INCREASING LOCAL, PRIVATE SEED PRODUCTION AND MARKETING IN PAKISTAN

A Consultancy Report
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With Significant Contributions by
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A

The MART (Management of Agricultural Research and Technology) Project is funded by the United States Agency for International Development (USAID). The MART Project's chief link to the Government of Pakistan is through the Pakistan Agricultural Research Council (PARC). A MART Project Coordination Committee composed of federal, provincial, and university representatives coordinates and guides project activities. Its purpose is to assist the Pakistani agricultural research system to strengthen its research management capabilities, and to improve communications, training, farming systems research, arid zone research, and research in the rural social sciences. Winrock International, through a contract with USAID, has responsibilities to assist with the first four of these tasks. Two international agricultural research centers, the international maize and wheat improvement center (CIMMYT) and the International Center for Agricultural Research in Dry Areas (ICARDA), are responsible for the other two tasks.

The mission of Winrock International Institute for Agricultural Development is to help reduce poverty and hunger in the world through sustainable agricultural and rural development. Winrock International assists people of developing areas - in Asia, Africa and the Middle East, Latin America and the Caribbean, and the United States - to strengthen their agricultural institutions, develop their human resources, design sustainable agricultural systems and strategies, and improve policies for agricultural and rural development. As an autonomous, nonprofit organization, Winrock International provides services independently as well as in partnership with other public and private organizations. The institute is recognized as a private voluntary organization.

B

C O N T E N T S

ABBREVIATIONS

AARI	Ayub Agricultural Research Institute
ADA	Agricultural Development Authority
BARD	Barani (Rainfed) Areas Research & Development
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo
FAO	Food and Agriculture Organization
FSCD	Federal Seed Certification Department
GOP	Government of Pakistan
HYV	High Yielding Varieties
ICARDA	International Center for Agricultural Research in Dry Areas
ICRISAT	International Crop Research Institute for the Semi Arid Tropics
IRRI	International Rice Research Institute
MINFAC	Ministry of Food, Agriculture and Cooperatives
MOA	Ministry of Agriculture
NARC	National Agricultural Research Centre
NCA	National Commission on Agriculture
NSC	National Seed Council
NWFP	North West Frontier Province
PARC	Pakistan Agricultural Research Council
PASSCO	Pakistan Agricultural Storage and Supply Corporation
PSC	Punjab Seed Corporation
RSCS	Report of the Sub-Committee on Seeds
SIA	Seed Improvement Association
SSC	Sindh Seed Corporation
US	United States
USAID	United States Agency for International Development

CURRENCY EQUIVALENTS

US$ 1.00 = Rupees (Rs) 21.00

WEIGHTS AND MEASURES

1 Hectare (ha)	= 2.47 acres
1 Kilogram (kg)	= 2.205 pounds
1 Metric Ton	= 2205 pounds
1 Maund	= 37.32 Kilograms
1 Acre foot	= 43.560 cubic feet

E

Executive Summary

Efforts to increase seed production in Pakistan started in the 1960s with the introduction of high yielding varieties (HYV). From that time until recently the primary effort to increase seed supplies was placed on developing public sector seed production and marketing programs. Although this effort has contributed to increased awareness of the value of good seed, it has fallen far short of the objectives. The vast majority of the seed is either saved by the farmer himself or is obtained from neighbors and other sources that are not well identified.

Although it had been hoped that local, private seed production and marketing would get started, many constraints have held back this development. Among the most commonly identified constraints are: 1) policies that have favored the public sector organizations, 2) a lack of credit and tax exemptions, 3) little economic incentive because of low seed prices in the public sector, 4) lack of suitable hybrids from the public research programs, 5) inadequate pre-basic and basic seed supplies, 6) inadequate access to seed processing equipment, 7) limited information about seed production and technology, 8) lack of technical support, 9) no assistance in improving management and marketing capability, and 10) an inadequate awareness among farmers of the importance of good quality seed and improved varieties.

