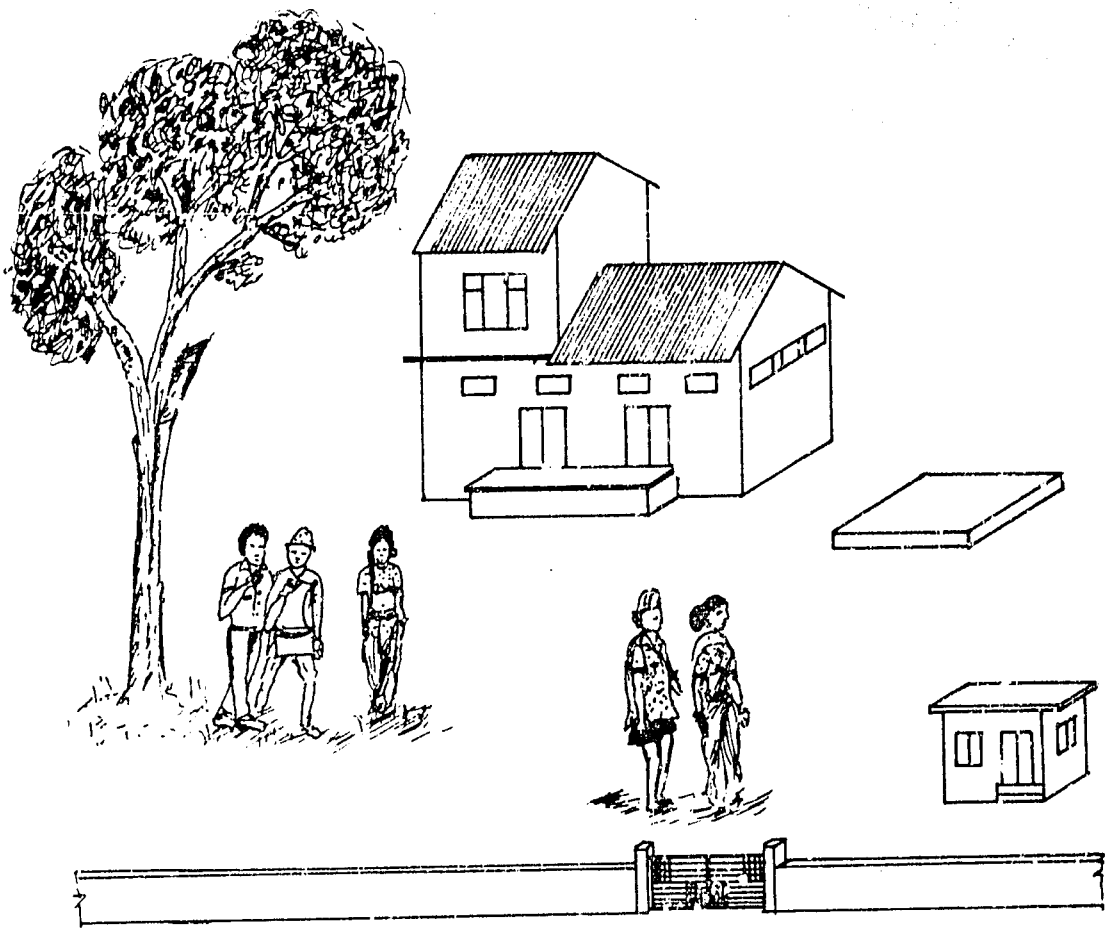
MINI-SEEDHOUSE OPERATION
FOR
HILL SEED PRODUCTION & SUPPLY
IN
NEPAL



The Seed Production & Input Storage Project (SPISP)
Agriculture Inputs Corporation
Kathmandu

July 1984

MINI-SEEDHOUSE OPERATION

FOR

HILL SEED PRODUCTION AND SUPPLY

NEPAL

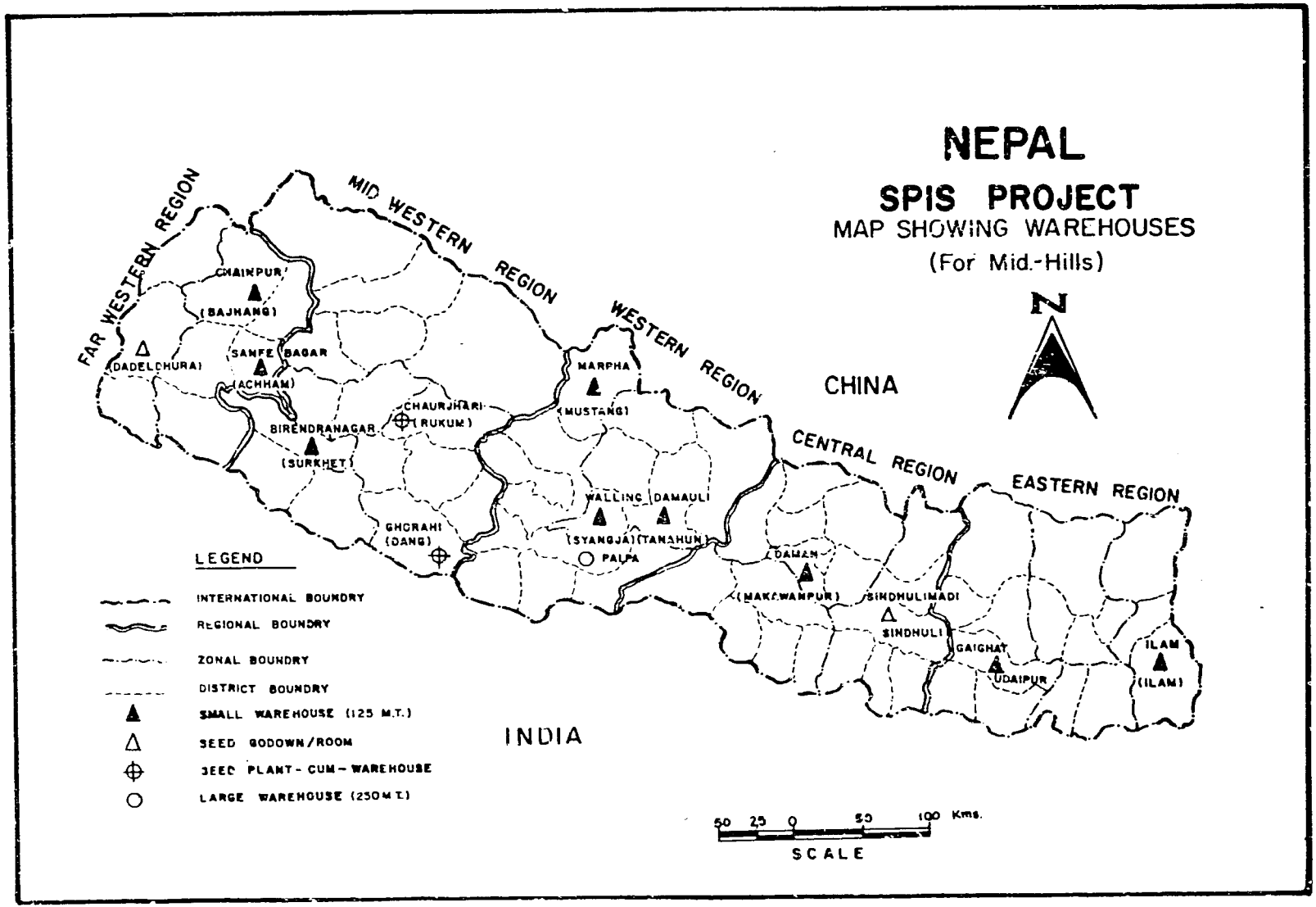
The Seed Production & Input Storage Project (SPISP)

Agriculture Inputs Corporation

Kathmandu

July 1984

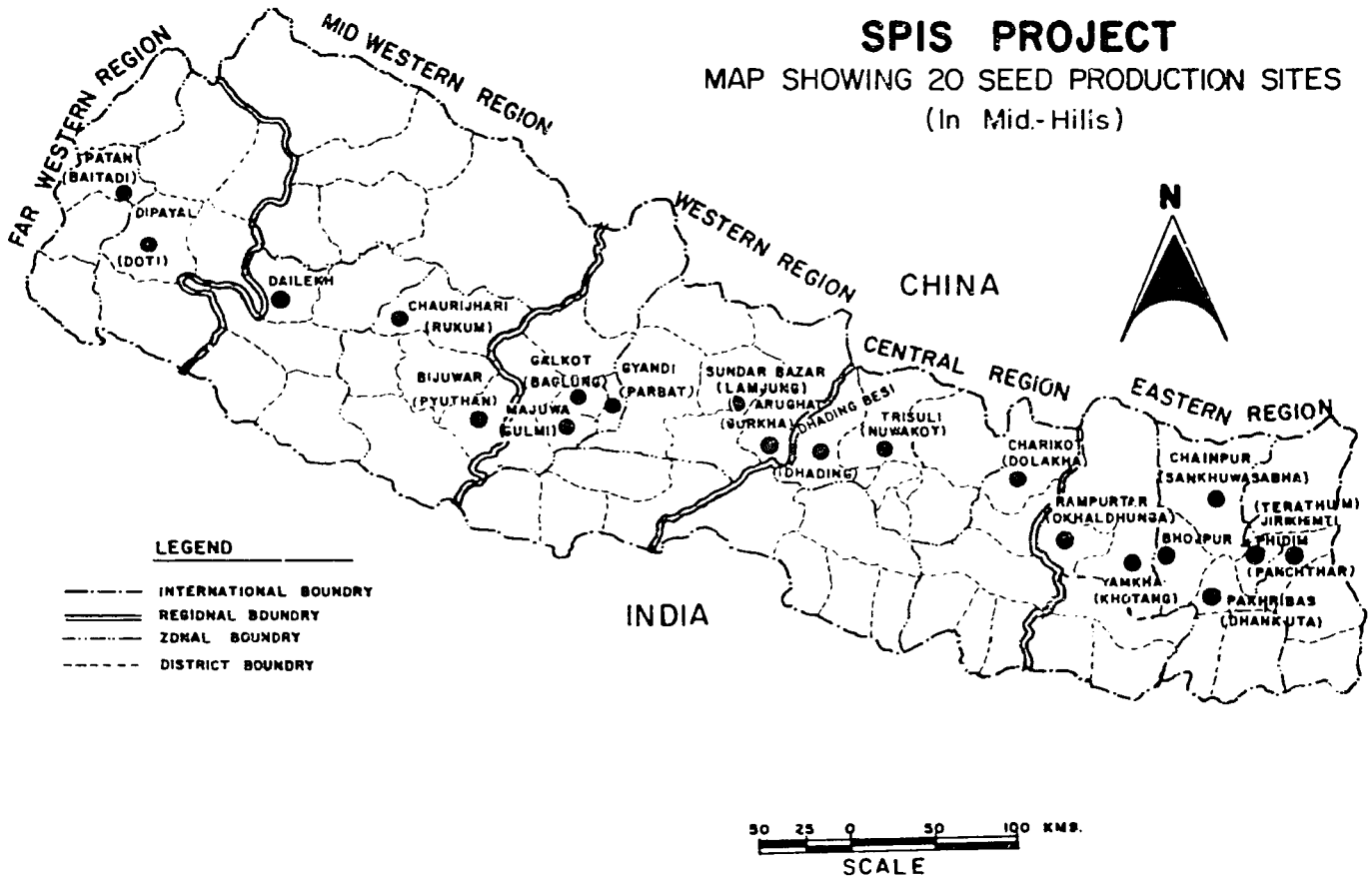
Mr. Narendra S. Wagley, Asstt. Administrative Officer, (SPISP) has helped in the typing and preparation of this document. His contribution is acknowledged with appreciation.


NEPAL
SPIS PROJECT
MAP SHOWING WAREHOUSES
(For Mid.-Hills)
N
FAR WESTERN REGION
MID WESTERN REGION
WESTERN REGION
CENTRAL REGION
EASTERN REGION
CHINA
INDIA
CHAINPUR
(BAJHANG)
(DADELDHURA)
SANFE BAGAR
(ACHHAM)
BIRENDRANAGAR
(SURKHET)
CHAURJHARI
(RUKUM)
GHORAHI
(DANG)
MARPHA
(MUSTANG)
WALLING
(SYANGJA)
DAMAULI
(TANAHUN)
PALPA
DAMAN
(MAKWANPUR)
SINDHULIMADI
SINDHULI
GAIGHAT
UDAIPUR
ILAM
(ILAM)
LEGEND
INTERNATIONAL BOUNDRY
REGIONAL BOUNDRY
ZONAL BOUNDRY
DISTRICT BOUNDRY
SMALL WAREHOUSE (125 M.T.)
SEED GODOWN/ROOM
SEED PLANT - CUM - WAREHOUSE
LARGE WAREHOUSE (250 M.T.)
50 25 0 50 100 Kms.
SCALE

NEPAL

SPIS PROJECT

MAP SHOWING 20 SEED PRODUCTION SITES
(In Mid.-Hills)



CONTENTS

			PAGE
1.		NEED FOR IMPROVED SEED	1
2.		SPIS PROJECT AND ITS OBJECTIVES	1
3.		NATIONAL SEED PROGRAM STRUCTURE	2
4.		MINI-SEEDHOUSE APPROACH	9
	4.1	Background	9
	4.2	Seed Situation	10
	4.3	SPISP Strategy	11
	4.4	Mode of Operation	12
	4.5	Status Review	20
5.		PILOT SITE EXPERIENCE	23
	5.1	AIC-managed System (Sundar Bazar)	23
	5.2	Farmer-managed System (Arughat)	25
	5.3	Operational Plans	28
6.		CHARIKOT MODEL	37
7.		TECHNOLOGY APPLICATIONS	38
	7.1	Seed Drying	38
	7.2	Electrification	40
	7.3	Seed Processing	41
8.		SEED PRODUCTION AND MARKETING PLANS	42
9.		TRAINING INPUT	47
10.		VOLUNTEER SUPPORT	52

.../..

