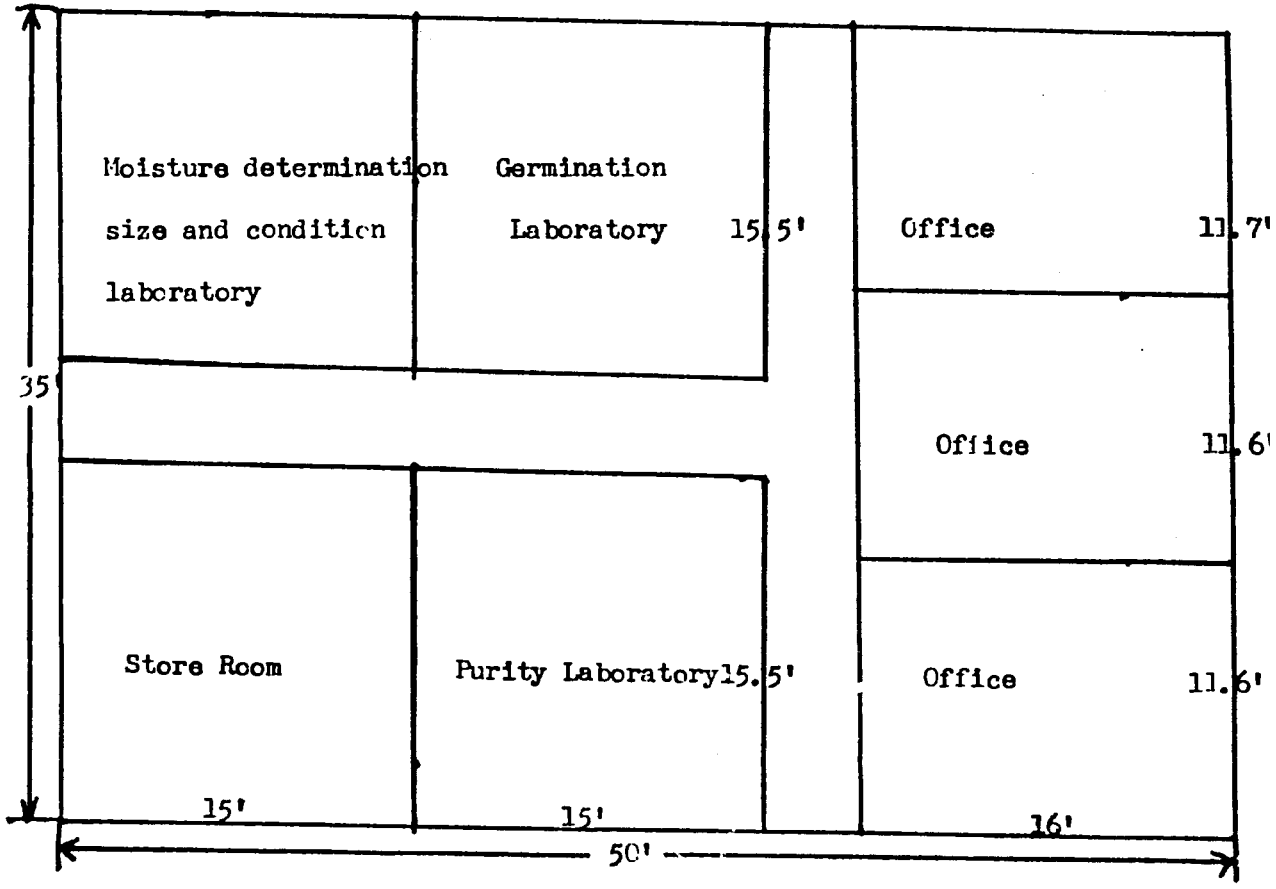
This Laboratory building is to be built at the Central Research Station at Khumultar.



Scale: 1 in.=8'

REGIONAL SEED LABORATORIES
(Three to be constructed)

Note: These buidlings may be built either as independent buildings or as additions to existing GON office/laboratory structures.



Scale: 1 inch = 8 Ft.

MAP I

NEPAL

14 ZONES and 75 DISTRICTS

GOVT. ESTABLISHED RATES FOR BUILDING CONSTRUCTION

NOTE:- 1) Figures indicate NC Rupee Cost per sq. ft. in each district.

2) Kathmandu valley Rates: Rs. 75/sq. ft. for storage and godowns; Rs. 100/sq. ft. for other buildings such as Office, Laboratory, Residential etc.

International Boundary

Zonal Boundary

District Boundary

GRAPHIC ART & REPRODUCTION
RAA AID / NEPAL

ANNEX J

Economic Analysis

I. Background

This section projects Nepal's apparant demand for improved seed of paddy, wheat and maize, and compares projected demand with available and incremental seed processing capacity. Also analyzed are the comparative costs implicit in two ways of meeting hill/high hill projected improved seed demand, the social returns from incremental seed processing capacity, and scattered datum on effective demand for improved seed of paddy, wheat and maize.

There is no question that processing and dissemination of improved seed is desirable. Generally speaking, improved processing and drying of seed will maintain the quality of seed for longer than the normal 3 or 4 growing seasons experienced by farmers before the quality of their (home produced) seed begins to deteriorate noticeably. Improved processing and drying of seed will reduce moisture content (reducing the probability of fungus attacks and making seed much easier to store for long periods), remove impurities (weed seed, insects and insect larvae), help to maintain genetic quality (by rejecting misshapen seeds and seeds of most undesired species), facilitate more rapid planting (by mechanical means, through selecting seeds of near uniform shape), improve germination rates (by drying and rejection of substandard seed shapes and weights), and facilitate storage and grading (product differentiation). Proper storage of seed affects not only germination rates, but also seed size; weight; color; longevity (moisture content); purity; freedom from disease and rodent, insect and mechanical damage.

Small grain seeds (wheat and paddy) are comparatively easy to store and involve the simplest form of marketing: farmer-to-farmer sales (estimated in the millions of pounds even in America). These seeds may be salvaged by use as livestock feed if sale is not possible. Maize seed is much more difficult, as it is an open-pollinated crop (genetic purity deteriorates a great deal inside of three or four seasons unless farmers are willing to tassel the crop or unless the area is planted to only one variety). Cross-country studies have demonstrated conclusively that high rates of use of improved seed result directly in increased yields. In general, if 50% of a crop's area is planted to improved seed, yields may be expected to increase by 100% over traditional yields. Generally speaking, this area coverage is attained when 25% of the seed used is marketed (not retained or transferred farmer-to-farmer). However, the pattern of experience is that improved seed is simply one of a number of improved practices that complement each other: soil analysis, fertilizers, seed selection, credit, insecticides/herbicides, and particularly sufficient water on a timely basis.

II. Nepalese Demand for Improved Cereals Seed

Improved seeds were introduced into Nepal on a large scale about 12 years ago. The source of most of this initial stock was India. Many

private interests (in addition to the GON) brought improved seeds to Nepal. Those initial imports and subsequent multiplications are not recorded. Neither are there any systematic estimates available of farmer-tofarmer seed distributions. An approximation by major crop may be derived from estimates of "area covered by improved seed".

Table 1

Seed Distributed and Marketed in Nepal by the Public Sector, With Estimated Proportion of Total Cropping Area Covered, FY 67 - FY78

(Metric tons and %)

Fiscal Year	Crop: Paddy MT	Paddy %	Wheat MT	Wheat %	Maize MT	Maize %
1966/67	140	NA	162	NA	nil	NA
1967/68	232	NA	508	NA	30	NA
1968/69	253	NA	426	NA	49	NA
1969/70	210	NA	411	NA	40	NA
1970/71	102	NA	326	NA	47	NA
1971/72	265	0.40	814	5.16	56	0.43
1972/73	160	0.26	1873	10.94	50	0.38
1973/74	414	0.61	1366	7.56	46	0.34
1974/75	328	0.48	1555	8.12	51	0.37
1975/76	184	0.27	1726	7.96	145	1.08
1976/77	359	0.52	1810	7.87	105	0.79
1977/78	NA		2030	8.82	NA	

Note: Seeding rates used (Kg/ha) -- paddy-55, wheat-66, maize-30.