Even though three multinational companies have begun operations in a small way, it is generally recognized that a local, private seed production and marketing capacity is badly needed. Farmers need seed close to their doorsteps. Studies show that most of them travel only five kilometers or less to buy wheat seed. The development of local, private seedsmen and seed enterprises can give the country a widely dispersed commercial seed industry with far better capability of reaching large numbers of farmers. Seedsmen are individual seed operations often owned by a family. Seed enterprises may be small, medium or large and are organized in a number of different ways.

As local, private seedsmen and seed enterprises are encouraged, a special effort is required on seed marketing. Many factors affect how easily seed can be sold, including the availability of the varieties and hybrids farmers want, seed

quality, the effort at seed promotion, the number of sales outlets, the commission for seed sellers and their knowledge of the product, the size and attractiveness of the seed container, the seed price, the availability of credit with the seed buyer, and the actual and perceived economic benefit to the farmer who buys good seed of an improved variety or hybrid.

Local, private seedsmen and the staff of seed enterprises must have more opportunities to improve their knowledge and skills through training courses, workshops and educational tours. They also require guidance on the kind of seed facilities and equipment needed. Especially important is information on seed storage facilities. Another needed resource is credit. Although the seed business must be profitable, it is not possible for seedsmen and seed enterprises to grow without access to credit.

A focal point is needed to spearhead the development of local, private seedsmen and seed enterprises. It is recommended that a "Seed Improvement Association" (SIA) be organized under the Societies Act as a non-profit organization with a Board of Directors composed of member seedsmen and seed enterprise leaders. The SIA would provide a wide range of services to members including production of basic seed by members for the use of members, assistance in seed production technology, guidance in the design and development of seed processing and storage facilities, aid in developing sound seed quality assurance programs, technical and other necessary support for obtaining loans, and assistance in market development.

A small staff would be formed to provide these services. It is proposed that an SIA be formed in a major cotton producing area initially. The strongest present private seed sector exists in the cotton belt. The SIA would gradually expand to other areas based on priorities determined by the leadership of the SIA and related to the interest of members, the availability of superior varieties and hybrids, farmers' interest, the activities of the PSC/SSC and governmental priorities. The staff would seek to maximize the development of each seedsman and enterprise; the SIA would not get involved in selling commercial seed on a retail basis.

For this program to be successful, strong support and a long-term commitment would be required from both the federal and

provincial governments. Several steps would be needed at both levels to assist private seed sector development and growth. The Provincial and National Seed Councils should be reorganized with adequate SIA representation and should be given a new mandate. They would need to focus especially on issues of concern to the private seed sector, help overcome bottlenecks and properly reflect the increased emphasis on local, private seedsmen and seed enterprises.

Small seed cells are required at both the provincial and federal levels within the MOAs with responsibility to implement decisions taken by the respective Councils. Such seed cells should be under the charge of an Additional Secretary. These cells would deal with issues concerning the seed program, pursue solutions to problems with the proper authorities and have responsibility for administering the truthful labelling program.

The Federal Government should fully endorse the formation of SIAs on a gradual basis. It should, after consultation with the National Seed Council, take a number of actions to provide incentives for seedsmen and seed enterprises to encourage entry into the seed business.

The facilities and seed technology competence at the provincial research institutions and universities should be strengthened. If adequate support can be obtained from the GOP or outside agencies, the SIA could help develop these institions' physical facilities with the objective of the SIA being able to use these facilities for its own basic seed processing and storage activities.

The PARC and NARC should provide leadership and a range of support to the development of SIAs and their members. PARC could be quite helpful in developing uniform policies among the public research programs regarding pre-basic seed allocations to SIAs and the development of strong linkages between the public and private sectors especially in regard to the encouragement of private research.

The Federal Seed Certification Department (FSCD) can contribute much to the development of the private sector by offering a service which may be used voluntarily by the public and private sectors equally. The FSCD needs to review its field

and seed standards, especially on varietal purity levels, to assure they can be attained by most of the seed certifiers.

The PSC and SSC should continue operations at present levels and support private seed sector development as a way to make up the deficiency in seed availability in the interest of farmers throughout the nation.