Preface

The hill farmers of Nepal grow their crops against the heaviest of odds. Undoubtedly, they are hard working and second to none in enterprise. In the process of agricultural development, nothing is more rewarding than seeing them produce more and improve their economy. It is to serve these farmers that the SPIS Project of AIC is working to improve the supply of seed — the catalyst for better agriculture. A seed system, unique in design, and captioned mini-seedhouse program is being developed within the hill region such that the farmers may have ready access to a vital input.

This publication aims at documenting the operational experience of the system. It also highlights some of the constraints and attempts to suggest a definitive line of action for consolidation and improvement in the future.

I hope the document will prove useful in many different ways, dissemination of information not excluded. If only it contributes to a more reliable seed supply system, the purpose of writing would be fully achieved.

S.S. Bal
Project Supervisor

July 2,1984

Contd.. CONTENTS

PAGE

11. HILL SEED REQUIREMENT ---------- 53

12. SATELLITE SEED BINS ---------- 60

13. LINKAGE WITH PRODUCTION PROGRAM ---- 63

14. FUTURE PLAN OF MANAGEMENT ---------- 64

14.1 Integration and Supervision -------- 65

14.2 Working Capital Provision ---------- 66

14.3 Management Strategy ---------- 67

14.4 Wider Scope ---------- 67

Appendix - I - Dignitaries Associated with the SPIS Project ---- 69

Appendix - II - SPIS Project Staff ------- 70

1. NEED FOR IMPROVED SEED

Improved seed is, indeed, a vital ingredient in modern agriculture. Since the impact of inputs like fertilizer, irrigation, chemicals and labour largely depends on the genetic potential and field performance of seed, it is rightly recognized as the key input in crop production.

For the developing countries, good seed is truly an instrument of change. It is through the green revolution, triggered by better seeds, that the rural economy can significantly improve. In a predominantly agricultural country like Nepal, high quality seed of improved varieties has a crucial role in agricultural development. The national food production plans aim to feed the growing population and, possibly, to generate an exportable surplus for earning foreign exchange. Without an extensive coverage of area by high yielding seeds, production cannot possibly break the bonds of stagnation. In hill areas, where timely supply of fertilizer is difficult to achieve, better seeds alone could lead to gains in production even at a modest level of fertilization. Evidently, not only outdated varieties need be quickly replaced with improved ones, there must be a system of continued varietal replacement. As seed is the vehicle to carry the fruits of research to farmers' fields, the benefits of new varieties and improved technology would be realized only if there is a recurrent seed supply.

Given the advantages of good seed, a conscious effort ought to be made toward seed industry development. If that is assured, the task of increasing production could not only be accelerated, the progress would be sustainable on a permanent basis.

2. SPIS PROJECT AND ITS OBJECTIVES

The Seed Production and Input Storage Project was launched in the beginning of 1980 to assist the Ministry of Agriculture in establishing a labour-intensive system of local seed production

in the mid-hill areas of the kingdom; supported by arrangements for storage and supply of other inputs so as to stimulate increased food production and improve the economy of the farmers. Additionally, the project extends selective assistance to the national seed program through activities like training, equipment supply, technical assistance and improvement in seed quality control services. The project, funded by a USAID grant together with substantial HMG contribution, is being implemented by Agriculture Inputs Corporation (AIC) with technical support from International Agricultural Development Service (IADS). It is expected to continue till September 1985.

Under the project, a number of mini-seedhouses have been created and seed production is going-on at 20 different sites shown in an accompanying map. Small-scale facilities for seed drying, processing, treating, packaging and storage are available at these places. All in all, the mini-seedhouses are serving as a tool to promote greater use of improved seed in the hills. The traditional dependence on Tarai-produced seed is slowly phasing out. In order to complement the hill seed system a network of 13 small warehouses (125 mt each) has been established at selected points leading to the mini-seedhouses. These warehouses are also listed in a map for reference.

It is generally recognized that a dispersed system of seed production and supply in the far-flung hill areas is hard to manage and implement through AIC. Therefore, it is deemed better if the farmers of individual sites run the mini-seedhouses themselves through local community participation. The project aims at encouraging the formation and growth of farmers' seed enterprises on a trial basis.

3. NATIONAL SEED PROGRAM STRUCTURE

The seed program in Nepal is fairly well established. Starting from crop research and development of new varieties all

the essential components leading to quality seed production and distribution are, by and large, functioning. However, there is an apparent absence of impact in the matter of seed supply to farmer and maintenance of quality. Seed complaints are not uncommon. Lack of control and coordination is considered to be the bane of the present seed program. This was explicit in the deliberations of the 1st National Seed Seminar held in February 1983. To remedy the situation, the seminar, inter-alia, recommended the formation of a National Seed Board and a functional seed development office with a clear mandate toward seed industry development. The following terms of reference have been proposed for such a Board:-

1. To oversee seed industry development.
2. To take care of seed planning and programming at the national level.
3. To coordinate foundation seed production and supply.
4. To promote manpower development through training and education in seed technology.
5. To generate essential information on national seed program activities.

At the present juncture, Agriculture Inputs Corporation, whose main business is fertilizer, is the sole agency for the production and supply of major seeds in the country. Seed is largely produced by contract growers. Some seed is collected from the government farms. The private sector is rather small and invisible. It is perhaps stifled due to AIC domination and uncertain pricing policies. The AIC has a number of seed processing plants in the Tarai (and mini-seedhouses in the hills). In these facilities seed is cleaned, processed, treated for disease control and stored either at the same place or shifted to storage godowns in different parts of the country. For retail selling of seed, the AIC utilizes Sajhas as its dealers.

Private dealers occasionally fill the gap where Sajhas do not exist. Some seed is sold by AIC from its own sales counters. In any case, no matter who supplies seed at the retail level, farmers know it is all AIC seed. The choice, if any, is restricted. Thus, farmer-to-farmer seed exchange is predominant. The problems of poor germination of AIC seed and failure of new varieties are prevalent. In the final analysis, the quality and price of seed, besides timely availability, greatly determine farmers' reaction toward AIC.

Within the Department of Agriculture (DOA), there exists a Seed Technology and Improvement Program (STIP) responsible for the management of seed testing laboratories and seed certification system in the country. Certification at present is mainly confined to Tarai area. Also in DOA, there is an official Central Seed Production Committee, and a Variety Release Committee formed since 1974. The latter committee prescribes procedures for evaluating the superiority of the new varieties based on field trials and handles the release of promising varieties. The DOA, besides controlling crop research, has a responsibility for extension activities. It also executes crop production programs.

Several external agencies are assisting with the national seed program. They include, Seed Production and Input Storage Project, (USAID/IADS), Vegetable Seed Production Project (FAO) and Cereal Seed Production Project (GTZ). In addition the Agricultural Centres at Dakhribas and Lumle, Integrated Hill Development Project, National Potato Development Program and Integrated Cereals Project, to name a few, have a seed component included in their activities.

Since AIC's program is the biggest, it plays a leading role in seed production and distribution. Various steps involved in the system followed by AIC are indicated below:-

.../..

a. Foundation seed is produced by the coordinated crop programs and government farms (DOA).

b. Farmer-seed producers are selected by AIC.

c. Contracts negotiated between AIC and farmers.

d. Foundation seed delivered by DOA to AIC and then to cooperating seed growers.

e. Seed planted and crop grown and rogued by farmers.

f. Field inspections by Seed Technology and Improvement Program of DOA to check for varietal purity, isolation, reguing, diseases and weeds.

g. Seed crop harvested, dried, and cleaned by farmers.

h. Harvested crop inspected and samples taken by Seed Technology and Improvement Program of DOA.

i. Crop seed delivered to AIC for processing if it appears to be satisfactory in quality.

j. The farmer is paid local market price plus 15 percent premium upon delivery.

k. Sample of the processed seed is analysed by Seed Technology and Improvement Program of DOA and results delivered to AIC.

l. Premium calculated on the basis of analysis and farmer is paid upto 20 percent more premium on the basis of quality of seed delivered.

m. AIC completes processing and packaging.

n. Certification tags are issued.

o. Seed is placed in short-term storage by AIC.

p. AIC is authorized to sell and deliver seed after re-checking germination.

q. Seed moved to distribution warehouses and country sale points.

r. Seed sold to dealers.

s. Seed sold to farmers.

These steps basically apply to the production of certified seed. Another catagory of seed produced and supplied by AIC is known as improved seed which is the progency of certified-II class of seed and is field inspected by AIC staff themselves. Improved seed bears a yellow label. The premium paid in this case is a maximum of 30 percent and not 35 percent.

Table - 1

SEED STORAGE CAPACITY OF AIC

Development Region	Capacity in m.t.
Eastern	2030
Hill	430
Tarai	1600
Central	4595
Hill	895
Tarai	3700
Western	2350
Hill	1350
Tarai	1000
Mid-Western	770
Hill	220
Tarai	550
Far-Western	210
Hill	210
Tarai	-
Nepal	9955
Hill	3105
Tarai	6850

Source: "Seed Program Development Strategy" 1983

Table - 2

STORAGE FACILITIES UNDER SPIS PROJECT

	Site	District	# Storage capacity in m.t.
1.	(A) Small Warehouse		
1.	Ilam	Ilam	125
2.	Sindhulimadi	Sindhuli	50
3.	Waling	Syanja	125
4.	Damauli	Tanahun	125
5.	Marpha	Mustang	125
6.	Ghorahi	Dang	125
7.	Chaurajhari	Rukum	125
8.	Surkhet	Surkhet	125
9.	Sanfebagar	Achham	125
10.	Chainpur	Bajhang	125
11.	Dandeldhura	Dandeldhura	50
12.	Daman	Makanwanpur	100
13.	Tansen	Palpa	200
14.	Udaipur	Udaipur	125
	(B) Mini-Seedhouses		
15.	Pakhribas	Dhankuta	40
16.	Phidim	Panchthar	40
17.	Bhojpur	Bhojpur	40
18.	Jirikhimti	Terathum	40
19.	Chainpur	Sankhuwasabha	40
20.	Diktel	Khotang	40

.../..

Contd., Table 2

	Site	District	# Storage capacity in m.t.
21.	Rampurtar	Okhaldhunga	40
22.	Charikot	Dolakha	40
23.	Dhadingbesi	Dhading	40
24.	Arughat	Gorkha	40
25.	Sundar Bazar	Lamjung	40
26.	Gyandi	Parbat	40
27.	Gaikot	Baglung	40
28.	Majuwa	Gulmi	40
29.	Dailekh	Dailekh	40
30.	Bijuwar	Pyuthan	40
31.	Patan	Baitadi	40
32.	Dipeyal	Doti	40
33.	Trishuli	Nuwakot	40
	TOTAL		2410

With seasonal turn-over, significant increase is possible in capacity.

4. MINI-SEEDHOUSE APPROACH

4.1 Background

First, a brief review of the country situation seems relevent. The ecology of Nepal consists of three distinct areas; the Tarai plains (75-300 meters a.s.l.), the hills (300-2500 meters) and the mountains (beyond 2500 meters, and upto 8848 meters high Sagarmatha). The mountains have little agriculture because of snow cover. The Tarai is a fertile plain having potential for agricultural production and is comparatively easy to manage.

The hill areas are under-developed and lack infrastructural facilities. They are criss-crossed by streams and rivers and are generally inaccessible. Farming is carried out on terraced slopes and in small valleys. The hills have been intensively cultivated and practically every bit of land is cropped. Monsoon rains are usually sufficient for rice crop cultivation but maize, planted around March, is dependant on early summer showers. Wheat, however, being a winter crop, usually needs some irrigation. There is also a crop of irrigated rice transplanted soon after the winter is over.

Of the total 2.3 m. ha cultivated land in the country less than one-third is in the hills; but population-wise, 56% of the total population (16 million) lives in the hills. Therefore, development of hill agriculture is extremely vital. The average hill farmer owns less than 0.5 ha of farming land. He has to work against odds and constraints. His purchasing power is limited. Only low-cost, low-risk technologies can be applied in hill farming. Among the hazards, hailstorms are a malady, not to mention the menace of birds, monkeys, rats and other animals. Soil erosion is widely prevalent.