NA - Not available.

Table 1 shows the very poor record of the first five years of public sector distribution of seeds in Nepal. This may have been due in part to informal (private) competition marketing seed from India. However, there no evidence that Indian source seed has played a significant role in the past 3-4 years (see Banskota report, p.2) when public-sector marketing of seed has again stagnated (following an increase in 1972-74).

Table 2

Estimated Area Covered by Improved Seed and Calculated Area Covered by Public Sector Marketing of Improved Seed, FY 67 - FY 71 and FY 77 .

(000 hectares and %)

Fiscal Year	Crop: Paddy			Wheat			Maize		
	A	B	B÷A	A	B	B÷A	A	B	B÷A
1966/67	13.4	2.5	19.0	11.4	2.5	21.6	1.2	-	-
1967/68	26.1	4.2	16.2	27.7	7.7	27.8	3.2	1.0	31.2
1968/69	43.2	4.6	10.6	54.3	6.5	11.9	6.2	1.6	26.3
1969/70	50.3	3.8	7.6	76.3	6.2	8.2	11.7	1.3	11.4
1970/71	67.9	1.9	2.7	97.8	4.9	5.1	11.6	1.6	13.5
1976/77	225.8	6.5	2.9	271.7	27.4	10.1	75.7	3.5	4.6

A= Estimated total area covered by improved seeds.

B= Calculated area covered by public sector marketings.

Farmer-to-farmer multiplication and informal marketing of the improved seed introduced in the mid-1960's met most of the early demand as the improved seed varieties initially doubled in area planted each year: The public sector market share declined proportionately as the base grew. In recent years, the rate of increase in adoption of new varieties has declined and public sales of improved seed have increased. Consequently, since hitting a low point in 1971, the public sector has retained its very small market share in paddy seed and increased its share in wheat from 5.1% to 10.1% (see Table 2).

However, public sales of maize seed declined very sharply in relative significance. The striking decline in relative importance of public sales of improved maize seed may be due in part to an overreporting of hectarage under maize. There is evidence to suggest that the agricultural extension service reports areas where the use of improved maize has been tried and abandoned as being still under improved varieties.

In the absence of substantial private seed imports from India, it is apparent that farmer-to-farmer sales and barter of improved seed have accounted for 97% of the recent area expansion in improved seed in paddy and maize and 87% of the increase in area planted to improved wheat seed.

Table 3

Area Covered By Improved Seed as Proportion of Total Cropped Area, FY 67 - FY 71, FY 77

	Proportion		
Fiscal Year	Paddy	Wheat	Maize
1966/67	1.2	9.0	-
1967/68	2.3	14.4	0.2
1968/69	3.7	26.1	0.4
1969/70	4.3	33.8	0.3
1970/71	5.7	42.9	11.6
1976/77	17.9	78.0	17.0

Rates of growth in diffusion of improved varieties of the major cereal grains have dropped very sharply in recent years (see Table 3). The compound rate of growth in diffusion FY 71 - FY 77 for improved paddy, wheat and maize respectively was: 17.6, 10.2 and 6.6 percent per annum. In earlier years (FY 67- FY 71) the rate for paddy and wheat was nearly identical: 32.2 and 32.4 percent per annum, respectively.

Targets for public sector production of improved paddy, wheat and maize seed have been attempted by two authorities. A GON/USAID seed committee in 1977 established the following targets for FY 82 (in metric tons):

Paddy	Wheat	Maize
1645	5660	605

The Mississippi State University consultants report (10/77) includes estimated "production needed" for "the fifth year of the project" (assumed to be FY 83, in metric tons, modified using GON standard seeding rates per Table 1, as follows):

Paddy	Wheat	Maize
3064	2438	946

There are obvious inconsistancies between these two estimates. Implicit annual compound growth rates are as follows (%):

	Paddy	Wheat	Maize
GON/USAID	31	19	39
MSU	53	3.65	56

The GON/USAID committee estimate for paddy and maize probably assumes a return to growth in diffusion of improved varieties which was experienced

with introduction of the new varieties in the mid-1960's, with a proportionate increase in public sector marketings. Based on past experience, this would require a vigorous marketing effort in maize. It could be a realistic forecast in any case only if new, improved varieties of maize and paddy which are highly profitable to farmers are introduced soon. For wheat, the difference in growth estimates probably results from different assumptions about farmer-to-farmer transfers of improved varieties. While the MSU team apparently assumes a continuation of present trends, the GON/USAID committee apparently assumes that the slow deterioration in quality of farmer-transferred stocks has reached the point where farmers will turn to the public sector for replenishment. The GON/USAID forecasting approach for wheat is consistent with Indian experience (cited in the MSU report, P. 82) that farmer saving of wheat seed results in no yield loss until the third planting, when a loss of 5% - 10% may be expected. This gradual loss in yield continues until, after the fourth or fifth planting, it is clearly profitable to the individual farmer to purchase new wheat seed.

Actual growth in sales 1971/72 to 1976/77 (1977/78 for wheat) have been as follows (annual compound rates, %):

Paddy	Wheat	Maize
6.27	14	11.6

Source: Table 1

A reasonable first approximation in physical demand projection is to use the GON/USAID implicit annual growth rates as a "high" set of estimates which could be realized under very favorable circumstances. These rates are applied in Table 4 below, with the following additional assumptions:

A. The area under the three crops in Nepal continues to increase through FY 94 at the same rate as during the period FY 72-77 (78 for wheat). This implies a 66% increase in area cropped, which could be attained through a 50% increase in average cropping intensity (to 200%) plus an expansion in hectarage by 16% (equivalent to 308,000 hectares).

B. The proportion of hectarage planted with improved varieties continues to grow at the same rates as were recorded during FY 71-77 (see above).

C. Seeding rates are as noted in Table 1.

Table 4

Projected "High" Levels of Demand for Improved Seeds of Paddy, Wheat and Maize Marketed with Public Sector Support, FY 77-94.

(metric tons)

Fiscal Years	Crop		
	Paddy	Wheat	Maize
77	359	1810	105
78	470	2038	146
79	616	2425	203
80	807	2886	282
81	1057	3434	392
82	1385	4087	545
83	1814	4863	757
84	2376	5787	1053
85	3113	6886	1463
86	4078	8194	2034
87	5342	9751	2827
88	6998	11604	3930
89	9167	13809	5462
90	12009	16433	5966*
91	15732	19555	6523*
92	20609	23270	7120*
93	26998	27691	7792*
94	35367	32952	8510*

*Growth rate in public sales held to zero to prevent public proportion exceeding total calculated requirement.

The actual growth rates in sales between FY 72 and FY 77 (FY 78 for wheat) were applied to derive a "low" set of estimates of demand for improved paddy, wheat and maize seed, using additional assumptions noted below. However, it was found that adherence to the 6.27% rate for paddy resulted in a gradual decline in the public sector marketing share. Therefore, the rate for paddy used below has been increased to 12.54%. Additional assumptions employed in calculation of Table 5 are:

A. Rates of increase in hectarage cropped assumed to be one-half the rates used in calculation of Table 4. The compound annual growth rates used are as follows: Paddy - 0.47, Wheat 3.25, Maize 0.125.

B. The annual compound rates of increase in proportion of total hectarage planted in improved varieties are assumed to drop from the FY 71-77 experience in the same proportion (for each crop) that FY 71-77 declined from the FY 67-71 rates of increase.

C. Seeding rates are as noted in Table 1.

Table 5

Projected "Low" Levels of Demand for Improved Seeds of Paddy, Wheat and Maize Marketed with Public Sector Support, FY 77-FY 94 (metric tons)

Fiscal Year	Crop		
	Paddy	Wheat	Maize
77	359	1810	105
78	404	2038	117
79	455	2323	130
80	512	2649	146
81	576	3019	163
82	648	3442	181
83	729	3924	203
84	820	4473	226
85	923	5100	252
86	1039	5814	282
87	1169	6628	314
88	1316	7556	351
89	1481	8613	392
90	1667	9820	437
91	1876	11194	488
92	2111	12762	544
93	2376	14548	608
94	2674	16585	678

The above two (high" and "low") sets of linear projections will now be subjected to a simple set of conditions in the best available method of accounting for the fact that seed is but one of several, closely interrelated inputs to an individual farm decision maker. There are no authoritative estimates for Nepal available projecting effective demand for fertilizer, herbicides, pesticides and hectarage to be irrigated by season. Therefore, experience from many developing countries (as cited in the MSU report, Vol. 1, p. 47) is drawn upon to apply ceilings to the growth patterns recorded above. The ceilings are maximum annual seed replacement rates as follows:

Paddy	Wheat	Maize
5%	25%	15%

These proportions are the maximum percentages of apparent farmer requirement for improved seed which experience shows are actually purchased from publically assisted sources in developing countries.