To complement the effort of the private sector in marketing seed the extension service should assist the development process by increasing the number of on-farm demonstrations. Extension would be encouraged to utilize the assistance of the members of SIA especially in field days and meetings. They need to place a stronger emphasis on the use of good quality seed of improved varieties. Equally important can be their assistance to farmers in locating good seed sources from both the public and private sectors.

To support the improvement in the human resources for the growing private seed industry, key universities should develop curricula with a strong seed technology component.

The seed program in Pakistan is at an ideal stage of development to shift from dependence on the public sector to a more dynamic situation in which the public and private sectors jointly can greatly expand the availability of good seed of improved varieties and hybrids for farmers throughout the country. The SIAs can catalyze the development of the total seed industry with strong support from all relevant elements within the GOP.

I. INTRODUCTION

Good seed of improved varieties is recognized by government officials and farmers in Pakistan as one of the most important agricultural inputs. Dynamic seed production and supply systems have been an essential ingredient for increased agricultural production and economic benefit to the farmers of many countries.

The Government of Pakistan (GOP) has placed a strong emphasis on seed sector development since the 1960s, but most of the effort has focused on seed development in the public sector. Though well intentioned and contributive to the seed program these measures have fallen short of expectations. The supply of good quality seed of improved varieties from public sector activities continues to be quite limited in relation to need.

Studies in Pakistan repeatedly show the operation of an "informal private seed system" in the countryside with substantial seed supplied by these local seed producers. Only a few of these seed suppliers are recognized officially; they do not have adequate supplies of basic seed for sustained, systematic multiplications; their seed often is not certified; and they receive no special encouragement or technical information on seed production. They rely totally on public crop research for their parent material and information.

During the past three years considerable emphasis was placed on encouraging multinational private seed companies to enter the seed business in the country. These efforts are good and should contribute to increased seed supplies of maize and sunflower hybrids especially. A comparable effort has not been given to encouraging local, private seed production and marketing.

Now seems an ideal time to place a special focus on the development and improvement of this vital segment of the country's seed industry. The public sector's crop research programs urgently need local, private seed producers and suppliers to move the seed coming from their plant breeding programs to farmers. To complement the extension system, the local producers and suppliers of seed can contribute significantly to the flow of technical information to farmers. Pakistan can no longer ignore the need to properly organize and assist the development of these small to medium scale private

seed producers and supply entities. This report will concentrate on how to assist this development.

II. SEED DEVELOPMENT IN PAKISTAN

Historical Review

Efforts to increase seed production started in the 1960s in Pakistan. The introduction of high yielding varieties (HYV) placed new impetus on the need for better seed. Most seed at that time came directly from research institutes and was spread from farmer to farmer. The Agricultural Development Corporation was formed at that time to help with input supply including seed. Subsequently, in an effort to strenghten the seed program, a project was developed with World Bank support to improve many aspects of the seed program, but all of this effort was directed at public sector seed production and distribution programs. In 1976, the Punjab Seed Corporation and the Sindh Seed Corporation were formed.

After about 10 years of effort, many in the GOP felt seed supplies continued to be inadequate, and new initiatives were taken to improve on the situation. A Seed Industry Seminar was held in 1987 to consider improvements needed in the program. The recommendations of that seminar had a strong emphasis on private sector involvement in the seed system. At about the same time the National Commission on Agriculture formed a sub-committee on seeds which developed several recommendations. One of the recommendations was, "The Government should initiate appropriate actions for promoting induction of the private sector as partners of the public in the seed industry..." and they listed several measures needed to achieve this goal. Subsequently three multinational seed companies started small scale operations in the country.

In 1989 Seed Industry Workshop was held in Peshawar and several recommendations resulted. The second recommendation stated, "Existence of a private seed industry as a central component of a seed delivery system should be encouraged and promoted by government at the national and provincial levels, with the aim of transferring to such industry the role of seed production and distribution". A consensus seemed to have developed that the private seed sector must be encouraged.