4.2 Seed Situation

AIC has developed a program of seed production in the country, but it is concentrated in the Tarai. In FY 1982-83, 89 percent of the area under maize seed multiplication and 93 percent of the area under wheat seed was in the Tarai. There is also a small but expanding rice seed production program. Country-wide, the use of improved varieties over the years is reported to have increased to about 20 percent of the cultivated area in maize and rice and more than 80 percent in case of wheat, but some of these varieties have become disease-susceptible and need replacement. This is especially true in the hill areas.

Although AIC is producing 5-6000 mt of improved seed anually, this is considered quite small in relation to total cereal seed requirement (about 100,000 m.t.). More than 90 percent of the seed used for planting comes either from farmers own production or from farmer-to-farmer exchange.

Table - 3

Seed Supplied by AIC

(1981-82)

Crop	Tarai	Hills	% age in Hills
Wheat	1782	436	20
Maize	77	58	43
Rice	200	43	18
Total	2059	537	21

.../..

Table - 4

Seed Supplied by AIC

(1982-83)

Crop	Tarai	Hills	% age in Hills
Wheat	3800	1175	24
Maize	156	132	46
Rice	610	116	16
Total	4566	1423	24

The current supply of improved seed is inadequate for the hills and, as a result, the spread of new varieties with better yield potential has remained patchy and low. The hill areas have been receiving Tarai-produced seed with numerous problems. These include non-availability of seeds specifically suited to hill environments, uncertainty of supply, high transportation cost, late arrival, logistics of seed movement over mountain trails, in-transit opening of seed bags by contractors and delivery of sub-standard seed to farmers. The problems posed by the rugged terrain and topograpy were, however, recognized by HMG of Nepal and after considerable thought and deliberation in the late seventies a decision was made to enable the hill farmers to meet their seed needs through local production.

4.3 SPISP Strategy

The strategy guiding the SPIS Project aims at developing a seed multiplication system whereby hill farmers in identified pockets are encouraged to produce quality seed. Following are the broad elements included in this strategy.

.../..

1. In each selected site, a mini-seedhouse facility for processing and storage of 40-50 m.t. of seed should be created.
2. To complement the mini-seedhouses, a number of fertilizer-cum-seed warehouses be provided at strategic points to ensure an effective flow of inputs to farmers.
3. Hill farmers be given practical training to become efficient seed growers.
4. A mini-seedhouse should serve as the coordinating centre for inputs, credit and extension advice to farmers.
5. To encourage community participation in the mini-seedhouses activities, formation of farmers own organizations be encouraged.
6. To promote the hill seed system, suitable incentives in the initial years may be extended.

/ With successful implementation, such a strategy would, eventually, obviate the need for carrying large quantities of seed from the Tarai to the hills. It would, instead, be easier to regularly pump in small amounts of foundation seed of promising varieties letting the hill system take care of further multiplication and local distribution.

4.4 Mode of Operation

The first step in initiating SPJSP activities was to identify suitable and needy areas in relatively remote locations with potential for enhancing food production. This was sought to be achieved through baseline surveys and socio-economic investigations. Well-trained field teams were sent out for data collection through the key-informant method. Thus, site profiles were obtained. The result of this basic exercise revealed the complexities and limitations of prospective seed ventures in the hills of Nepal. It was realized that a viable strategy must take into account many unique characteristics such as the ones listed below:-

.../..

1. Mules and porters are the chief means of transportation in mountaneous areas and so carrying bulky equipment or material is unpracticable.
2. At most places, use of electrically-powered seed cleaning equipment is out of question and sun drying is the only possibility of achieving a safe moisture content in seeds.
3. Among the small hill farming communities seed quality consciousness is yet to permeate. The result: most planted seed comes from farmer to farmer exchange.
4. In food deficit areas the land for seed multiplication is very limited.
5. Due to high default rate, bank credit is scarce and lack of capital is usually overcome through barter among the villagers themselves.
6. To induce competent agronomists, extension workers, technicians or seed technologists to live and work in remote areas is by itself a difficult proposition.
7. The cooperatives (Sajhas) are beset with limitations and hence not in a position to give a lead to seed program activities.
8. A privately managed system is possible but has to wait because the small farmers with limited resources have neither the initiative nor motivation to attempt a commercial proposition. In the beginning such farmers usually prefer a no-risk plan by being contract growers of the AIC. They do have an interest in a farmer-managed seed program if successful working is first demonstrated by an official agency.
9. Saving seed from insect and rodent attack is a critical problem for small farmers. This is especially true for vulnerable wheat and maize seeds that need to be stored through the rainy season. Therefore, organized seed production, processing and storage is essential in the hills if the traditional varieties are to be replaced by improved ones.

In light of the foregoing and based on relevant information, a detailed site operational plan was developed appropriate to each site. Thereafter investment was made to create basic infrastructure and an action plan for seed production launched in consultation with the local community.

.../..

As already mentioned, the basic purpose of the SPIS Project is to assist in establishing a system of seed production in selected pockets of the mid-hills. Obviously, the system should be simple to manage. It should have the participation of private growers to be effective. The seed produced should be locally handled for processing and storage so as to meet demand in the surrounding areas. In order to pursue the goal, it was decided to create a chain of mini-seedhouses in potential pockets (Panchayats). A mini-seedhouse serves as the hub of seed-related activities in the area. It consists of a small building with two sections. In one, small-sized (mostly hand-operated) equipment is installed for cleaning, grading, treating, bagging, labelling and weighing of seed, and the other section is essentially a room for safe storage of seed over wooden pallets. The length and breadth dimensions of these two sections are: 25'x40' and 25'x20' and they are inter-connected by a door. Section 2 in some sites is double-storeyed which improves the environment of the storage room below and provides upstairs space for a small office. Within the compound fence is a drying platform (40'x20) for sun-drying of high-moisture seeds.

Having created the basic structure of a mini-seedhouse, possible improvements are made on the basis of site needs. For instance, a couple of sites now have electricity or captive electricity is provided by a 2.5 KVA kerosene generator making it possible to use a motorized seed cleaner with a larger through-put of high quality seed.

It is important to keep a mini-seedhouse stocked with the essential equipment and supplies for proper handling of seed. Table 5 shows the items of basic equipment needed. Seasonal supplies of seed bags, labels, leaflets and chemicals are also made available to each mini-seedhouse for seed treatment, fumigation and packaging.

.../..

A team of motivated seed growers is, of course, the backbone of the program. Since development of seed growers is a pre-requisite for quality seed production, foremost attention is paid to identify, motivate and train a sufficiently large number of farmers to ensure program implementation. The following criteria is kept in view while selecting seed growers:-

1. Seed growers should be as close to the mini-seedhouse as possible.
2. Seed should be produced in compact blocks for better supervision as also to overcome the problem of isolation in maize seed production.
3. A seed grower should have enough land of productive quality, preferrably irrigated land.
4. Farmers having long-term interest in seed production should be selected.
5. The selected farmer should demonstrate a cooperating attitude and willingness to be a member of the Seed Grower's Association.
6. Quality consciousness is also an important qualification. A seed farmer must be willing to do timely roguing and avoid admixture while handling seed.
7. A seed grower should, basically, be a good farmer, otherwise he may not have the ability to be a good grower.
8. The growers should follow the recommendations in growing a seed crop and be willing to deliver raw seed at the mini-seedhouse for processing.
9. The seed growers should understand the value of foundation seed for multiplication and be willing to pay the extra cost it might entail.
10. Above all, a seed grower should have risk-bearing capacity in the event his crop is rejected for seed purposes or is damaged due to natural factors.

Table - 5

LIST OF STANDARD EQUIPMENT FOR A MINI-SEEDHOUSE

A. Processing Equipment

1. Seed Cleaner + Tools
2. Avery Scale
3. Pan Balance
4. Drum Seed Treater
5. Scoop Shovel
6. Large Hand Scoop
7. Small Hand Scoop
8. Metal Handling Tubs
9. Bag Truck

B. Office Supplies

1. Furniture, 3 chairs, 3 benches and a table
2. Steel Cabinet
3. Numbering Machine

C. Storage Supplies

1. Tarpaulin 5x5 meters
2. Fumigation Cover 3x3x3 meters
3. Wooden Pallets
4. Padlocks

D. Quality Control

1. Moisture Tester
2. Sprayer
3. Max-Min Thermometer
4. Sling Psychrometer
5. Bag Probes
6. Measuring Tape
7. Petri Dishes

.../..

Contd.. Table 5

E. Specific Items

In addition, certain sites have been provided with items such as generator, sleeping bag, metal bins, bag closer, kerosene heater etc. according to need.

F. Seasonal Supplies (according to requirement)

1. Gunny bags
2. Seed bags
3. Sample bags
4. Labels
5. Leaflets
6. Celphos
7. Malathion
8. Vitavax
9. Foundation Seed.

Table 6

JT/JTA's worked/working with SPIS Project

No.	Site		Name
1.	Trishuli	a.	Hari Prasad Neupane *
		b.	Ram Chandra Paudal
2.	Charikot	a.	Nava Raj Sapkota *
		b.	Ram Hari Soti *
		c.	Nava Raj Sapkota
3.	Dhadingbesi	a.	Prem Bahadur Kumal *
		b.	Raghu Narayan Shrestha
4.	Sundar Bazar	a.	Jagat Bahadur K.C.
5.	Gorkha	a.	Keshab Raj Adhikary *
		b.	Nava Raj Acharya *
		c.	Buddhi Prasad Shrestha *
		d.	Ram Hari Khanal *
		e.	Dhan Kumar Shrestha
6.	Gyandi	a.	Lokendra Bohara *
		b.	Sundar Shyam Shrestha *
		c.	Nani Ram Silwal *
		d.	Chandra Bhusal
7.	Galkot	a.	Jayanti Prasad Misra
8.	Majuwa	a.	Khem Narayan Chapagain
9.	Chaurajhari	a.	Tul Bahadur Pun *
		b.	Keshab Prasad Pokharel
10.	Dailekh	a.	Satya Dev Mandal
11.	Bijuwar	a.	Bharat Mani Sharma
12.	Dipayal	a.	Mara Bahadur Dhami
13.	Patan	a.	Jaya Singh Bista
14.	Okhaldhunga	a.	Ram Lakhan Mandal
15.	Chainpur (S)	a.	Hari Kumar Prasain
16.	Pakhribas	a.	Bishow Nath Sharma
17.	Bhojpur	a.	Dinesh Kumar Bhattarai
18.	Phidim	a.	Bishnu Kumar Raj
19.	Terathum	a.	Dharma Raj Budathoki
20.	Diktel	a.	Shyam Lall Khatri

* Former JTs/JTAs

Table - 7

TECHNICAL CONSULTANTS' UPDATE

No.	Name	Field	Date
1.	Dr. J.F. Harrington	Veg. Seed Production	Apr 11-May 31, 1981
2.	Mr. P. Koostra	Seed Technology	Jun 19-Jul 18
3.	Mr. E.D. Perdon	Extension and Communication	Jul 1-Aug 28
4.	Dr. P.F. Kaplan	Socio-Economic Survey	Sep 11-Dec 11
5.	Dr. A.H. Boyd	Humidity and Temperature Control in Seed Storage	Nov 3-Nov 13
6.	Dr. J.R. Pedersen	Field and Storage Pest Control	Nov 9-Nov 19
7.	Dr. C. Hugo	Storage Management	Nov 9-Nov 19
8.	Dr. P.R. Mezynski	Seed Production and Seed Storage	Apr 13-May 9,1982
9.	Dr. A.H. Boyd	Seed Drying Packaging and Storage	Apr 13-May 9
10.	Mr. R.G. Griffiths	Field Inspections and Seed Analysis	Jun 5-Jul 4
11.	Dr. J.C. Delouche	Seed Technology and Research	Sep 26-Oct 12
12.	Dr. B.R. Gregg	Seed Drying, Packaging, and Storage	Feb 14-Feb 19, 1983
13.	Dr. J.E. Douglas	Seed Program Development and Management	Feb 21-Mar 12
14.	Messrs Binod Sijapati and K.B. Hamal	Seed Marketing	Jun 1-Sep 1

Mid-term Evaluation Team

1. Dr. J.I. Sutherland, Team Leader
2. Dr. Ramesh Munankarmi
3. Mr. J.N. Thapliya

4.5 Status Review

The construction of mini-seedhouses, as per approved designs and estimates, was taken up in a phased manner; the work started first in the central and western regions and later spread to the eastern, mid-western and far-western regions where, presently, it is still on-going at a few of the sites. An area of 2 Ropanies was considered adequate for a mini-seedhouse but the final land area varies from site to site. The land for the purpose has been given to AIC by the Panchayats and, obviously, this left but a restricted scope for choice in siting the buildings.