The effect that application of these ceilings has on the seed replacement rates implicit in Tables 4 and 5, and on total estimated demand under the "high" projection is shown in Table 6.

The same set of calculations is presented in Table 7 for the "low" projection of demand (presented without constraint in Table 5 above). The only effect is upon projected demand for seed of improved varieties of wheat after FY 87.

Table 6

Projected and Applied Seed Replacement Rates and Total Demand, "High" Projection, FY 77 - FY 94
(metric tons and %)

Fiscal Years	Total Quantity		Paddy		Wheat		Maize	
	Projected	Applied	P	A	P	A	P	A
77	2274	2274	2.89	2.89	10.10	10.10	4.62	4.62
78	2654	2654	3.19	3.19	10.26	10.26	5.89	5.89
79	3244	3244	3.50	3.50	10.41	10.41	7.49	7.49
80	3975	3975	3.89	3.89	11.63	11.63	9.51	9.51
81	4883	4883	4.29	4.29	13.00	13.00	12.08	12.08
82	6017	6003	4.74	4.74	14.52	14.52	15.41	15.00
83	7434	7178	5.22	5.00	16.23	16.23	19.62	"
84	9216	8484	5.76	"	18.13	18.13	24.93	"
85	11462	10022	6.36	"	20.26	20.26	31.76	"
86	14306	11856	7.02	"	22.63	22.63	40.37	"
87	17920	13913	7.75	"	25.29	25.00	51.33	"
88	22532	14648	10.05	"	28.26	""	65.36	"
89	28438	15432	13.05	"	31.58	"	83.06	"
90	34408	16267	16.93	"	35.28	"	"	"
91	41810	17205	21.98	"	39.27	"	"	"
92	50999	18106	28.52	"	44.05	"	"	"
93	62481	19119	37.01	"	49.22	"	"	"
94	76829	20197	48.04	"	55.00	"	"	"

Table 7

Projected and Applied Seed Replacement Rates and Total Demand, "Low" Projection, FY 77 - FY 94
(metric tons and %)

Fiscal Years	Total Quantity Projected	Applied	Paddy	Wheat		Maize
			P and A	P	A	P and A
77	2274	2274	2.89	10.10	10.10	4.62
78	2559	2559	2.96	10.96	10.96	4.78
79	2908	2908	3.02	11.72	11.72	4.92
80	3307	3307	3.08	12.54	12.54	5.11
81	3758	3758	3.15	13.42	13.42	5.28
82	4271	4271	3.21	14.36	14.36	5.44
83	4856	4856	3.28	15.37	15.37	5.66
84	5519	5519	3.35	16.97	16.97	5.83
85	6275	6275	3.45	18.74	18.74	6.03
86	7135	7135	3.50	20.69	20.69	6.25
87	8111	8111	3.58	22.85	22.85	6.44
88	9223	9155	3.66	25.22	25.00	6.68
89	10486	9606	3.74	27.85	"	6.91
90	11924	10088	3.82	30.75	"	7.13
91	13558	10608	3.91	33.95	"	7.38
92	15417	11166	3.99	37.49	"	7.63
93	17532	11774	4.08	41.38	"	7.89
94	19937	12426	4.17	45.69	"	8.15

Table 8

Applied Levels of Demand, by Principal Crop by "High" and "Low" Projections, FY 77 - FY 94

(Metric tons)

Fiscal	Paddy		Wheat		Maize	
Years	High	Low	High	Low	High	Low
77	359	359	1810	1810	105	105
78	470	404	2038	2038	146	117
79	616	455	2425	2323	203	130
80	807	512	2886	2649	282	146
81	1057	576	3434	3019	392	163
82	1385	648	4087	3442	531	181
83	1814	729	4863	3924	579	203
84	2063	820	5787	4473	634	226
85	2445	923	6886	5100	691	252
86	2906	1039	8194	5814	756	282
87	3448	1169	9639	6628	826	314
88	3480	1316	10266	7488	902	351
89	3513	1481	10933	7733	986	392
90	3546	1667	11644	7984	1077	437
91	3579	1876	12448	8244	1178	488
92	3613	2111	13207	8511	1286	544
93	3647	2374	14065	8790	1407	608
94	3681	2674	14979	9074	1537	678

In Table 8, the "applied" levels of projected demand under both the "high" and "low" sets of assumptions are given for each of the three major crops. These are annual estimates in metric tons of improved seed of the principal crops which may be expected to be sold by publically-assisted seed facilities under two different sets of assumptions about future growth in Nepalese agriculture. "High" and "low" totals as projected are contained in Tables 6 and 7 above.

III. Projected Output of Public-Sector Seed Processing Facilities, Available and Project-assisted.

The numbers and characteristics of the seed plants already available and proposed in this project to process seed for sale have been described in detail elsewhere in this Project Paper. This information is summarized below in Table 9.

Table 9

Output of Public-Sector Seed Processing Facilities

Number of units	Per hour capacity (M/T)	Efficiency %	Utilization Days/year	Utilization Hour/day	Total Output (M/T)
6 1/	3	75	100	7	9450
6 2/	1	75	100	7	3150
25 2/	.25	75	80	7	2625
				Total	15,225

1/ Available.

2/ Proposed.

In addition, there are small facilities at each of several government research farms which are intended to process (foundation) seed for government use only. The units could, however, process seed for neighbouring farmers on a cost-plus basis.

It is readily apparent that, even when the 37 plants would be operated at one-fifth of their nominal capacity (assuming 75% of design output per hour is maintained), under the most optimistic assumptions (see Table 6) demand for the total curtailed output could not be expected to materialize until the late 1980's. In the Financial Analysis section it is shown that neither the proposed 1 ton/hour (medium") nor the .25 ton/hour ("mini") units are privately profitable investments at the given (low) levels of utilization except at relatively high output sale prices. Therefore, reductions in rates of utilization to meet projected demand would have the consequence either of increasing the break-even sale price or of invoking public subsidies.

The six medium and 25 small seed processing units and associated storage proposed under this project represent an increment to Nepal's available seed processing capacity of 61%, at rates of utilization given in Table 9. This increment cannot be justified in terms of satisfying any reasonable level of anticipated demand based on known physical relationships. For example, even in FY 94 the "applied high" level of demand could be met by operating the six available plants 214 days/year, 7 hours/day (or 107 days/year, 14 hours/day). These rates represent operation at 36% of nominal capacity (300 days/year, 14 hours/day).

IV. Transport

It is apparent that the output of the six relatively large seed processing facilities already available in Nepal must be transported to many relatively inaccessible locations throughout Nepal. The six facilities are located as follows: Eastern Development Region-Biratnagar; Central Development Region (2) - Janakpur and Hetauda; Western Development Region (2) -- Bhairawa and Pokhara; Far Western Development Region -- Nepalganj. All but one of the six are located in the Terai (plains region of Nepal, near the Indian border). However, the Hetauda plant is on the road to the Kathmandu Valley, and at the terminus of the ropeway to Kathmandu. Therefore, for purposes of computing transport cost differentials, 80% of shipments to the Central Region, hill area (Kathmandu Valley, essentially) will be considered to have the same transport implications as shipments within the terai. Similarly, because the plant in the hill area of the Western Development Region is located on a main road near the (relatively) major demand center of the Pokhara Valley, 70% of shipments to the hill area of the Central Region will be considered to have the same transport implications as shipments in the terai.

With these adjustments, the destination of shipments of improved seed currently are distributed as follows (from the MSU report, Vol 1, pages 50-53):

Table 10

Adjusted Improved Seed Shipment Destinations, Proportionate Distribution by Area, FY 77.