Current Situation

Today the public seed sector operations supply less than 10% of the total seed needs for wheat. Maize seed supplied is only about 3% of total needs and the multinational companies are relying largely on imported seed at this time. About 29% of the cotton seed comes from the public seed programs. Sunflower seed is totally imported. Fodder seed production is scarcely identifiable in the public sector. Extremely small quantities of rice, pulses and oil seeds are produced in the public sector. Some vegetable seed projects are supplying seed to farmers, but the bulk of the seed is being imported by or is being produced by private sector merchants.

After several years of public sector effort, the vast majority of seed is either saved by the farmer himself or is obtained from neighbors and other sources that are not well identified. The latter sources have been called the "informal seed sector" and is represented by individuals or companies that are not easily recognized or assisted in any way.

We all recognize the need for an increased effort to encourage the private seed sector. We need to reach an understanding on how the private seed sector can be assisted so that it can do better the vital job that it is now doing with very limited support from the public sector.

III. OBJECTIVES

1. To assess ways in which local, private seed production and marketing can be increased.

2. To identify measures needed to facilitate the development of local, private seed production and marketing.

3. To clarify the roles to be played by the federal and provincial governments, research organizations and other public agencies to achieve objectives 1 and 2.

IV. CONSTRAINTS TO LOCAL, PRIVATE SEED PRODUCTION AND MARKETING

Federal & Provincial Policies

Until recently federal policies concentrated on the public sector seed production and marketing system. Thus, local, private seed production and marketing was discouraged. Even as policies changed somewhat to encourage multinational companies, little attention was given to policies that assist local seedsmen and seed enterprises. The National Seed Council (NSC) has limited private representation and does not seem to have dealt with issues concerning local seedsmen and enterprises. Import of specialized equipment for seed processing and delinting is difficult. The registration process for a seed enterprise is slow and requires reporting to government.

The provincial governments have followed the federal government's lead by tending to stress only the use of seed produced by the public sector. The Provincial Seed Councils have no representatives from private seedsmen or enterprises. The Councils concentrate on variety release. They do not deal with policy issues that could assist the private seed sector.

Credit and Taxes

Currently credit is not adequately available to seedsmen and enterprises either for capital improvement or as working capital to hold seed supplies from harvest until planting. Seed is not recognized as collateral even when credit is available.

A tax benefit previously available to seed companies was rescinded recently. Thus, little tax incentive exists for registered seed companies.

Investment in research and development work can be deducted from taxes for those few enterprises that undertake private research. This information does not seem to be widely known or utilized by the local private seed industry.

Economic Benefits

In the past cereal seed prices have been held low because of a desire to help farmers and to encourage them to purchase seed.

This very policy has discouraged local private seed production and marketing. The Punjab Seed Corporation continues to price seed of some crops too low to cover all direct and indirect costs, including an appropriate return on their investment. Without the income from its farm operation the PSC's seed business would show a loss. For private seedsmen and enterprises only seed of hybrid maize, sorghum-sudan hybrids for forage, vegetable and cotton offer the possibility of somewhat satisfactory returns on investment. Yet in many countries similar to Pakistan all seed prices are at a level that stimulate local, private investment in the seed business and farmers are willing to pay substantially more for good seed.

Lack of Suitable Hybrids

Until recently only Rafhan Corn Products produced hybrids of maize suitable for the country. The Auyb Agricultural Research Institute (AARI) has tests of impressive single crosses, but information for local, private seedsmen about appropriate hybrids they can produce does not seem to be available. Similarly, even though sorghum-sudangrass hybrids are available in limited quantities, mostly from imported sources, parent seed in quantities adequate to sustain a hybrid program do not exist within the country. Hybrid millets are extensively available in neighboring countries yet tests are lacking to determine the most suitable areas for maintaining the lines and producing the seed. The situation is comparable for sorghum hybrids.