The original design was a 2-room structure, one room for seed cleaning and one for seed storage. Nearby, is a raised drying platform for sun-drying of high moisture seeds. Also inside the fence is a guard room. As construction proceeded it was realized that a flat concrete roof is needed over the storage area to avoid water leakage during rains, to keep the area naturally cool and also to permit effective fumigation of the entire room. Consequently, an improved double-storey design for the storage room was adopted at some of the remaining sites. This decision also created office space upstairs. With the said change, the number of ventilators was reduced to the minimum as they served little useful purpose. The floor of a mini-seedhouse is made damp-proof with the use of tar-felt/plastic sheeting. Likewise rat proofing is ensured by removable wooden stairs to the mini-seedhouse. A barnyard ventilator atop the single storey storage room helps in cooling the area by judicious ventillation. For instance, the wall openings (ventilators) could be opened during late evenings (in hot summer) when the atmospheric air is relatively cool and dry. Likewise, if the room temperature anytime rises beyond 30°C, aeration can be done to arrest the temperature rise.

.../..

The seed storage is equipped with wooden pallets so that seed bags do not touch the floor (& the walls). A fumigation cover has been provided for dealing with batches of seed when necessary.

On the operational side, due to short duration of the Project, a decision was made at an early stage to launch the site seed production program in anticipation of mini-seedhouse construction. At the present time, construction at several sites is still in progress and, accordingly, the produced wheat seed of 1983-84 crop season is being handled in rented accomodation on a temporary basis. Without the improvisation, it would appear, the essential task of producing seed would have been delayed by a year.

In the future, it might be advisable to simplify construction work for a program of this kind. Through design improvement and use of local construction material, construction can be speeded up considerably. Efforts should be made to reduce the time lag between construction and operational use of a mini-seedhouse. By now it is quite evident that a modest and less expensive structure would be equally suited to seed processing and storage needs in the remote areas.

Table - 8

MINI-SEEDHOUSE CONSTRUCTION PROGRESS

No.	Site	District	Contract Amount	Construction Start Date	Work Progress
1.	Trishuli	Nuwakot	252,779.97	038.2.1	Completed
2.	Dhadingbesi	Dhading	350,070.50	038.2.4	,,
3.	Sundar Bazar	Lamjung	335,884.66	038.2.10	,,
4.	Arughat	Gorkha	247,554.85	038.7.6	,,
5.	Gyandi	Parbat	531,155.25	038.12.25	,,
6.	Galkot	Baglung	388,659.82	038.6.29	,,
7.	Okhaldhunga	Rampurtar	427,124.00	040.2.27	,,
8.	Pakhribas	Dhankuta	227,975.80	040.5.19	,,
9.	Dipayal	Doti	602,237.54	040.5.6	,,
10.	Charikot	Dolakha	424,989.38	039.2.21	,,
11.	Majuwa	Gulmi	323,819.74	039.9.2	,,
12.	Chaurajhari	Rukum	899,430.86	039.1.10	Roof level
13.	Patan	Baitadi	371,200.35	040.4.24	,,
14.	Phidim	Panchthar	465,305.60	040.6.20	,,
15.	Diktel	Khotang	546,862.50	040.7.11	,,
16.	Dailekh	Dailekh	535,009.20	040.8.4	,,
17.	Pyuthan	Bijuwar	384,324.60	040.8.6	,,
18.	Chainpur	Sankhuwasabha	278,711.19	040.8.20	,,
19.	Bhojpur	Bhojpur	316,320.18	040.7.7	Nearing completion
20.	Terathum	Jirikhimti	689,083.60	040.6.28	,,

5. PILOT SITE EXPERIENCE

Under the SPIS Project, the Revised Project Implementation Strategy of 1981 emphasized the establishment of two pilot sites. This concept was introduced in order to gain work experience, test innovations and develop appropriate strategies for desired success in project implementation. In practice, however, each and every project site, because of its distinct profile, is a pilot site in character. All the same, two sites, Sundar Bazar in Lamjung district and Arughat in Gorkha district have received special treatment, the former as an AIC-run system and the latter as an enterprise managed by farmer themselves.

5.1 AIC-run System (Sundar Bazar)

At the time of writing this report, all but two of the 20 seed production sites are directly managed by AIC. Sundar Bazar was the very first to get started in 1981-82. The nearest AIC office for the district is at Besi Sahar, a 5-hour walk. The area farmers showed keen interest in mini-seedhouse establishment but were not willing to take the operation in their own hands till AIC demonstrated it to them for a few years. This was understandable as the farmers have never had an exposure to a seed enterprise to give them the needed confidence. For a start, it was decided to let AIC organize contract seed production with the interested farmers.

Under this system, AIC supplies source seed to its seed growers following the signing of a contract. With assistance from the project, training in repeat sessions is given for the production of good quality seed and the farmers are motivated to follow the technical guidance in this regard.

To its best ability, AIC helps the seed growers meet their fertilizer needs and coordinates with ADB for sanction of loan so that the seed production effort is not hampered by constraints. The site JT works with the farmers to assure timely planting, proper fertilization, clean cultivation, roguing of off-types and finally careful harvesting, drying and threshing of the seed crop. He also conducts field inspections and prepares reports as to crop purity and general condition. Short meetings are held with the seed growers from time to time to convey instructions and listen to their problems. The project seed technologist as also the coordinator ensure continuous backstopping of the JT through field visits. Once in a while, the JTs of different sites receive more formal training to do their job well.

Barring the lots that may look sub-standard and deteriorated, the seed produced by these private growers is collected/procured by AIC. The growers deliver the seed at the mini-seedhouse and are paid on the basis of an agreed price topped by 10 percent as premium (for improved seed). AIC, with the help of mini-seedhouse equipment, arranges to clean, process and package the seed into convenient-size bags. At the same time representative samples are drawn from all the seed lots and sent to official seed testing laboratory (Khumaltar) for quality testing. Based on the laboratory report, the approved seed lots are finally tagged and taken to storage. In accordance with the calculation formula of AIC, the seed growers are paid the balance of premium in line with seed quality.

In this system, while seed production is privatized, storage and marketing are not. Subsequent to buying the seed from seed growers, entire responsibility is that of AIC. They later sell the seed to farmers through Sajha Sansthans or to an extent directly. Both in seed pricing and marketing, AIC run mini-seedhouses essentially follow AIC regulations.

.../..

The AIC-run system is generally acceptable to farmers due to its pioneering role. It makes the mini-seedhouses perform even as the volumes are low in the initial years. Also, the seed growers feel they are free from the risk and hassle attached to seed handling and marketing. But, for AIC, the management of scattered mini-seedhouses is difficult and cost-ineffective. To them, a mini-seedhouse is not a commercially viable business, nor is it a thing of any priority, considering the fact that AIC's mainstay is fertilizer followed by seed production program in the Tarai.

5.2 Farmer-managed System (Arughat)

Unlike AIC-run system, a community seed enterprise for each mini-seedhouse, though a desirable goal, is inherently slow in starting-up. A lot of time has to be allowed for motivation, demonstration and convincing before a group of farmers at all feel ready for the seed venture. But the time and effort are worth spending, considering the benefits of local management of mini-seedhouses by non-governmental sector. The following advantages weigh heavily in favour of a farmer-run system.

1. As hill programs require peoples participation, farmers themselves ought to be involved in mini-seedhouse operation.
2. A locally managed mini-seedhouse is evidently more responsive and efficient than a remotely-controlled one.
3. Through judicious planning seed production can be arranged according to known demand thus avoiding unwanted surplus stocks or a seed famine.
4. Because of flexibility in decision making, rational prices can be fixed to promote the use of good seed. Prices can also be revised anytime in line with the market trend.

.../..

5. If the farmers manage the mini-seedhouse, the responsibility and burden of the government would be reduced to the minimum. Thus the system could be self-sustaining.

6. With this system, it is possible for the seed consumers to pay with grain than with scarce cash, a point strongly made out by Dr. Paul F. Kaplan in his report "Social/Economic Factors Influencing Seed Production, Storage, Distribution and Usage in Hill Areas of Nepal".

The farmer-managed system is presently working at Arughat (Gorkha) as a pilot operation. There the first step was taken when in 1982 the project succeeded in identifying a young farmer with leadership qualities. Soon the idea of a farmer's own organization caught up and a group of about fifteen farmers came forward to launch the program. By now the program is well established. Seed production, though on a small scale, is going on well season after season.

The modalities of the system are something like this. The farmers have formed a Seed Growers Association (SGA) and nominated/elected a working committee for the purpose of running the seed business. The leader among them acts as co-Manager of the mini-seedhouse alongwith the JT (site Manager). SPIS Project is intimately involved in motivating, training, backstopping and providing necessary support in the initial years. To promote the program, AIC has placed the newly constructed mini-seedhouse at the disposal of SGA for toll-free use.

Decision making at Arughat is entirely SGA's business. It decides how much seed of a variety to produce and how to apportion area among the members. The farmers have a complete say in fixing prices besides using the sale proceeds and profits in their best interest. They work themselves in the mini-seedhouse instead of hiring labour for seed handling.

.../..

Usually the seed production fields are selected within easy reach as the distant farmers only escalate the transportation cost. The SGA holds meetings in the presence of JT to discuss and sort out problems. The role of JT is transitional and eventually the co-Manager himself will be in a position to take care of the program with continued technical assistance from AIC. As far as possible, the JT avoids direct interference and is essentially available to SGA for guidance and to arrange inputs. He also assures that the seed sold by SGA is of an acceptable quality.

In a farmer-managed system, the local bank (ADB) has an important role to play. SGA needs loan to raise a seed crop; again when the members deliver their seed at the mini seedhouse a sizeable loan is required against stock hypothecation. However, loan repayment is practically assured and even guaranted by AIC whose representative, the JT, supervises the program. The bank gives loan to SGA and not to individual members and hence chances of default are minimal.

The Arughat model is already attracting attention. Farmers in other sites like the idea of a self-managed system and want to emulate. The Project has in the recent past organized observation tours to Arughat for the farmers of Dolakha and Bhojpur. As a result, similar systems are beginning to sprout there. It is increasingly realized that many more mini-seed-houses could go private if persistent efforts are made in that direction.

The experience at Arughat, however, has not been problem free. Especially, official policies in the seed sector seem to have an adverse effect. Farmers complain the AIC seed is subsidized and they cannot compete unless they receive a uniform treatment in this regard. They also expect to receive

.../..

source seed of high quality for multiplication and at a more reasonable price. They are demanding superior varieties that farmers can readily accept. They want ADO's help in promoting the use of improved seed in the area so that demand at a higher level is generated. These problems, however, are not insurmountable and if they are resolved a bright future should await the farmer-run system.

5.3 Operational Plans

(A) Sundar Bazar Mini-Seedhouse

1. General Information:

The site is situated at latitude 28° 17' longitude 84° 20'. Its elevation is about 700 meters a.s.l. It is at a distance of 16 km from Dumre on Kathmandu-Pokhara highway. Tarku Panchayat in which Sundar Bazar is located has a population of about 5100 comprising of 760 households. A new motorable road (in dry season) reaches Pondi Dhik from where the mini-seedhouse is only 40 minutes pleasant walk.

2. Site Management:

The site is AIC-managed and comes under the branch office, Besisahar. The site coordinator is Mr. Jagat Bahadur KC, JT, an AIC employee, working since July 1982. One watchman has also been employed by AIC. Additionally, an ADB loan officer and DOA extension JT are available for necessary help and cooperation. Two Peace Corps Volunteers have done work in Sundar Bazar

1. Mr. Robert N. Iltis from Sept. 1981 to July 1982
2. Mr. Jarol Kalhoff from August 1982 to July 1983

.../..

3. Operational Details:

For the purpose of seed production, plans are prepared by SPIS Project office each year/season in consultation with the Seed Division (AIC) and discussed with the site JT before they are finalized. Accordingly, the JT holds meetings with the prospective seed growers to enlist their views and cooperation and to decide on area allotment and base price for seed multiplication. Training sessions then follow. If necessary, field verification may be done by the JT so that he is satisfied with the fields where seed is going to be produced. Finally, contracts are signed with individual seed growers. Then the project office arranges to supply the source seed obtained from AIC on the basis of advance planning. The JT keeps the project office and project coordinator informed of the progress through periodical reports. The project field staff also visits the site to review progress and deal with problems.

Based on planting report figures, the project office initiates procurement of bags, labels, leaflets and other necessities for the season so that they reach the site about a month before seed collection. Meanwhile, AIC central office channels sufficient funds to the branch office for payment to seed growers. Since AIC also deals with fertilizer, it is usually possible for the JT to assure sufficiency of this vital input. If not, AIC central office is approached for help. Similarly, loan arrangements are coordinated with the local bank branch. During crop season, the JT pays frequent visits to growers fields to render advise and to assure acceptable seed quality. From the year 1984-85, plans have also been made to introduce certification of seed by STIP of the Botany Division, Khumaltar.

.../..

The processed seed is tested, bagged and stored under constant supervision. As the marketing season approaches, AIC branch office, in consultation with its zonal office (Pokhara) announces marketing plans for the seed alongwith sale price. For local demand, the site JT is able to get a fair idea of how much to reserve and the rest of the seed is moved to Besisahar or other Panchayats for sale to farmers.