Crop	Terai	Hill	High hills
Paddy	93.7	5.9	0.3
Wheat	89.7	9.8	0.5
Maize	71.1	22.9	6.0

Note: See text for information on adjustments.

The MSU report assumes that these proportions will change only slightly by the end of the fifth year of the proposed project (FY 83), so that the average of 0.68% of shipments destined for the "high hills" at present increases to only 2.7% by FY 83. Nearly 60% of this increase is projected to occur in shipments of wheat seed, although the FY 77 - FY 83 absolute increase involved is only 109 metric tons.

For purposes of analysis it is assumed that shipments of the three major grain seeds are distributed by area of destination in FY 94 as shown in Table 11.

Table 11

Improved Seed Shipment Destinations, Proportionate Distribution by area, FY 94.

Crop	Terai	Hills	High Hills
Paddy	90	7	3
Wheat	75	18	7
Maize	60	28	12

This distribution extrapolates the trend assumed in the MSU report as cited above. It also assumes that major grain varieties suitable for the high hills are available for marketing by FY 94. A similar distribution for FY 83 as calculated from the MSU report is used in the analysis. The shifts in percentage distribution of shipment destinations given in Tables 10 and 11 imply high rates of growth in shipments to the hills (over 25% annual compound growth in the "high" series and 20% in the "low" series, as detailed in Table 12).

The two "applied" levels of demand by crop detailed in Table 8 above are distributed by shipment destination in Table 12, using the percentage distributions calculated in Tables 10 and 11 (and the FY 83 mid-way set of proportions calculated from the MSU report). The "terai" destination is not shown: It is a residual.

Table 12 provides annual "high" and "low" estimates of demand for the three major cereals seeds by "adjusted" hill and high hill destinations through FY 94. The next step in analysis is to assign monetary values to the difference in transport conditions which would be experienced if all of the shipments of Table 12 were made from the six available seed processing facilities (which has been shown to be feasible from a capacity utilization point of view) and, if specified percentages of the shipments were made from the 25 small facilities plus one facility of 1 MT/hour capacity located much nearer the source of demand (as proposed in this project).

Table 12
Calculated Demand by Adjusted Geographic Areas,
FY 77 - FY 94
(metric tons)

Fiscal Years	Paddy				Wheat				Maize			
	High		Low		High		Low		High		Low	
	Hills	H.Hills	Hills	H.Hills	Hills	H.Hills	Hills	H.Hills	Hills	H.Hills	Hills	H.Hills
77	21	1	21	1	177	9	177	9	24	6	24	6
78	28	1	24	1	200	10	200	10	33	9	27	7
79	36	2	27	1	238	12	228	12	46	12	30	8
80	48	2	30	2	283	14	260	13	65	17	33	9
81	62	3	34	2	337	17	296	15	90	23	37	10
82	82	4	38	2	401	20	337	17	122	32	41	11
83	114	20	46	8	579	151	467	122	143	36	50	13
84	130	23	52	9	689	179	532	139	157	39	56	14
85	154	27	58	10	819	213	607	158	171	43	62	16
86	183	32	65	11	975	254	692	180	187	47	70	17
87	217	38	74	13	1147	299	789	205	204	51	78	19
88	219	38	83	14	1222	318	891	232	223	56	87	22
89	246	105	104	44	1968	765	1392	541	276	118	110	47
90	248	106	117	50	2096	815	1437	559	302	129	122	52
91	251	107	131	56	2241	871	1484	577	330	141	137	59
92	253	108	148	63	2377	924	1532	596	360	154	152	65
93	255	109	166	71	2532	985	1582	615	394	169	170	73
94	258	110	187	80	2696	1049	1633	635	430	184	190	81

The percentages specified as shipped from proposed facilities located in the hills and high hills are estimated for the purposes of this analysis by comparing estimated FY 94 levels of demand (Table 12) with plant capacities given in Table 9. Calculation shows that the 25 small plants plus one larger plant could meet 100% of estimated "high" demand in the high hills in FY 94 plus 70% of the estimated "high"hill demand if rates of utilization were increased by one-fifth over those given in Table 9. (The 25 small plants alone could meet 100% of estimated "low" demand in the high hills in FY 94, plus 93% of the estimated "low" hill demand. The addition of one larger plant creates an overcapacity (at utilization rates given in Table 9) of 344 MT over the combined hill and high hills "low" demand projected for FY 94.) Incorporating a possible eventual increase in utilization, comparison is made on the basis of 100% of the "high" demand from the high hills plus 70% of the "high" demand from the (middle) hills and 100% of the combined "low" demand.

We are left with the task of giving monetary values to the differences arising from comparison. The FY 80 transport cost estimates for the hills of Nepal initially are assumed to be Rs. 16.00 per 40 Kg. per porter/day. (Transport by mule is not included in order to simplify the analysis. Transport by other means is not assumed.) The rate of Rs. 16 is a linear projection of the German Consult baseline contained in the GON/IBRD Trail Suspension Bridge Feasibility Study (Vol. 4, P. 21) and is basically the average financial cost for unskilled labor. (There are very few professional porters in Nepal, and no specialized skills are required in portage).

The assumption that transport by other than porter (ex. mule) is not employed is derived from the assumption that transport by truck, bus or ropeway into the hills results in cif roadhead product/transport cost ratios roughly the same as transport within the terai proper. This is consistent with the earlier assumption that most shipments from the available plants in Hetauda (to Kathmandu) and Gandaki (to Pokhara) are essentially comparable to terai shipments. To this is added the assumption that the sole proposed MT/hour plant incorporated into the analysis is located in an area of concentrated demand not readily accessible from one of the six available plants. In other words, the basis of comparison is shipments within the hills/high hills, not shipments from plants.

It is assumed in the first approximation, results of which are detailed in Table 13, that transport from the six available large plants or roadheads to the hills and high hills takes an average of five days, while transport from the 25 "mini" and one medium-size plant averages one day. Further, it is assumed that portage costs increase at an annual rate of two percent. In addition, it is assumed that packaging costs are constant regardless of source (type of plant). Finally, it is assumed that costs of transport are identical for the three principal seed grains.

The analysis results in two streams of costs: cost of transport from roadheads or six available large plants to the hills and high hills of Nepal, and cost of transport to the same areas from 25 small and one medium plant proposed under the project. The annual differences in the two cost streams can be considered as either: 1) Implicit subsidy costs which must be met by Nepal in shipping from the available six large plants or, 2) A gross benefit to be derived from construction and operation of 26 proposed plants. These annual differences are shown in Table 13. (The annual stream of costs used are developed in the Financial Analysis section for the "mini" and one medium plant, based upon Indian-source equipment, simplified construction and 3% annual increase in variable costs.) The initial three fiscal years shown so far for use in comparisons with actuals are excluded in this analysis, since the project-proposed plants could not come into production until FY 80.

Table 13

Annual Differences in Transport Costs From Suppling "Applied High and Low" Estimated Demand in Hills and High Hills with Few Large or Several Small Plants, FY 80 - FY 94.

(Rs. & $ 000).

Fiscal Years	"High" Estimate*	"Low" Estimate
80	496.0	555.2
81	628.7	643.4
82	798.0	743.0
83	1346.4	1200.2
84	1603.1	1391.5
85	1919.8	1613.4
86	2303.9	1870.2
87	2740.2	2172.2
88	2967.9	2501.2
89	5246.3	4299.2
90	5687.9	4500.5
91	6188.0	4888.0
92	6694.5	5216.8
93	7269.7	5576.2
94	7891.7	5965.6
	53782.1	43216.6
	($4,481.8)	($3,601.4)

*Includes only 70% of estimated demand in middle hills.

The fifteen-year cost associated with the 25 "mini" plants is estimated to be $17,790, while the fifteen-year cost associated with one medium-size (MT/hour) plant is estimated to be $3,692.4 (see Financial Analysis section). The combined incremental costs to Nepal of these plants ($21,482.4 million) over fifteen years exceeds saving in transport costs by at best $17,000.6 in this first approximation.

The minimum set of conditions which yields an undiscounted total of transport costs saved under the "high" demand estimate that is greater than the undiscounted cost of the plants is roughly as follows: 1) Initial financial wage rate of Rs. 20/day. 2) The 26 plants, working at 50% above utilization rates given in Table 9, fill 100% of the "high" hill demand level* 3) An average transport time from the 25 plants of ½ day. 4) An average transport time from the six large plants of seven days. The undiscounted benefit streams under this set of assumptions total as follows:

*This increase in utilization over what is assumed in derivation of financial costs of plant operation would result in some increase in plant operating costs.

"High" Demand - $25,247.9

"Low" Demand - $15,756.1

The net present value of the difference between plant cost outlay and transport cost saved under the "high" demand assumption is negative (- $1,359.3) at the discount factor of 14% used throughout the Financial Analysis section. This is due to the fact that most of the projected savings in transport occur in later years, when they are heavily discounted. The net present value of the incremental 15 year benefit steam under the "high" demand estimate at 5% is $649,800. The internal rate of return of this benefit stream is 5.83%.

V. Summary

The analysis above has developed the minimal set of conditions under which an incremental set of proposed seed processing facilities (with associated storage) show a nominal positive national or social return. These conditions have been developed throughout this analysis and are summarized as follows:

1. That the compound annual growth rates in demand for improved seed through FY 94 will be (%):

Paddy	Wheat	Maize
31	19	39

2. That the gross cropped hectarage increases through FY 94 at the following compound annual growth rates (%):

Paddy	Wheat	Maize
0.94	6.50	0.25

3. That the proportion of hectarage planted with improved varieties increases through FY 94 at the following compound annual growth rates (%):

Paddy	Wheat	Maize
17.6	10.2	6.6

4. That the seeding rates used through FY 94 average as follows: (Kg./ha.):

Paddy	Wheat	Maize
55	66	30

5. That the quantities projected as demanded under the above set of assumptions are constrained in growth by maximum annual seed replacement rates as follows (%):

Paddy	Wheat	Maize
5	25	15

6. That 25 "mini" proposed seed processing facilities with a nominal capacity of ¼ MT/hour each will be operated at 75% of that capacity for seven hours/day, 150 days/year.

7. That one "medium" proposed seed processing facility with a nominal capacity of MT/hour will be operated at 75% of that capacity for seven hours/day, 120 days/year.

8. That six "large" available seed processing facilities with a nominal capacity of 3 MT/hour each will be operated at 75% of that capacity for seven hours/day, 164 days/year.

9. That the output of the available six "large" facilities will satisfy 100% of demand in the terai, in the Kathmandu Valley and immediately adjacent areas and in the Pokhara Valley and immediately adjacent areas, and none of the hill/high hill demand.

10. That there will be a proportionate increase in seed shipments to the hills and high hills, as follows (% of total shipments):

	FY 77	FY 94
Paddy	6.2	10
Wheat	10.3	25
Maize	28.9	40

11. That all seed shipments to the hills and high hills (from roadheads or plant sites) are by porter, at the initial (FY 80) wage rate of Rs. 20/40 Kg./day.

12. That wage rates increase at a compound annual rate of 2%.

13. That the average portage time from the 26 proposed plants is one-half day.

14. That the average portage time of (hypothetical) shipments from the available six large plants to the hills/high hills is seven days.

15. That costs of packaging and transport do not vary by grain.

16. (See the Financial Analysis section for assumptions associated with capital and operating costs, FY 80 - 94, of Indian-origin, simply-constructed plants).

The conditions or assumptions listed above could be termed "optimistic" or "favorable". In other words, further increases in rates of growth assumed would be quite difficult ito reconcile with recent experience.

In this analysis a "low" set of projections appears throughout as a more "probable" base for analysis. Under this "low" base for projection (even under the "optimistic" conditions listed under 9-15 above) all undiscounted net "benefit" streams computed are substantially negative.

In Table 13 the undiscounted net stream of "benefits" is calculated under a set of assumptions replacing 9-14 above. This series, calculated given conditions more closely approximating the current economic situation, yields very substantial negative net "benefits" under the "high" as well as "low" demand projection.

Negative net "benefits" are, of course, costs. Under all "probable" sets of assumptions, the implementation of 25 project proposed "mini" seed plants and one "medium" seed plant would be considerably more costly to Nepal than the subsidized transport of seed from the six large plants already available. The 15- year undiscounted difference between the costs of subsidized transport and of the 26 project-proposed facilities as calculated under three sets of assumptions range between $17.9 million and $5.7 million. Under a most optimistic set of assumptions the 26 project-proposed plants would show a 15 year net present value at 5% of only $650,000 (IRR 5.0%).

This analysis has developed a structure within which it is possible to specify the minimum conditions under which an optimal combination of inputs under the proposed project would yield a positive return. The conditions as listed above are "optimistic" while the positive return is nominal.

Following development of a "high" and a "low" set of projections of demand for seed (constrained in an attempt to control for uncertainty regarding future availability of complementary inputs), it was shown that the combined output of the six seed plants already available to Nepal could meet the maximum projected demand for paddy, wheat and maize seed in FY 94 by operating at roughly 35% of capacity. (The addition of a capacity requirement to account for processing of barley, millet and other grain seed could increase the FY 94 tonnage to be processed by as much as 2000 MT, requiring an increase in utilization of the six plants of roughly 3.5% to 40% of capacity.) At lower or "more probable" projected levels of demand the six available plants would, of course, be able to meet the requirement at lower levels of capacity utilization.

To sum up, the project-proposed seed processing facilities represent an increment to available processing capacity which is not required to serve even the highest levels of projected demand. The least cost alternative for Nepal to meet projected demand in the hills and high hills is to subsidize the transport of seed from the six large facilities already available.

VI. Possible Other Analytical Approaches.

The MSU report (Vol. 2, pps. 4,7,8, 16-19) reaches several conclusions which appear to be inconsistent with the results of the analysis detailed above. Such MSU conclusions are:

1. "..... that added investment in seed could reap tremendous returns to the country". (p.4)

2. That, "the small plants will not add to the built in inefficiencies that result from overcapacity." (p.7)

3. That "small farmers producing seed (as well as subsistance farmers) would receive direct benefits from the increased demand for seed" that would result from increased agricultural production. (p. 8)

4. That "very high returns to the nation of Nepal (are obtained) when benefits to farmers are included." (p. 18)

5. That, when farmer-to-farmer diffusion of improved seed and individual farmer multiplication of improved seed are considered, "results indicate a high return to Nepal at all seed/grain price ratios considered. "(p. 19)

With the exception of "conclusion 2" noted above, the MSU report does not consider the proposed project investments as incremental. As noted at the outset of this analysis, there is no question that improved seed per se is both a privately and a socially profitable and desirable commodity. The proposed project would not provide improved seed to the farmers of Nepal (gratis or at any price). It would provide incremental seed processing and warehousing facilities.

The first MSU conclusion cited above is based upon research published in the Agricultural Credit Survey: Nepal (1972). That research estimated linear (Cobb-Douglas) relationships for four inputs to private farm production. The conclusion quoted in 1 above refers to individual investment decisions to p urchase seed by private farmers, therefore (not national investment in incremental capacity for processing seed). This would be a pertinent finding if our analysis had not

concluded that seed for the farmer to purchase would be available even without the proposed project investment. Furthermore, the Credit Survey analysis with respect to seed contains the following reservations: A. "Valuation of seed used was found zero in majority of cases" (p. 303), presumably because it was home-grown. This calls into question the validity of results (simple size not stated for values obtained in an apparently poorly structured questionnaire). B. The obtained relationships between seed and output were significant at the 20% probability level in only two districts. C. In many cases standard errors of estimate were quite large. D. In only two districts did an increase in investment in seed yield a proportionately greater increase in output.

The MSU observation that added capacity in an existing structure of overcapacity does not "add to built-in efficiencies" may be superficially correct, since the inefficiencies are "built-in". But the added capacity costs something. A relevant analytical question would address the incremental costs and benefits of the added capacity. This has been done (sections III and IV above), with the conclusion that incremental capacity, and only of a particular type (mini units located in remote areas) could be economically justified only under an "extremely optimistic" set of assumptions.