4. Working Guidelines:

The project, in consultation with AIC, have developed guidelines for the working of the mini-seedhouse. They have been given to the JT as well as to AIC branch manager. These guidelines, together with management system of AIC at the field level, enable the JT to carryout assigned responsibilities. Following the guidelines, a site budget is developed and, accordingly, operational funds are made available through AIC. In order to ensure integration of the mini-seedhouse into AIC, the supervisory role has recently been assigned to the local branch manager.

5. Seed Multiplication:

The site has made rapid strides in producing good quality seed. It has achieved the capability to utilize the mini-seedhouse to its full capacity but the production of seed is consciously restricted in line with the present demand level. While wheat tops the list of seed crops, the program of maize seed multiplication is also moving forward; rice is still minimal.

.../..

In three wheat seasons at this site, harmful rains hit twice at the harvesting time, inflicting a severe blow on the seed growers. This appears to be a general problem in hill areas, as actual experience has revealed. Untimely rain and hail are a serious hazard in quality seed production but there is no escape from them in a program of local seed production. The adverse effect could be minimized, however, through area dispersal. A satellite seed bin program, discussed elsewhere, may provide an answer or atleast a partial solution to the problem.

Table - 9

*Seed Production at Sundar Bazar

Year	Wheat			Maize		
	Area (ha)	Seed (m.t.)	No. of Growers	Area (ha)	Seed (m.t.)	No. of Growers
1981-82	15	16	55	0.5	0.5	3
1982-83	26	20	71	3.0	2	7
1983-84	30	17	84	2.5	2 (estimated)	12
1984-85 (proposed)	25	-	-	70	-	-

* Actually more seed is produced but each farmer retains some for own use.

In both 1982-83 and 1983-84, harmful rains at harvest reduced the expected production by 50 percent

Multiplication of rice seed has begun on a small scale.

.../..

6. Seed Pricing and Marketing:

Sale prices at Sundar Bazar are decided by AIC. The price of wheat seed was subsidized by about Rs. 2/kilo in 1982-83 and Rs. 1.50/kilo in 1983-84. The seed procurement price is, however, decided by a local committee consisting of AIC, ADO and ADB representatives keeping in view the market price of grain. If the market price rises at harvesting time the seed growers get a correspondingly increased price. AIC sells seed through the Sajha, who are entitled to 6 percent dealer's commission on seed sold. Because of better quality, the seed sold by Sundar Bazar mini-seedhouse in the last two years has been widely appreciated by the farmers. This, according to reports, is a refreshing contrast with the situation of the past. Therefore, demand for locally-produced seed is expected to be high if quality is maintained.

Table - 10

Wheat Seed Prices (Sundar Bazar)

Rs/Kg

	1981-82	1982-83	1983-84
Foundation seed sale for multiplication	Rs 3.40	* 3.75	** 6.55
Base Procurement price of Certified/ Improved seed	Rs 3.25	3.75	5.00
Sale price of Certified/ Improved seed	Rs 3.40	* 3.75	***5.06

* Subsidized by Rs. 2/- per kg
** ,, ,, ,,
*** ,, Rs 1.50/kg

(B) Arughat Mini-Seedhouse

1. General Information:

Arughat is situated at latitude 28° 03' and longitude 84° 49' and is about 600 meter a.s.l. Its distance from Gorkha (1½ days walk) is 20 km and all transportation takes place by porters and mules. The mini-seedhouse, at one end of the bazar, is close to the river Budhi Gandaki. Arughat lies between two large valleys, Salyantar of Dhading district and Bhorlangtar of Gorkha district.

2. Site Management:

This is a pilot site for farmer-managed system and stands apart by its uniqueness. For administrative purposes, it comes under AIC branch office, Gorkha. The site JT (presently Mr. Ram Hari Khanal) is on deputation from DOA to AIC and his primary role is to build up a farmer-managed system. Mr. Dhan Kumar Shrestha, local farmer-leader and field assistant for SFIS Project is the farmers' representative jointly responsible for running the mini-seedhouse program.

The site became operational in September 1982-83 and took off as a private enterprise from the beginning. Rick Kunkel, PCV, served at the site from April 1982 to July 1983.

The farmers of Arughat, motivated by the challenge to run their own seed business and inspired by leadership of Mr. Dhan Kumar Shrestha, have formed a Seed Growers Association, (SGA) consisting of about

.../..

15 members. The SGA operates through a working committee and have nominated Mr. Dhan Kumar as co-Manager of the mini-seedhouse to work alongside the official JT. The site owes its success to the cohesiveness of the SGA. The members have been displaying a sense of cooperation among themselves and are ever willing to take initiatives. Farmers of other sites are impressed by the Arughat model. They are slowly coming round to creating their own associations for the purpose.

3. Operational Details:

For the purpose of planning for seed production, a bottom-up approach is the rule which is working well. The SGA meets and decides about the hectarage to be put under seed production to meet the effective demand. Seed production plans are not prepared in contralized offices. No contracts are signed with AIC, nor is there any question of procurement price. The seed growers understand that their involvement extends from production to storage and marketing and in the end they most likely turn a larger profit than is possible by producing grain crops. The production plans are, however, reviewed and agreed upon by the project staff. Accordingly, source seed of each variety is arranged for the SGA who pay for it as per AIC rules. Similarly, fertilizer needs are also met. Most farmers have received formal training in seed production and handling from the project but, each season, refresher sessions are also held at the site.

.../..

Under technical guidance of the JT, the seed growers produce requisite quantity of seed and pool it in the mini-seedhouse after harvesting and drying individually. Meanwhile, the seed cleaning and processing equipment is readied with JT's assistance. As in AIC-managed sites, the project supplies bags, tags and labels but the chemicals are bought by the SGA from AIC. The initial help in providing bags is meant to promote the embryonic set-up and to demonstrate the importance of proper packaging and labeling of seed. Inside the mini-seedhouse, the farmers work on a voluntary basis and no labour as such is employed. Later in the marketing season, SGA decides the price at which to sell the seed to other farmers. The first years production of wheat seed sold rather fast in October-November 1983. It was good to see that the SGA did not compromise on quality while pooling seed of its members at a time when repeated rains at harvest had badly affected some seed lots. The most heartening feature was that the SGA sold its seed at Rs. 5.75/kg and obviously made adequate profit - as compared with AIC's sale price of Rs. 5/kg for the district (subsidized to the extent of Rs. 1.50/kg). The whole system enjoys much greater flexibility in decision making than would ever be possible in a large size official organization. Moreover it casts least burden on government resources and has the advantage of much-avowed community participation in the context of rural development.

So far the SGA in Arughat has avoided dependence on costly bank loan although they have a clear option

.../..

to make use of it with AIC's help. AIC also assures to buy surplus seeds, so that the small-scale seed enterprise does not unduly carry a risk due to unsold stocks.

The SGA is keen to try new varieties because a promising variety, if successful, would significantly enhance their marketing capability. The new varieties thus far introduced include UP 262 of wheat, Arun of maize and Kanchan and Himali of rice.

4. Seed Multiplication:

Table - 11

Seed Production at Arughat (ha)

Crop/Variety	1982-83	1983-84	1984-85 (proposed)
Wheat	5.5	8.0	10.0
Maize	3.0	5.0	6.0
Rice	0.25	0.5	3.0

6. CHARIKOT MODEL

The site at Charikot (Dolakha) was started in September 1982 and continued to be managed by AIC for over a year. In the meantime, efforts to convert the site to a farmer-managed system began to prove successful. To give a fillip, the Integrated Hill Development Project (IHDP), operating in the area, joined hands with SFIS project in efforts to privatise the system. As a result, the wheat seed of 1983-84 is being handled by the farmers themselves.

Unlike Arughat, the system at Charikot does not have a Seed Growers Association or a co-Manager to represent a visible seed enterprise. It is infact more like a satellite program of the mini-seedhouse that fits well with IHDP's existing field activities. Apart from producing seed near about the mini-seedhouse, 3 or 4 outlying villages are participating by offering small compact blocks for seed production. In these villages, IHDP plans to create small storage facilities which the farmers may use. The farmers produce seed for local demand under technical supervision of SFIS Project JT and assistance from IHDP. At processing time, mini-seedhouse equipment like Model 30 Seed Cleaner and Dole Moisture tester are loaned for use in these villages. To promote the program, SFIS Project makes arrangements for bags, tags and labels etc. The processed, packed and tested seed remains farmers' property till they sell, barter or consume it for crop production.

Since, the small farmers need ready cash soon after harvest and think the bank credit is too expensive, the key ingredient for a private seed enterprise in the hills is the availability of some kind of a revolving fund. In Charikot, IHDP has done this in their own way. They extend an interest-free loan fund to seed growers in compact blocks and the token 2 percent charge on it is used as a source of reserve finance for the farmers to develop the seed program.

.../..

As is evident, the mini-seedhouse in this case serves basically as the source of foundation seed and supplies, technical guidance, training and promotional assistance for satellite seed production pockets run by the farmers themselves. The problem of transportation of seed to and from the mini-sedhouse is automatically eliminated. The program has the potential for adoption in areas like Pakhribas and Bijuwar (Tyuthan) where similar systems can be launched with the cooperation of Pakhribas Agricultural Centre (PAC) and Rural Area Development Project (RAD) respectively.

7. TECHNOLOGY APPLICATIONS

The hill seed production program launched under the Project is unique in many ways. It has to contend with geographical, social and economic constraints and operate in a situation where text book answers to many of the questions are hard to find. The program is essentially developmental in nature. New concepts have to be evolved from actual experience and in response to the needs of the situation. In the existing circumstances, simple, low-cost and risk-free ideas have a chance to sucoed. Even an appropriate technology must be tailored to local environment if it has to be adopted by the small seed growers associated with the mini seedhouses. Despite limitations, it is extremely necessary to continuously improve and upgrade the operation of the mini seedhouses so they can provide a meaningful service to the farmers. Some of the innovations tried so far are described in the following paragraphs:

7.1 Seed Drying:

Drying of seed to a safe moisture content is a difficult problem in so-far-as hill areas are concerned.

This is particularly true of maize crop in which case the farmers are traditionally used to hanging bundles of ear maize by the house walls as the only way out. But they are unable to prevent deterioration due to vagaries of weather and insect infestation. Such a system cannot obviously be recommended for seed purposes. Direct sun drying, although a possibility, again is not reliable. It also causes undesirable bleaching of kernels. The maize crop is ready for harvesting sometime in August and that coincides with monsoon rains. Thus, handling and preservation of maize seed is a difficult problem. Use of conventional drying with heated air is out of question. Sometimes wheat seed too requires rapid drying soon after harvesting to escape damage from early rains. Artificial seed drying is usually an integral part of a seed processing operation but in the hill areas of Nepal its application is not practicable.

Recognizing seed drying problems, the project availed technical guidance from Mississippi State University, USA to develop a solar-cum-kerosene seed dryer. The university assigned the problem to a participant trainee of the project (in the U.S.A.) studying for M.S. degree. The trainee, Mr. C.D. Acharya, was successful in developing a prototype model and conducting detailed study on its effectiveness. The following extract from his thesis is reproduced to give an idea of his findings:-

"In this lot, the initial moisture content of corn was 22.3%. Alongwith solar drying in daytime, the kerosene heater was used during the night. Average temperature rise at night and daylight hours was found to be 16°C respectively. Twenty two hours were required to dry the corn from 22.3% moisture content to 10.7%".

.../..

Mr. Acharya found out that on a sunny day corn drying can be successfully accomplished, the night time supplementation with kerosene heater is useful and even in a partly cloudy day the temperature rise in the dryer is sufficient to achieve some drying.

Based on the aforesaid conclusions a dryer having a capacity of five hundred kilos per day has been installed at Dhading Besi and is being further tested so that similar ones could be made available to all the sites. Fabrication of the dryer is simple and its main frame can be easily made by a local technician from material available within the country.

7.2 Electrification

Electricity is usually a rare commodity in remote hill areas. But, considering the small requirement of a mini-seedhouse and overriding benefits of power supply, a search was initiated for ways to generate some electricity. In this direction at least two approaches have been tried with success. At Sundar Bazar, Lamjung, a mountain stream flowing near the mini-seedhouse has been utilized to run a water turbine in cooperation with a rice mill owner of the area. The turbine was supplied by M/S Balaju Yantra Shala (BYS). The system generates upto eight kilowatts of electricity which is sufficient for lighting and for running the essential equipment such as seed cleaner and bag closer. Likewise in Bijuwar, (Pyuthan) and Rampurtar (Okhaldhunga), portable kerosene generators of 2.5 KVA capacity have been supplied for electrification. This system is quite economical, simple to handle, and appropriate for the needs of a mini-seedhouse. Kerosene is usually

.../..

available even in remote areas. It is estimated that 50 to 60 litres of kerosene is sufficient to process 20 ton of seed in ten days. Based on feasibility, such units of captive electricity could be created at more sites.