Benefits calculated for small farmers (MSU report, vol, 2, pps 7-8) refer to "the economic impact of improved seed and seed distribution" (p.7). The implicit assumption is that the proposed project's facilities would make available to small farmers seed that would otherwise not be available. This assumption has been shown (sections II and III above) to be incorrect under widely differing assumptions of future growth in demand. Available facilities will be more than able to supply even the highest levels of demand projected over the coming 16 years.

The social returns to Nepal are analyzed in pages 16-19 of the MSU report (vol. 2). The initial assumption stated in that analysis is "that as a result of the use of improved seed provided by this project expected increases in production will occur " (p. 16). This assumption in essence incorporates Say's Law, that the total supply of goods always equals the total demand for those goods. This proposition, formulated in the early 1800's with reference to a barter economy, most certainly is incorrectly applied to the case in point, because processing capacity provided through external assistance will neither create demand for improved seed for processing nor create demand for the processed seed. To reiterate, the proposed project makes available additional processing capacity. All levels of projected demand can be met with available processing capacity. The magnitude of social returns calculated in the MSU report might be ascribed to processing capacity recently acquired by Nepal. Such returns cannot then be ascribed to further capacity indicated as additional to that required by the most optimistic projections of demand. The processing capacity required for the improved seed to which returns are imputed already is available.

The most obvious social return to Nepal of the project-proposed facilities, reduced costs of supplying processed seed to numerous remote locations, was evaluated in Section IV above. It was found that, at least through FY 94, it was more efficient for Nepal to subsidize transport from a few fairly large plants than to purchase, operate and maintain 26 small plants. It is likely that there are some demand foci at which it would be more efficient to place a small or "mini" plant than to tranport demanded quantities from some distance. Such a location might be the Dang Valley. Each location proposed for a plant would need to be analyzed as a discrete activity.

The possibility that seed for processing would be so highly location-specific that special handling requirements might impose very high costs unless processed at or near the growing site might exist. If quantities involved were substantial (e.g., Jumla), a small or "mini" plant at site might be feasible. Each such proposed location would require careful analysis, basically in the context of unique agronomic conditions.

A proposition that many small, farmer-cooperative managed units would be more efficiently utilized than a few large units with associated transport is arguable at best. Managerial assistance to the controlling interest in the large units might show a very high pay-off. The possibility of monopoly profits being realized at small, isolated units is worth considering.

VII. Price Ratios

The Financial Analysis of individual processing facilities assumes the following set of price ratios:

1.00 - grain price
1.20 - price paid to seed grower
1.50 - Seed Sale price 1
1.70 - Seed Sale price 2
1.90 - Seed Sale price 3

Actual prices of grain and calculated seed prices (using the above ratios) for the period August - September 1977 are given in Table 14, together with the range of actual prices paid for seed "during the past twelve months" by a sample of 31 farmers interviewed during March - April 1978. The very incomplete information on actual seed prices paid by farmers indicates that paddy and wheat seed are sold across the range of price ratios considered in the Financial Analysis, but that maize seed does not command the higher prices.

Table 14

Grain and Calculated Seed Prices and Actual Prices Paid for Seed, FY 78

(Rs./Kg.)

Crop / Area	Grain Price	To grower	Calculated Seed Prices S1	S2	S3	Actual Seed Purchase Prices
Paddy						
Kathmandu	2.07	2.48	3.11	3.52	3.92)	1.90 to 3.60
W. Terai	1.58	1.90	2.37	2.69	3.00)	
C. Terai	1.81	2.17	2.72	3.08	3.44)	
Wheat						
Kathmandu	1.73	2.08	2.60	2.94	3.29)	2.61 to 3.77
W. Terai	1.50	1.80	2.25	2.55	2.85)	
C. Terai	1.92	2.30	2.88	3.26	3.65)	
Maize						
Kathmandu	1.87	2.24	2.81	3.18	3.55)	2.10 to 3.33
C. Terai	2.08	2.50	3.12	3.54	3.95)	

AID 1330-1
(9-71)

PIO/T
ACTION REQUEST

DEPARTMENT OF STATE
AGENCY FOR
INTERNATIONAL DEVELOPMENT

PROJECT IMPLEMENTATION ORDER/TECHNICAL SERVICES

1. Cooperating Country: NEPAL

Page 1 of 9 Pages

2. PIO/T No.: 367-0118-3-80141

3. [X] Original or Amendment No.

4. Project/Activity No. and Title: 367-0118 SEED PRODUCTION AND INPUT STORAGE

DISTRIBUTION

Clearances:

B. K. Thapa, General Manager, Ag. Inputs Corp. A.N. Pradhanang

A.N. Pradhanang Deputy Director General for Crop Prot. Dept. of Ag., Min. of Food, Ag. & Irri., HMG/N

T.N. Pant, Executive Director, APROSC

Lynn K. Knauss Director, Peace Corps for D.L. Chaffee

T.B. Khadka, Min. of Food, Ag. & Irri., HMG/N

Mission References: Seed Production & Input Storage Project Grant Agreement Original 367-0118

5. Appropriation Symbol: 72-1181021.3

6.A. Allotment Symbol and Charge: 843-50-367-00-69-93

6.B. Funds Allotted to: [X] A.I.D./W [ ] Mission

7. Obligation Status: [ ] Administrative Reservation [ ] Implementing Document

8. Funding Period (Mo., Day, Yr.): From 8/31/78 To 8/31/83

9.A. Services to Start (Mo., Day, Yr.): Between January 1, 1979 and March 31, 1979

9.B. Completion date of Services (Mo., Day, Yr.): 8/31/83

10.A. Type of Action: [ ] A.I.D. Contract [X] Cooperating Country Contract [ ] Participating Agency Service Agreement [ ] Other

10.B. Authorized Agent: Ministry of Food, Agriculture and Irrigation with Mission & AID/W assistance

Estimated Financing $1.00=		(1) Previous Total	(2) Increase	(3) Decrease	(4) Total to Date
11. Maximum A.I.D. Financing	A. Dollars	–	2,613,000	–	2,613,000
	B. U.S.-Owned Local Currency	–	–	–	–
12. Cooperating Country Contributions	A. Counterpart	–	–	–	–
	B. Other	–	564,000	–	564,000

14. Instructions to Authorized Agent: The Ministry of Food, Agriculture and Irrigation (MFAI) of His Majesty's Government of Nepal is authorized to negotiate a contract with an appropriate U.S. firm to help HMG/N conduct the Seed Production and Input Storage Project (SPISP) in cooperation with the various agencies and departments of the MFAI.

AID/W is requested to advertise the project in the normal manner requesting that interested parties submit proposals for conducting it. AID/W should screen the proposals to select a short list of up to five firms. The proposals submitted by the firms of the short list should be sent to Nepal for review by representatives of HMG/N. Contractor selection will be made by HMG/N with concurrence of USAID/N, the Regional Legal Advisor (RLA) & the Area Contract Officer (ACO). (continued on page 5)

15. Clearances – Show Office Symbol, Signature and Date for all Necessary Clearances.

A. The specifications in the scope of work are technically adequate — Office of Agriculture — John R. Wilson

B. Funds for the services are available — Office of Financial Management — D. L. Lounsbury

C. The scope of work lies within the purview of the initiating and approved Agency Programs — Program Operations — Ram Chaudhri

D. — Office of Administrative Management — Robert F. Rumery

E.

F.

16. For the cooperating country: The terms and conditions set forth herein are hereby agreed to

Signature and date: for Keshab Bahadur Reet Singh Shrestha

Title: Joint Secy., Min. of Finance, HMG/N

17. For the Agency for International Development

Signature: Julius E. Coles

Title: Assistant Director, USAID/Nepal

18. Date of Signature: 1/10/79

SCOPE OF WORK

19. Scope of Technical Services

A. Objective for which the Technical Services are to be Used

To help the MFAI establish a system for producing good seed, mostly in the private sector, and for distributing all agricultural inputs needed by small farmers.

B. Description

The contract team will work within the Ministry of Food, Agriculture and Irrigation to help increase the production of seed and the use of fertilizers, pesticides and other inputs economically and effectively to benefit the small farmers of Nepal, particularly those in the isolated areas. Most of the team's time will be spent in working with the Agricultural Inputs Corporation (AIC), the Department of Agriculture, the Department of Food and Agricultural Marketing and the Agricultural Development Bank and APROSC. They will also work with the Cooperative Department and the Home and Panchayat Ministry in developing programs to involve the small farmers in operating seed production facilities and managing the distribution of all inputs. While working with these institutions, the contractor will assist HMG/N in the following and other duties:

(Continued on page 6)

C. Technicians

(1) (a) Number	(b) Specialized Field	(c) Grade and/or Salary	(d) Duration of Assignment (Man-Months)
1	Seed Production/Management	To be negotiated	60
1	Seed Processing	To be negotiated	12-24
	Short term consultants	To be negotiated	14 to 60 days

(2) Duty Post and Duration of Technicians' Services

Kathmandu

(3) Language requirements

Appropriate language instruction will be provided the long term consultants at post.

(4) Access to Classified Information

Not required except for Chief of Party who should have clearance through "Confidential"

(5) Dependents [X] Will [ ] Will Not Be Permitted to Accompany Technician (Long term only)

D. Financing of Technical Services

(1) By AID - $ See Budget, Page 11 (2) By Cooperating Country –

PIO/T	Cooperating Country NEPAL	PIO/T No. 367-0118-3-80141	Page 3 of 11 Pages
	Project/Activity No. and Title 367-0118 SEED PRODUCTION AND INPUT STORAGE		

20. Equipment and Supplies (Related to the services described in Block 19 and to be procured outside the Cooperating Country by the supplier of these services)

A. (1) Quantity (2) Description (3) Estimated Cost (4) Special Instructions

The contractor will be authorized, with the concurrence of HMG/N, to procure vehicles, seed, supplies, laboratory, field, warehouse and seed equipment and supplies. The contract specialists will help HMG/N identify commodity requirements and obtain USAID/N concurrence. The contractor will then complete the procurement. Except for ocean shipping, goods and services financed by A.I.D. under the project shall have their source and origin in Nepal, or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean shipping of commodities financed under this PIO/T shall be procured in the United States of America. Waiver of U.S. source and origin for commodities and vehicles granted in project approval document.

An illustrative list of such commodities might contain:

40 Hand operated seed cleaners
60 sprayers
25 hand maize shellers
20 moisture testers
60 platform scales - 1000# capacity
5 dehumidifiers
5 room air conditioners
4 25 KVA power units
40 locally made seed treaters
2 grain driers (trashburning)
6 pick up trucks
5 Utility vehicles
12 motor cycles

B. Financing of Equipment and Supplies
(1) By AID - $ 793,000 (2) By Cooperating Country -

21. Special Provisions

[X] A. This PIO/T is subject to AID (contracting) regulations.

[X] B. Except as specifically authorized by AID, or when local hire is authorized under the terms of a contract with a U.S. Supplier, services authorized under this PIO/T must be obtained from U.S. sources.

[ ] C. Except as specifically authorized by AID/W, the purchase of commodities authorized under this PIO/T will be limited to the U.S. under Geographic Code 000. (See Block 20 above)

[X] D. Other (specify):

- All consultants under this contract must have clearance from HMG/N before being permitted to come to Nepal.
- Non-U.S. citizens may be employed under this contract provided they are regular employees of the contractor.
- Approval of the contract must be secured from AID before it can be signed.
- Dollar funding will be made available to the contractor through a letter of commitment (See page 6, para 4)
- The contractor will be responsible for conducting the participant training program.
- The contractor will train 6 PCVs in the US and in-country as appropriate to assist the contractor with farmer training and production supervision aspects of this project in selected field locations.

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PIO/T	Project/Activity No. and Title 367-0118 SEED PRODUCTION AND INPUT STORAGE		

12. Reports by Contractor or Participating Agency (Indicate type, content and format of reports required, including language to be used if other than English, frequency or timing of reports, and any special requirements)

A. Within 90 days of the signing of the contract, the contractor, in cooperation with HMG/N, will prepare a five year action plan and a detailed work plan for the first year (5 copies each to HMG/N and USAID/N). An updated annual work plan will be submitted each year (5 copies each to HMG/N and USAID/N).

B. Semi-annual financial reports will be submitted summarizing fiscal activities under the project. (5 copies each to HMG/N and USAID/N).

C. Other reports to be submitted as agreed upon but to include semi-annual reviews in accordance with HMG/N practice, quarterly and annual project reports, special consultant reports and annual evaluation reports. These reports should be submitted in 10 copies to USAID/N and 10 copies to HMG/N.

13. Background Information (Additional information useful to Authorized Agent and Prospective Contractors or Participating Agency; if necessary cross reference Block 19.C(4) above.)

A. Information on the development of the project can be furnished by AID/W, USAID/N, the A.I.C., and the Department of Agriculture, HMG/N.

B. Information on sources of seed and varieties adapted to Nepal is available with LADS, CIMMYT, IRRI, HMG/N agencies and USAID/N.

14. Relationship of Contractor or Participating Agency to Cooperating Country and to AID

A. Relationships and Responsibilities

The contract will be negotiated between the prospective contractor and HMG/N with the General Manager of A.I.C. serving as Project Director, assisted by concerned persons & agencies of HMG/N Ministry of Food, Agriculture and Irrigation.

B. Cooperating Country Liaison Official

General Manager, A.I.C.
Deputy Director General for Crop Research of Agriculture Department, HMG/N
Executive Director, APROSC

C. AID Liaison Officials

Chief, Office of Agriculture on technical aspects of the project; Assistant Director on programming aspects of the project.

Cooperating Country	PIO/T No.	Page 5 of 11 Pages
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Project/Activity No. and Title
367-0118
SEED PRODUCTION AND INPUT STORAGE

LOGISTIC SUPPORT

25. Provisions for Logistic Support

A. Specific Items (Insert "X" in applicable column at right. If entry needs qualification, insert asterisk and explain below in C. "Comments")

	IN KIND SUPPLIED BY		FROM LOCAL CURRENCY SUPPLIED BY		TO BE PROVIDED OR ARRANGED BY SUPPLIER
	AID	COOPERATING COUNTRY	AID	COOPERATING COUNTRY	
(1) Office Space		X			2/
(2) Office Equipment		X			X
(3) Housing and Utilities					X
(4) Furniture	X*				X
(5) Household Equipment (Stoves, Refrig., etc.)	X*				X
(6) Transportation In Cooperating Country					X3/
(7) Transportation To and From Country					X
(8) Interpreter Services/Secretarial					X
(9) Medical Facilities	X1/				
(10) Vehicles (official)					X
(11) Travel Arrangements/Tickets					X
Other (specify) (12) Local Support Staff					X4/
(13) Office Expenses					X4/
(14) Pouch Facilities (First Class only)	X				
(15)					

B. Additional Facilities Available From Other Sources

☐ APO ☐ PX ☒ COMMISSARY

☒ OTHER (specify, e.g., duty free entry, tax exemption)

All other privileges and facilities available to contractors under current U.S. Mission policy in Nepal including duty free privilege.

C. Comments

*If available, household equipment and furniture will be provided in-kind on a loan basis until contract funded furnishings are received; not to exceed six months.

1/ Embassy medical facilities available to U.S. Citizens and TCN employees of the contractor.

2/ On a cost reimbursable basis.

3/ Fuel and Oil for private use in personal vehicle may be purchased from tax free pumps in AID and Embassy compounds.

4/ Support staff and office expenses will be as agreed upon by the parties to the contract.

[illegible] UATION SHEET	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT	[X] Worksheet [ ] Issuance	PAGE 6 OF 11 PAGES
		1. Cooperating Country NEPAL	2a. Code No. 367-0118-3-90141
FORM SYMBOL	TITLE OF FORM	2b. Effective Date –	2c. [X] Original OR No. ___ Amendment
PIO/T	PIO/T	3. Project/Activity No. and Title 367-0118 SEED PRODUCTION AND INPUT STORAGE	

Indicate block numbers. Use this form to complete the information required in any block of a PIO or PAA form.