7.3 Seed Processing

In the beginning, Burrows Model 30 seed cleaner, a small hand-operated machine, was adopted for the mini-seedhouses. Later in order to encourage local self-sufficiency a manufacturing firm in Butwal was contracted to fabricate small hand-operated cleaners for the project. These cleaners are doing a good job and are capable of handling 15-20 tons of seed each in a season. However, in order to achieve larger output a pedal-operated seed cleaner made by Ferrell-Ross of U.S.A. and called Winnover-Cleaner is being tried at Charikot, Dolakha. At several sites motor-operated M2B seed cleaners have been installed as they have all the features necessary for fine processing of a variety of seeds giving an output of 350-400 kg per hour. Yet another plan is to supply hand screens to seed growers enabling them to pre-clean in their homes before delivery of seed to the mini-seedhouse. Thus, several approaches are being tried to achieve larger and more efficient cleaning of seed.

8. SEED PRODUCTION AND MARKETING PLANS

All of the 20 sites are technically operational. They have gained initial experience in the production and supply of seed. From a modest start, some sites are already producing up to ten tons of seed annually, a figure which according to one plant breeder "is all we need for varietal replacement in the hills". Any way, a firm base has been laid over which assured growth and consolidation could take place. If all goes well, the "take-off" in seed production activities should be possible in the coming year 1984-85.

At this point of time, however, attention ought to be paid to seed marketing aspects. Without realistic plans, it may be that the farmers do not get seed at the right time and right price or burdensome surpluses accumulate in the mini-seedhouses. In a recent study by APROSC many issues of relevance were examined for specific action. Below are some of their recommendations.

1. The farmer-run system is appropriate for the mini-seedhouses. It should be encouraged in every way possible, including incentives, financial assistance etc.
2. The site JTs should be AIC employees because, for all practical purposes, it is AIC that has the responsibility for executing seed production and marketing plans.
3. Unauthorized opening of seed bags by transportation contractors in hilly areas is common; it must be stopped.
4. AIC should review and strengthen its retail seed business. To attract both Sajhas and private dealers the existing level of commission should be raised. Training of Sajha managers in seed preservation is necessary. Sales promotion campaigns should also be launched.

5. Better and reliable varieties for hill areas are needed and hence research in the direction should be intensified.

6. For effective utilization of seed, there is a clear case to link the availability of improved seed with programs for extension and increased production.

7. While improving the supply of improved seed for the hill farmers, steps should be taken to assure fertilizer supply as well.

8. Individual mini-seedhouses should have the option to fix a local sale price for their seed if AIC sale price is out of line with the local market.

9. The on-going supply of subsidized seed by AIC and the hill transport subsidy should not be allowed to operate against the interest of a farmer-run system of seed production.

As most of the above recommendations are viewed in official circles with due appreciation, a positive follow-up on them would seem to be a step in the right direction. The issue of seed pricing is crucial and needs to be addressed specifically so that rational policies can be evolved in the seed sector.

Table - 12

SEED PRODUCTION UNDER SPIS PROJECT

WHEAT

No.	Site	1983-84 Likely production		1984-85 Target	
		(ha)	(m.t.)	(ha)	(m.t.)
1.	Rampurtar	7.50	5.0	10	15.0
2.	Phidim	10.00	14.0	10	15.0
3.	Chainpur	7.20	7.0	10	15.0
4.	Pakhribas	5.00	5.0	15	22.50
5.	Jirikhimti	7.50	3.0	8	12.0
6.	Yamkha	7.25	6.0	8	12.0
7.	Bhojpur	10.0	20.0	15	22.50
8.	Trishuli	15.0	19.0	20	30.0
9.	Charikot	8.0	Rain Damage	8	12.0
10.	Dhadingbesi	5.0	4.0	6	9.0
11.	Arughat	7.0	6.0	10	15.0
12.	Sundar Bazar	30.0	16.0	25	37.0
13.	Gyandi	12.0	6.0	15	22.50
14.	Galkot	5.0	1.0	6	9.0
15.	Majuwa	16.0	24.0	20	30.0
16.	Bijuwar	5.0	5.0	8	12.0
17.	Chaurajhari	0.75	1.0	10	15.0
18.	Dailekh	5.0	5.0	8	12.0
19.	Patan	3.0	Rain damage	5	7.50
20.	Doti	0.80	-	4	6.0
	TOTAL	167.0	147.0	221	331.00

Varieties: RR 21 (mostly), UP 262 (in lower elevations) and NL 30 (in Bijuwar)

Table - 13

SEED PRODUCTION UNDER SPIS PROJECT

MAIZE

No.	Site	1984 Likely Production		1984-85 Target	
		(ha)	(m.t.)	(ha)	(m.t.)
1.	Rampurtar	10	10	10	15
2.	Phidim	4	4	6	9
3.	Chainpur	4	4	5	7.5
4.	Pakhribas	8	10	10	15
5.	Jirikhimti	-	-	5	7.5
6.	Yamkha	2	2	5	7.5
7.	Bhojpur	5	6	8	12
8.	Trishuli	1	1	10	15
9.	Charikot	4	2	5	7.5
10.	Dhalingbesi	4	4	4	6
11.	Arughat	-	-	6	9
12.	Sundar Bazar	3	3	7	10.5
13.	Gyandi	3	3	5	7.5
14.	Galkot	2	2	4	6.0
15.	Majuwa	4	4	8	12
16.	Bijuwar	5	5	20	30
17.	Gahurijhari	2	2	6	9
18.	Dailekh	2	2	5	7.5
19.	Patan	3	2	5	7.5
20.	Doti/Dipayal	2	2	4	6
	TOTAL	68	68	138	207.0

Varieties: Khumal yellow, Arun, Rampur Composit, Hetauda Composit and Sarlahi seto.

Table - 14

SEED PRODUCTION UNDER SPIS PROJECT

RICE

No.	Site	1984 Likely production		1984-85 Target	
		(ha)	(m.t.)	(ha)	(m.t.)
1.	Rampurtar	4	6	6	12
2.	Phidim	2	3	4	8
3.	Chainpur	-	-	2	4
4.	Pakhribas	-	-	2	4
5.	Yamkha	-	-	2	4
6.	Jirikhimti	-	-	2	4
7.	Bhojpur	1.5	2	2	4
8.	Trishuli	-	-	2	4
9.	Charikot	1	1.5	4	8
10.	Dhadingbesi	1	1.5	4	8
11.	Arughat	-	-	3	6
12.	Sundar Bazar	1	1.5	3	6
13.	Gyandi	1	1.5	2	4
14.	Galkot	1	1.5	2	4
15.	Majuwa	-	-	2	4
16.	Bijuwar	4	4	4	8
17.	Chaurijhari	1	1.5	2	4
18.	Dailekh	-	-	2	4
19.	Patan	1	1.5	4	8
20.	Dipayal	-	-	2	2
	TOTAL	18.5	25.5	47	94

For rice seed demand is limited.

Varieties: CH 45, Himali and Mansuli.

9. TRAINING INPUT

The project attaches high priority to upgrading skills of the staff and seed growers alike so that they attain the capability of producing high quality seeds. In a new program like mini-seedhouses, nothing much can be accomplished without effective training support.

Although many out-of-country training opportunities have also been utilized under the Project, training sessions within the country were considered more appropriate to the needs of the mini-seedhouse system. Such training is implemented through involvement of the resource personnel earlier trained abroad. Training material and handouts in Nepali are also given to the trainees for study and reference.

For launching the mini-seedhouse program, one JT/JTA per site was required. These personnel were obtained from the Department of Agriculture. The next step put the JTs through an intensive 4-day training on seed technology and management aspects. They already possessed ample experience in agricultural extension work as a good background. The trained JTs went to their posts and began identifying prospective seed growers. They organized growers' meetings to motivate and to acquaint them with the new program. The selected growers then received practical training in seed production and handling methodology. Several volunteers (Peace Corps) were involved in this endeavour. It was thus possible to initiate seed production in a short time where none existed before.

Training sessions are repeated at suitable intervals, especially before the crop season. Table 14 indicates the training courses that have been offered thus far.

.../..

In order to broaden the JTs'experience and outlook, there is a program of India observation tours whereby they get a chance to have a look at the seed industry and facilities in a neighbouring country. Two groups have availed the opportunity and two more are being planned in September 1984 and March 1985.

Beside formal training, the site JTs usually receive technical instruction from the project field supervisor, project coordinator, seed technologist and Peace Corps volunteers from time to time. District Agricultural Development Officers are also involved in the training of JTs and seed growers. The duties of site JTs are indeed, multifarious. Beside seed production technology, they are encouraged to learn the operation and maintenance of seed equipment as well.

The success of the mini-seedhouse system largely depends on the performance and dedication of site JTs. They must be thoroughly trained and deeply motivated for the job. Sometimes when a trained JT is transferred despite requests to the contrary the project has to make up for the loss by organizing a special training course even for a single person assigned to take over the responsibility. Staff turn-over is, indeed, detrimental and should be avoided.

Table - 15

IN-COUNTRY TRAINING SESSIONS

(including India observation tours)

No.	Subject	Date	Participants	Venue
1.	Crop Seed Production	Aug 3-5 Sep 1980	25 Officials	Kathmandu
2.	Maize Production	Jan 5-8, 1981	28 Farmers	Rampur
3.	Veg. Seed Production	May 15-20	25 Farmers	Marpha
4.	Trainers Training	Aug 2-12	10 Officials	Kathmandu
5.	Wheat Seed Production	Oct 19-22	25 Farmers	Sundar Bazar
6.	Wheat Seed Production	Nov 6	23 Farmers	Trishuli
7.	Grain and Seed Storage	Nov 9-19	20 Officials	Khairenitar
8.	Seed Quality and Field Inspections	Jan 17-22, 1982	17 Officials	Khumaltar
9.	Seed Storage & Handling	Mar 11-14	22 Officials	Biratnagar
10.	Seed Production and Handling	Mar-14-17	25 Officials	Nepalgunj
11.	Seed Production	March 26	28 Farmers	Dhadingbesi
12.	Seed Production, Seed Storage and Handling	Mar 29-1 April	22 Officials	Bhairahawa
13.	Seed Production and Handling	Aug 9-11	30 Farmers	Charikot
14.	Seed Production and Handling	Oct 3-5	40 Farmers	Baglung
15.	Seed Production	Nov 7-9	35 Farmers	Gorkha
16.	Seed Production and Handling	Jan 2-7, 1983	30 Officials	Trishuli
17.	Seed Production	Feb 2-3	38 Farmers	Gulmi
18.	India Observation Tour	Mar 15-1 April	9 Officials	India
19.	Seed Production and Handling	Apr 10-11	35 Farmers	Pyuthan
20.	Seed Production and Handling	Jun 13-15	45 Farmers	Dandeldhura

.../..

Contd... Table 15

No.	Subject	Date	Participants	Venue
21.	Seed Handling and Storage	Aug 15-17	25 Officials	Janakpur
22.	Seed Production Technology (for JTs)	Sep 14-16	12 Officials	Trishuli
23.	Seed Handling, Storage and Marketing	Oct 9-12	27 Officials	Kahirenitar
24.	India Observation Tour	Jan 23-Feb 8,1984	8 Officials	India
25.	Seed Production and Handling	Feb 24-27	30 Farmers	Diktel
26.	Seed Production Workshop	Mar 5-8	15 Officials	Pakhribas
27.	Observation Tour	Mar 11-19	20 Farmers	Arughat
28.	Observation Tour	June 12-16	5 Farmers	Arughat

Table - 16

ONE-DAY FARMERS TRAINING ORGANIZED AT THE PROJECT SITES

No.	Site	District	No. of Farmers	Date
1.			25	Sept 30,1983
2.	Patan	Baitadi	35	Oct 1
3.	Bijuwar	Pyuthan	35	Oct 1
4.	Chainpur	Sankhuwasabha	25	Oct 1
5.	Dipayal	Doti	40	Oct 3
6.	Bhojpur	Bhojpur	33	Oct 9
7.	Rampurtar	Okhaldhunga	70	Oct 11
8.	Panchthar	Phidim	39	Oct 11
9.	Dailekh	Dailekh	35	Nov 2
10.	Diktel	Khotang	35	Nov 14
11.	Chaurajhari	Rukum	*	Feb 23, 1984
12.	Panchthar	Phidim	*	Feb 25
13.	Jirikhimti	Terathum	*	Mar 11
14.	Dipayal	Doti	*	Apr 6
15.		Khotang	*	Apr 13
16.	Dolakha	Charikot	*	Apr 23
17.	Dailekh	Dailekh	*	Mar 25

* On an average, 35 farmers attended the training at each site.

10. VOLUNTEER SUPPORT

Table 17 below indicates the assistance provided by Peace Corps Volunteers at some of the project sites.