Continued from Page 1, Block 14

This group will then select a possible contractor from this short list. If it is deemed advisable by HMG/N, one representative from each of up to three firms on the short list may be invited to Nepal to discuss the project. The cost of the trip for the successful firm may be included as necessary pre-contract expense and be reimbursed after the contract is negotiated. The unsuccessful firms will be reimbursed up to $3,000 for costs associated with their trip to Nepal.

After selection of the possible contractor, HMG/N and the nominee will proceed to negotiate a contract acceptable to themselves and AID. The contract is to be for five years. This PIO/T identifies full funding for the life of the project.

In order to be approved and financed by AID, the contract must conform to the rules contained in AID Handbook 11, chapters 1, 2, 3 and 4 on host country contracting and should be compatible with AID's General Provisions, Cost Reimbursement Type Contract and its Additional General Provisions, Cost Reimbursement Type Contract for Overseas Contracts.

The letter of commitment method of payments of contractors through U.S. banks is the most commonly used method for U.S. dollar payments. The steps involved are as follows:

(a) HMG/N prepares a request for a Letter of Commitment and submits it to AID. Three conformed copies of the contract must be provided to AID.

(b) Based on provisions of the covering agreement between AID and HMG/N, the Letter of Implementation, if applicable, the Request for a Letter of Commitment, and the Contract, when applicable, AID issues a Letter of Commitment to the U.S. Banking institution named in the request and transmits a copy to the approved applicant of HMG/N (i.e. HMG/N bank or other entity authorized by HMG/N bank to open Letters of Credit or to make other arrangements for payment).

(c) The approved applicant requests the U.S. bank to issue, confirm, or advise Letters of Credit to the contractor. The Letter of Credit must be in accordance with the provisions of the Letter of Commitment.

(d) The contractor presents the documents prescribed in the Letter of Credit to the U.S. Bank and receives payment.

Continued from Page 2, Block 19. B

1. Selecting sites for seed houses and storage buildings. Criteria for selection have been tentatively established but the Contractor and HMG/N will re-examine them in light of their combined experience and findings.

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		1. Cooperating Country NEPAL	2.a. Code No. 367-0118-3-80141
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Indicate block number. Use this form to complete the information required in any block of a PIO or PAA form.

2. Establishing standards of construction for all buildings and assisting in supervision to insure compliance by contractors and other builders.

3. Selecting and procuring off shore equipment and supplies.

4. Selecting participants and handling the acceptance of their training programs, completing pre-departure and departure procedures and financing and monitoring approved activities as shown illustratively hereunder.

Training	Starting FY 1979	1980	1981	1982	1983
MBA	2	-	-	-	-
M.Sc.	2	4	2	-	-
Long-term, non-acad.	2	3	3	-	-
Short-term, non-acad.	4	4	4	4	4

5. Managing the seed production program; assisting in the preparation of annual and long-term plans; developing contractual documents and procedures to be used by A.I.C. when purchasing seed, transportation, storage and other goods and services from farmers and other suppliers; operating the seed production and input distribution system of the country; and instituting a suitable inventory and stock control system.

6. Advising on seed standards, enforcement of regulations, preparing new laws/rules regulations concerning labeling and regulating the seed industry and the supply of other inputs.

7. Conducting in-country training programs on:

a. Seed analysis
b. Field, seed house, warehouse and transportation inspection and supervision.
c. Seed production for farmers and for A.I.C. and MFAI employees.
d. Processing, preserving and drying seed in all sizes and classes of seed houses and warehouses.
e. Management of warehouses and seed houses with special reference to hygiene, cleanliness, inventory control, protection of commodities, book keeping, operation of ventilation systems, pest control, operation of equipment and maintenance.
f. Extension systems suitable for supporting a seed industry and the use of other inputs.
g. Handling of seed to protect its quality during processing, storage, transportation and eventual sale to and use by farmers.
h. Sales of seed and other inputs.

[redacted]	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT	[X] Worksheet [ ] Issuance	PAGE 8 OF 1[illegible] PAGES
[redacted]		1. Cooperating Country NEPAL	2.a. Code No. 367-0118-3.80141
FORM SYMBOL	TITLE OF FORM	2.b. Effective Date --	2.c. [X] Original OR No. ____ Amendment
PIO/T	PIO/T	3. Project/Activity No. and Title 367-0118 SEED PRODUCTION AND INPUT STORAGE	

Indicate block numbers. Use this form to complete the information required in any block of a PIO or PAA form.

8. Conducting and managing research, in cooperation primarily with APROSC, on the social and economic constraints to the use of seeds and fertilizer, on the management of small cooperatives and other groups producing seed and selling inputs and investigating the major causes of seed deterioration in Nepal and testing possible solutions.

9. Developing seed analysis, roguing and sampling techniques to be used in determining seed quality and adherence to quality standards.

10. Organizing farm groups to handle agricultural inputs and developing an appropriate set of business and management instructions to be used as guidance for their operations.

Individual job descriptions for each of the two long-term advisors follow. These terms of reference are in addition to the items listed above.

Seed Production and Management Specialist

Length of Assignment: 60 months

Post of Assignment: Kathmandu

Work Location: A.I.C.

Training and Experience:

This technician should have training and experience in all aspects of seed production and should be familiar with seed production techniques applicable to the major cereals, edible legumes and vegetables. A knowledge of forest tree seed collection and processing would be useful. Experience in managing a seed house and the attached production facilities as well as in setting up an effective distribution system is essential. Some training in business administration and business methods would be very helpful.

Duties:

This consultant will work with the General Manager of the A.I.C. and the Deputy Director General of Agriculture for crops in preparing plans for the development of the seed industry and then assist them in implementing them to build a successful seed industry. In addition to the tasks outlined above, the technician will assist with all aspects of the seed industry - legal, physiological, mechanical, contract negotiation and management, business administration, sales, storage etc. and will be the team leader of the U.S. financed expatriates.

This consultant must be willing to spend much of his time working with farmers in the hills and remote areas. He may be required to walk for long distances.

Seed Processing Specialist

Length of Assignment: 12 to 24 months

Post of Assignment: Kathmandu

Work Location: A.I.C.

Training and Experience:

The technician should have training and experience in seed processing and handling, distribution, storage, pest control, sales and distribution and business administration.

Duties:

This person will assist in developing systems of seed processing and storage applicable to the various parts of Nepal and adapted to the crops and cultural modes of the country. Time will also be devoted to improving input transportation and storage, repair and maintenance of machinery, equipment and buildings; setting up and equiping new seed houses and warehouses; renovating old seed houses and stores; training farmers and government employees; and setting up an adequate business system for the seed industry and input distribution. Knowledge of seed equipment, dehumidification and cooling apparatus, analysis instruments etc. is essential to this position.

The consultant must be willing to spend much of his time in the field in the remote areas which will require a great deal of walking.

Short-Term Consultants

Length of Assignments: Two weeks to two months.

Post of Assignment: Kathmandu

Training and Experience:

The training and experience of these consultants should be relevant to the job to be done while assigned to Nepal.

DESTINATION SHEET	DEPARTMENT OF STATE AGENCY FOR INTERNATIONAL DEVELOPMENT	[X] Worksheet [ ] Issuance	PAGE 10 OF 11 PAGES
		1. Cooperating Country NEPAL	2.a. Code No. 367-0118-3-80141
FORM SYMBOL	TITLE OF FORM	2.b. Effective Date -	2.c. [X] Original OR Amendment No.
		3. Project/Activity No. and Title	
PIO/T	PIO/T	367-0118 SEED PRODUCTION AND INPUT STORAGE	

Indicate block numbers. Use this form to complete the information required in any block of a PIO or PAA form.

Duties:

The jobs to be done by short-term consultants have not been decided upon and will be dependent upon the needs as they develop over the next five years and the capabilities of the long-term consultants. However, it is likely that personnel with the following skills might be required:

a. Plant physiology
b. Pest control
c. Seed drying
d. Seed and fertilizer packaging
e. Transportation
f. Humidity and temperature control
g. Moisture proofing

All technicians working as short-term consultants must be willing to work in the remote areas which may involve considerable walking.