Table - 17

No.	Name		Place	From	To
1.	Robert N. Iltis	a.	Trishuli	Nov 80	Sep 81
		b.	Sundar Bazar	Sep 81	Jul 82
		c.	Kathmandu	Aug 82	Nov 83
2.	Larry Prinzbach	a.	Dhadingbesi	Apr 82	Jul 83
		b.	Bhojpur	Aug 83	Apr 84
3.	Jarel Kalhoff	a.	Gyandi	Apr 82	Jul 82
		b.	Sundar Bazar	Aug 82	Jul 83
		c.	Phidim	Aug 83	Apr 84
4.	Rick Kunkel	a.	Arughat	Apr 82	Jul 83
		b.	Chainpur (s)	Aug 83	Apr 84
5.	William Yamartino	a.	Majuwa	Apr 82	Apr 84
6.	Jim Zeomek	a.	Pakhribas	Jul 83	To date
7.	Jayne Dalager	a.	Rampurtar	Jul 83	,,
8.	Steve Long	a.	Patan	Nov 83	,,
9.	Mike Ransom	a.	Galkot	Jun 84	,,
10.	Mark Wickenheiser	a.	Chainpur (s)	June 84	,,

The volunteers who finished their assignment in April 1984 are likely to be replaced by new volunteers.

11. HILL SEED REQUIREMENT

Under the SFIS Project, seed production activities have been launched in 20 hill districts. Some other districts like Salyan, Myagdi, Rasuwa, Ramechhap, Kavre may also need to have local seed production but these district are not within the project scope.

While it is easy to find out total seed requirement by multiplying area and seed rate, it is usually difficult to determine the likely demand for seed from organized sources. The truth is that all farmers need not obtain fresh seed from institutional sources every year. But some must, as they do. In wheat, potential demand could be safely assumed at a level of 20 percent annual coverage by improved seed (the rest by natural spread) and this would indeed include both seed renewal and seed replacement. For rice, however, it is reasonable to adopt only 10 percent coverage. Maize seed ought to be renewed more frequently but, for working ease, same norm may apply as for wheat. Based on these assumptions, the potential seed demand in respect of rice, wheat & maize for forty mid-hill districts (see table 18) works out to about 5400 m.t. As compared with this, AIC's hill seed supply (from Tarai) had reaked at 1425 m.t. in the year 1982-83. Considering the logistic and other problems in supplying larger quantities of seed from the Tarai, an independent hill seed production and supply system is, indeed, a clear necessity. However, the needs of each district deserve an in-depth study as certain areas might be approcheable with a developing network of roads.

In so far as 20 sites under the SFIS Project are concerned (serial No. 1 to 20 in Table 18), the position appears to be like this. The potential demand may be 456 m.t. for rice,

.../..

1358 m.t. for wheat and 615 m.t. for maize. This makes a total of 2429 m.t. Against this, however, the effective or actual demand for improved seed would be influenced by factors such as rate of acceptance of new varieties, efficiency of seed program, seed quality consciousness, efficacy of extension, seed pricing policies, seed quality and the extent of real benefit to the seed users. Therefore, the demand can be assumed to be at a much lower level than the potential demand.

At any rate, given adequate arrangements for seed supply, atleast 1500 m.t. of seed should be annually consumed in the said 20 districts. This clearly underlines the need to expand the scope of the present hill seed program. While the rated capacity of the 20 mini-seedhouses is about 800 m.t. of seed, it is doubtful if even this much seed can be produced and marketed from these centres in the near future. On the production side, for instance, the Project experience shows that on an average, it takes atleast 5 hill farmers to produce a ton of wheat seed. Moreover, the large area that has to be put under seed production is not obtainable unless the production fields are chosen at undesirably long distances, creating transportation problems. Contrary to general belief, the cost of locally-produced seed under AIC is not likely to be anything less than the seed from the Tarai, it might be more. Firstly, the base procurement price is much higher in the hills (currently an average Rs. 4.50 for wheat seed as compared with Rs. 3/kg in the Tarai). Secondly, intra-district transportation in hill areas is expensive. Also, the small hill farmers are not attracted to seed production unless they are assured of a handsome incentive. Moreover, the Tarai-produced seed receiving transport subsidy does not reflect the real price. As the hill seed is sold in smaller bags, the packaging cost also tends to be more than the Tarai-seed.

.../..

Likewise, on the marketing side, only a few tons of seed can be consumed around the mini-seedhouse, the rest needs subsidized shipment to distant parts of the district. Given AIC's experience and performance, it is doubtful if seed marketing plans would be prepared and effectively executed by each branch office of the AIC according to expectations. The end result might be that the mini-seedhouses cater only to the nearby Panchayats without penetrating the rest of the district. Thus, the conclusion is that, in practice, a single mini-seedhouse per hill district may not always cope with the entire seed demand. Alternative arrangements would seem necessary.

Table - 18

SEED REQUIREMENT BASED ON 040/41 FIGURES

	District	Crop	Area (ha)	Seed Requirement (m.t.)	Potential seed demand (m.t.
1.	Dolakha	Rice	2030	81	8
		Wheat	920	110	22
		Maize	4200	84	16
2.	Nuwakot	Rice	16920	676	67
		Wheat	4810	577	115
		Maize	8510	170	34
3.	Dhading	Rice	11140	445	44
		Wheat	4000	480	96
		Maize	8800	176	35
4.	Gorkha	Rice	4900	196	20
		Wheat	3360	403	80
		Maize	6060	121	26
5.	Lamjung	Rice	5690	227	23
		Wheat	4470	536	107
		Maize	8020	160	32
6.	Baglung	Rice	4600	184	18
		Wheat	1780	213	42
		Maize	9000	180	36
7.	Parbat	Rice	1870	74	7
		Wheat	2200	264	52
		Maize	4000	80	16
8.	Gulmi	Rice	3170	126	13
		Wheat	1850	222	45
		Maize	9900	198	39
9.	Pyuthan	Rice	3180	127	12
		Wheat	6000	720	144
		Maize	9080	181	36
10.	Okhaldhunga	Rice	2450	98	10
		Wheat	980	117	23
		Maize	8100	162	32
11.	Doti	Rice	6920	276	28
		Wheat	10510	1261	252
		Maize	4200	84	16

.../..

	District	Crop	Area (ha)	Seed Requirement (m.t.)	Potential Seed Demand (m.t.)
12.	Baitadi	Rice	3500	140	14
		Wheat	3500	420	84
		Maize	2900	58	11
13.	Sankhuwasabha	Rice	8230	329	33
		Wheat	1130	135	27
		Maize	8320	166	33
14.	Dhankuta	Rice	9070	362	36
		Wheat	2660	319	65
		Maize	19230	384	76
15.	Terathum	Rice	10780	431	43
		Wheat	1000	120	24
		Maize	11950	239	47
16.	Bhojpur	Rice	5810	232	23
		Wheat	1550	186	37
		Maize	11040	220	44
17.	Dailekh	Rice	3460	138	14
		Wheat	2100	252	50
		Maize	5200	104	20
18.	Khotang	Rice	1220	48	5
		Wheat	820	98	19
		Maize	5850	117	23
19.	Rukum	Rice	450	18	2
		Wheat	2000	240	48
		Maize	3460	69	13
20.	Panchthar	Rice	8970	358	36
		Wheat	1120	134	26
		Maize	7610	152	30
	Total for SPIS sites	Rice	114360	4566	456
		Wheat	56760	6807	1358
		Maize	155430	3105	615
	Grand Total		326550	14478	2429

Contd... Table 18

	District	Crop	Area (ha)	Seed Requirement (m.t.)	Potential Seed Demand m.t.
21.	Ilam	Rice	10120	404	40
		Wheat	2100	252	50
		Maize	8510	170	34
22.	Udaipur	Rice	11910	476	47
		Wheat	980	117	23
		Maize	8200	164	32
23.	Sindhupalanchowk	Rice	4400	176	17
		Wheat	4000	480	96
		Maize	10000	200	40
24.	Rasuwa	Rice	150	6	.6
		Wheat	500	60	12
		Maize	790	15	3
25.	Ramechhap	Rice	3790	151	15
		Wheat	2280	273	54
		Maize	11380	227	45
26.	Sindhuli	Rice	7880	314	31
		Wheat	4360	523	104
		Maize	9150	183	36
27.	Kavre	Rice	11620	464	46
		Wheat	7000	840	168
		Maize	22000	440	88
28.	Makawanpur	Rice	12050	482	48
		Wheat	5650	678	135
		Maize	18000	360	72
29.	Kaski	Rice	19000	760	76
		Wheat	4290	514	102
		Maize	10510	210	42
30.	Tanahun	Rice	10400	416	41
		Wheat	3980	477	95
		Maize	12300	246	49
31.	Syanja	Rice	9820	392	39
		Wheat	2060	247	49
		Maize	6330	126	25
32.	Palpa	Rice	8150	326	32
		Wheat	5000	600	120
		Maize	4730	94	18

.../..

Contd.. Table 18

	District	Crop	Area (ha)	Seed Requirement (m.t.)	Potential Seed Demand m.t.
33.	Myagdi	Rice	1920	76	7
		Wheat	1400	168	33
		Maize	5000	100	20
34.	Argakhanchi	Rice	1700	68	6
		Wheat	1000	120	24
		Maize	8830	156	35
35.	Rolpa	Rice	550	22	2
		Wheat	1600	192	38
		Maize	3760	75	15
36.	Salyan	Rice	5110	204	20
		Wheat	6000	720	144
		Maize	7100	142	28
37.	Jajarkot	Rice	2900	116	11
		Wheat	2550	306	61
		Maize	4000	80	16
38.	Surkhet	Rice	9670	386	38
		Wheat	12600	1512	302
		Maize	10140	202	40
39.	Achham	Rice	1930	77	7
		Wheat	3200	384	76
		Maize	2850	57	11
40.	Dandeldhura	Rice	5390	215	21
		Wheat	3200	384	76
		Maize	2380	47	9
	Total for mid-hills	Rice	252810	10097	1006
		Wheat	130510	15654	3120
		Maize	321390	6419	1273
	Grand Total		704710	32170	5399

Assumed seed rate: Rice 40 kg/ha
Wheat 120 kg/ha
Maize 20 kg/ha

Area Source: Department of Food, Agriculture and Marketing Services

12. SATELLITE SEED BINS

The need for widening the service area of a mini-seedhouse cannot be over-emphasized. The service area should, logically, include an entire district or a greater part of it. In hill areas, intra-district transportation presents formidable problems and hence to and from movement of large amounts of seed from a mini-seedhouse to distent places is cost ineffective and often impractical. In fact, because of difficult terrain, getting to know village-wise seed demand itself is an uphill task, leaving aside the challange of sending seed to meet the demand. Therefore, the hill seed system should have village-level ramifications to ensure free flow of improved seeds to every nook and corner.

Given the rugged terrain, a single mini-seedhouse in a hill district cannot perhaps effectively cover more than 8-10 surrounding Panchayats. The remaining 30-35 Panchayats might remain untouched if an extended system to cover them is not devised.

An average hill farmer lacks assured means to safely handle and store seed for the next crop. By planting time, most seed has suffered damage by insects and rats. Farm level storage in the traditional manner leads to moisture gain in seed during rainy season and this is injurious to quality. In deficit areas, the seed is often consumed as food. In this situation, the bigger farmers usually provide seed to others on an exchange basis. But, as is evident, that still leaves the problem of seed renewal in the area with improved varieties or with pure seed of the established varieties which is so essential for boosting productivity.

.../..

In the circumstances, it is worthwhile to decentralize seed production under the umbrella of a mini-seedhouse. Then indeed the benefits of good seed will rapidly trickle to all the Panchayats that a district may have. Of course, village-wise decentralization would demand the simplest of technology and a novel approach to seed production. In this regard, for remote hill areas, it would be useful to underplay cumbersome seed cleaning and packaging and certification aspects, while retaining emphasis on genetic purity (to an attainable level), safe storage and treatment for disease control. Such a strategy would do away with the difficult task of providing seed processing and testing facilities everywhere. The recurrent need for supplying articles like bags and labels would not arise. Above all collection (later distribution) of large quantities of seed at one place will be unnecessary as seed production and storage would be dispersed throughout the district in small units. The most difficult problem, transportation, could be solved by such dispersal because seed production will take place right in the consumption areas.

The foregoing concept utilizes a simple approach whereby individual (but selected) farmers will produce and supply seed with the help of metal bins unlike the mini-seedhouse system where a group of farmers together engage themselves in this function. Consequently, the system may operate as indicated below:-

- With a mini-seedhouse as the district seed centre, plan for an outreach system of seed multiplication for the distant areas.
- Select a number of agriculturally productive pockets throughout the district to launch a satellite seed bin program. To do this, a study of the district profile will be necessary.
- Identify a few good farmers in each pocket (village) and motivate them into joining the program for profit motive and community service.

.../..

- Register these farmers with the mini-seedhouse on the understanding that every year they will buy some seed of improved varieties from the mini-seedhouse and use it for further multiplication in their fields as per technical advice given them from time to time.
- Each seed multiplier will receive one or two metal bins for safe storage, hand screens for seed cleaning and chemicals for fumigation and treatment of seed.
- The seed multipliers will receive periodical training at the mini-seedhouse.
- Based on private business, they will thus be able to continually supply good seed to the surrounding farmers through cash sale, exchange, barter or as the case may be.
- The system can be monitored through site visits by the mini-seedhouse JT and by holding meetings with the seed multipliers. Through continuous feedback of field problems, the system will keep on refining itself.
- Such a scheme may be implemented in a phased manner so that in four to five years each mini-seedhouse has a satellite seed bin program with 100 bins totalling about 40 m.t. capacity on an average.

With the launching of seed bin program, the role of a mini-seedhouse will obviously undergo an important change i.e. it will not only be a direct supplier of seed in surrounding hill areas it will also become a district centre for seed promotion in the service of the farmers. Thus a mini-seedhouse will truly help local farmers to help themselves and the problems of seed transportation, pricing, subsidy, usually encountered by AIC, will cease to exist.

The real advantage of this program lies in simplicity, substainability and low-cost/high benefit profile. It would open up new possibilities for fast seed replacement in the hills through introduction of new varieties. When this happens, the mini-seedhouses would indeed begin to serve the purpose they have been created for.

.../..

For safe storage of seed, cool and dry environment is a pre-requisite and fortunately the hills are cool places and most suited to implementation of this low-cost technology. Metal bins would easily stay intact for 20 years and hence, beside low unit cost, they do not require frequent replacement.

Under SPIS Project, some metal bins were actually distributed at Sundar Bazar Pilot site but with the objective to create seed dealers away from the mini-seedhouse. But experience has indicated that the most effective use of metal bins could be made through a satallite seed bin program. A similar system implemented by the Department of Agriculture at Trishuli on a limited scale has proved to be successful.

The suggested system of satallite seed bins is atleast one possible approach to expanding the scope of hill seed program in the future years. As would appear, the program pre-supposes active involvement of the DADOs as their juridiction covers all parts of the districts. In fact they are eminently suited to run the system as part of their extension activity. This point would, however, need more careful consideration if and when such a program is launched.

13. LINKAGE WITH PRODUCTION PROGRAM

It is to be recognized that improved seed supply is but a part of the larger strategy to increase crop production in the country. An assured supply of seed together with other necessary inputs provides an excellent opportunity to launch production programs. The value of the mini-seedhouse system would be considerably enhanced if it is consciously used for boosting productivity in the area.

The success of the on-going production program in Tarai areas reportedly hinges on the availability of essential inputs like seed and fertilizer. While the same would be essentially true for the hills, there the production program could focus on good seed of new varieties used in conjunction with compost and with some nitrogen supplementation. Better crop management could also pay rich dividends. In hill areas the crop varieties are mostly traditional and hence a significant leap in production should be possible by introducing high yielding varieties. Thus improved seed supply in remote hills has a crucial role to play.

Launching of production programs will also lead to establishment of linkages between ATC and DOA in so far as seed component is concerned. Around each mini-seedhouse site, the DADO and his staff should organize, production in 20 hectares for a start, gradually increasing to 100 hectares. The program could effectively utilize the findings of the cropping system research so that recommended and productive technologies and cropping patterns can be demonstrated on a field scale to facilitate adoption by farmers.

It is earnestly hoped that in due course of time appropriate production schemes will be formulated under leadership of the Department of Agriculture and such schemes would, in turn, lend a new meaning to the mini-seedhouse system.

14. FUTURE PLAN OF MANAGEMENT

At present the management of mini-seedhouse system is, to a large extent, facilitiated by assistance rendered by the SLIS Project. As the Project is soon entering its final year of operation and will end as on August 31,1985, there is a genuine concern as to how the system would run thereafter. It is important that the system is enabled to stand on its own feet. Some of the actions that could contribute to that end are discussed below:

.../..

14.1 Integration and Supervision

Conscious of the above, the project is already encouraging complete integration of the system into AIC so that each mini-seedhouse, in practice, becomes a part of the local AIC operation. At the field level, certainly there have been misgivings arising, basically, from the fact that the site JTs are employees of the Department of Agriculture working for AIC on depution basis. This dualism is, in a way, undesirable. One would certainly hope the JTs would be, eventually, absorbed into AIC. Then alone the system can enlist full support and interest of AIC branch offices enabling them, in turn, to exercise complete management control and responsibility over the respective mini-seedhouses.

The integration issue, naturally touches on the role that Seed Division of AIC is expected to play. It should continually provide support to the mini-seedhouse system through program planning, progress monitoring, arranging supplies and seed and removing constraints affecting the system. Within the Seed Division, an exclusive cell for supporting the hill seed program seems essential. The cell may be staffed with seed technologists and mechanical technicians who should pay regular visits to various sites. Also the Project field support should be intensified. This may be done by assigning two Field Supervisors instead of one and improving the staff mobility for field work.

As the hill seed program needs promotional support for many years, it should be overseen at the highest level through the proposed national seed development office of the Seed Board. Through the same office, developmental assistance can also flow conveniently. Policy issues, as and when confronted, can also be quickly addressed.

.../..

14.2 Working Capital Provision

As of present, the budget AIC provides for running the mini-seedhouses is primarily for the purchase of seed from growers. This apparently is not enough. Funds should be allocated on several other accounts, such as:

- field travel and supervision
- seed growers meetings
- delivery of seed samples for testing
- stationery and office supplies
- seed packaging and labelling material
- equipment operation and maintenance
- contingencies
- in addition, some incentive to the staff working in remote areas.

Alongwith budgetary allocation, it is desirable to seek operational efficiency. The allocation of funds should slowly begin to focus attention on an economic return from the system. Consequently, management concern on efficient working of the system will cause things to improve constantly. Without AIC's financial commitment, perhaps, adequate attention to the whole system may not be forthcoming.

14.3 Management Strategy

As stated in this document, the secret of a viable hill-seed program lies in a farmer-managed mini-seedhouse system. This should be vigorously encouraged and implemented. Consequently, on the one hand the system would run smoothly, on the other hand AIC would need to commit no funds, take no risks and exercise least direct control. It will only need to backstop the farmers' own organizations to help themselves.

.../..

It is, apparently, much simpler for each site to be managed by the local association of seed growers than centralising the entire system through AIC. For this to happen, sympathetic attention will need to be paid to farmers problems paving the way for the establishment of their own enterprises. For instance, the present subsidy policy on seeds runs against a private enterprise.

Lack of capital is another serious impediment in the way of a private system in small hill communities. Seed growers are generally hesitant to work with high-interest bank funds for running a seed enterprise. But, as a rule, seed has to be held in storage for a few months atleast before the sale can take place. A strong need for storage capital is thus evident. Rules permitting, a practical way to solve the problem could be by creating a revolving funds of Rs. 2 or 3 lakhs per site for use by Seed Growers Association. Such a fund may be supervised and controlled by the DADO. The SGA should be enabled to use the fund for purchase of foundation seed, fertilizer, pesticides and payment to individual members for the seed produced by them. If properly controlled, the fund will remain intact at the end of each crop year. It will obviate the need for bank loan for the seed enterprise. Given such an inducement, private enterprises should rapidly form and develop even in remote hill areas.

14.4 Wider Scope

It is suggested that each mini-seedhouse should spread its activities over an entire district, if feasible. To achieve this, a satellite seed bin program is proposed.

.../..

The program, it would appear, can be best organized by the DADOs instead of AIC branch offices. From this, it follows that while the mini-seedhouses will be run by AIC, the satellite seed bins would be handled by DOA. There could perhaps be operational problems in a system of dual management and hence a coordination mechanism might have to be introduced. In case of a privately managed mini-seedhouse, however, it matters little whether DOA or AIC supervises the systems if only the backstopping arrangements are assured.

The service area of each mini-seedhouse needs to be so extended as to cover an entire district. It should be possible to identify the potential pockets in a district through a field survey. Then, steps could be taken to ensure seed sufficiency for all these areas. Moreover, a mini-seedhouse should, besides cereal seeds, stock the vegetable seeds for supply to needy farmers. With assured availability of all seeds, farmers would be able to follow an appropriate cropping system for an all-round improvement in hill agriculture.

In many situations, it may be impractical to stick to the district boundary while implementing a satellite seed program. A mini-seedhouse might cover areas in an adjoining district if that leads to farmers' convenience. For that reason, a study of the district profile is indeed necessary.

Appendix-I

Dignitaries closely Associated with the SPIS Project

1. Mr. B.B. Khadka, Co-member, National Planning Commission
2. Mr. P.N. Rana, Project Director (from December 1981 to date)/ Acting Secretary, Ministry of Agriculture.
3. Mr. D.J. Brennan, Director, USAID/N.
4. Dr. D.S. Athwal, Vice-President, IADS.
5. Dr. T.N. Pant, Chairman, Project Coordination Committee (PCC).
6. Mr. R.B. Singh, Project Director (from Feb 1980 to Dec 1981)
7. Dr. P.R. Mathema, DG, Department of Food Agriculture & Marketing Services.
8. Mr. N.K. Basnyat, Registrar, Cooperative Department.
9. Mr. P.P. Gorkhali, Director-General, Department of Agriculture.
10. Mr. S.K. Upadhayaya, General Manager, Agriculture Development Bank.
11. Dr. K.B. Rajbhandary, Joint Secretary, Ministry of Agriculture.
12. Dr. P.S. Rana, Wheat Coordinator, National Wheat Station.
13. Dr. S.M. Shah, DDG, Department of Agriculture.
14. Mr. A.M. Pradhananga, DDG, Department of Agriculture.
15. Mr. C.T. Hash, Chief, ARC, USAID/N.
16. Mr. D.R. Pickett, ARC, USAID/N
17. Dr. W.H. Freeman, IADS Representative.
18. Dr. C.N. Hittle, Project Supervisor, ICP
19. Mr. G.E. Alex, Project Officer, ARC, USAID/N
20. Mr. Mike Frame, Program Officer, American Peace Corps
21. Mr. N.B. Shrestha, Agriculture Inputs Corporation.
22. Mr. G.B. Rajbhandary, Maize Coordinator, National Maize Station
23. Dr. Mathema, Rice Coordinator, National Rice Station.
24. Mr. H.B. Shrestha, Chief, Botany Division.
25. Mrs K.L. Rajbhandary, Chief, STIP, Botany Division.
26. Dr. B.N. Kayastha, Project Coordinator (till 17 July 1983)
27. Mr. R.R. Pandey, Chief, Finance Division, AIC.
28. Mr. B.P. Parajuli, Act. Chief, Seed Division, AIC.
29. Mr. C.M. Manandhar, Project Coordinator (from 8 Sept. 1983).
30. Mr. Dharma Subal, ARC, USAID/N.
31. Mr. K.L. Gorkhali, Engineer, AIC.
32. Mr. R.R. Sharma, Engineer, AIC
33. Mr. N.L. Dewan, Engineer, AIC.

It is not feasible to mention all the numerous names of AIC & DOA field staff but their contribution is gratefully acknowledged.

The list of Peace Corps volunteers appears elsewhere in this document. Under the heading "Mini-Seedhouse Approach" there is a list of the JTs/JTAs and a list of technical consultants who have helped the Project thus far.

Appendix-II

SPIS Project Staff

1. Dr. Russell H. Bradley, Project Supervisor (till April 1981)
2. Mr. S.S. Bal, Project Supervisor (from Sept 1981 to date)
3. Mr. P.G. Rood, Field Supervisor (till January 1984)
4. Mr. R.N. Iltis, Field Supervisor (since December 1983)
5. Mr. S.C. Gurung, Administrative Officer (since April 1980)
6. Mr. S.L. Bajracharya, Chief Accountant (since April 1980)
7. Mr. Bhagwat Shrestha, Seed Technologist (since Sept 1982)
8. Mr. N.S. Wagley, Asstt. Administrative Officer (since April 1980)
9. Mr. B.B. Pandit, Transport & Procurement Officer (since Apr 1980)
10. Mr. S.B. Shrestha, Stores In-Charge (since April 1980)
11. Mr. D.P. Bhattarai, Economist (till Feb 1983)
12. Miss Kalsang Doma, Secretary/Typist (till September 1982)
13. Mr. B.L. Shrestha, Secretary/Typist (since May 1983)
14. Mr. L.N. Adhikary, Overseer (till June 1984)
15. Mr. H.R. Shrestha, Overseer (till June 1984)
16. Mr. Y.B. Katuwal , Overseer (till May 1983)
17. Mr. G.B. Subba, Overseer, (till August 1983)
18. Mr. R.R. Sharma, Overseer (till August 1983)
19. Mr. D.B. Gurung, Overseer (from 1 July 1984)
20. Mr. B.K. Rana Magar, Typist (till Nov 1983)
21. Mr. D.K. Shrestha, Field Assistant (since August 1982)
22. Mr. R.B. KC, Sr. Driver, (since April 1980)
23. Mr. P.R. Bajracharya, Driver (since June 1980)
24. Mr. B.B. Magar, Driver-cum-Messenger (since May 1980)
25. Mr. S.L. Bajracharya, Overseer (till March 1984)

(In addition, many more persons have contributed on a part time basis on activities such as baseline survey work, physiological research, in-country training etc.)