Pakistan is at the stage where many farmers would benefit by access to hybrids. These hybrids could be multiplied and sold by the local private seed industry if a concentrated effort was placed on the development and testing of hybrids. The availability of such locally adapted hybrids, and seed stocks to multiply them, would greatly stimulate local, private seedsmen and enterprises.

Inadequate Pre-basic and Basic Seed Supplies

The primary sources of pre-basic seed are the breeders in provincial research stations and the PSC. The PSC is essentially the only source of basic seed in the Punjab. The PSC currently sells some basic seed of cotton to the private cotton seedsmen and enterprises. All other basic seed with the PSC is for their

own production. Where are local, private seedsmen and enterprises to obtain adequate supplies of pre-basic or basic seed?

The more aggressive seedsmen and companies approach breeders for small quantities of pre-basic seed, but in general the private sector has no significant access to this seed, except in the case of cotton.

Inadequate Access to Seed Processing Equipment

The Punjab Seed Corporation's seed processing equipment is of large scale and is inappropriate for small and medium scale seed enterprises. No mechanism exists to help private seedsmen identify and obtain appropriate seed processing equipment, either from within the country or outside. Thus, those who have entered the seed business struggle with inadequate means to clean and grade seed and to delint cotton seed. They want to improve their services, but do not know what to do or how to do it.

Limited Information on Seed Production Technology Limited

Local, private seedsmen and enterprises lack adequate technical information about seed production. Publications prepared in other developing and developed countries on seed production and technology were found in only one seedsman's library and at the University of Agricultural, Faisalabad. Many staff members of the PSC and the FSCD undoubtedly have private collections, but these are not available to private seedsmen. This consultant received numerous requests for information -- a further indication of the lack of availability of information.

Lack of Technical Support

Technical capability exists within the PSC and the FSCD, but both organizations utilize this technical capacity in the pursuit of their own objectives. A local, private seedsman or enterprise has no single place to go to get the technical help needed on the many aspects of seed production, drying, processing, storage, and quality control. The plant breeders help some on seed multiplication information, but they have limited capability to assist on other seed technology aspects.

Guidance on Management and Marketing Issues Lacking

Although several capable managers of seed activities were visited, it was clear that they saw no place to go to upgrade their management skills except abroad. Only a few of the organizations visited had a solid seed marketing program. Only the PSC and one local private enterprise held training programs for dealers. No seed promotional material was offered during this consultant's visits.

Persons entering the private seed business must have greater access to management and marketing training.

Farmers' Seed Quality Consciousness Developing but Inadequate

Opinions among those people visited differed considerably about the farmers' seed quality consciousness. Many felt the PSC had helped to raise the farmers' sensitivity to good quality seed. Others expressed concern about the farmers' lack of awareness of the value of seed quality.

A few discussions with extension personnel were not reassuring about the extension system's efforts to improve the quality of the farmer's home grown seed or to promote the use of good seed of improved varieties. The local private seed sector will require a more dynamic extension program to help increase the farmer's desire for good quality, locally produced seed.

V. ACHIEVING THE OBJECTIVES

Ways of Increasing Local, Private Seed Production and Marketing the Product

The local, private seed sector can flourish only if it has seed of high yielding, stable varieties and hybrids of the type and quality acceptable to farmers. Since most private seedsmen have no crop research programs of their own, they must rely on the public research programs to continually supply them with new and improved varieties. Research institutions should allocate a meaningful percentage of all pre-basic seed to the private seed sector the first year a variety is released, and in all subsequent years it is in use. As the local, private seed sector increases, the percentage of pre-basic seed allocated for it should also be increased.

Because of the importance of the higher yield potential of hybrid crops and the interest of the private seed sector in these crops, crop research institutes should rapidly increase their effort to develop and evaluate hybrids. Concurrently, seed production trials are needed to assess the potential for hybrid seed production in different locations of the country. As stressed in the Report of the National Commission on Agriculture, private companies should be given access to parental material.

Local Seedsmen and Seed Enterprise Development

Farmers will benefit by having several sources of seed of different varieties easily accessible to them. The best way to assure that farmers have ready access to good seed is to increase the production and marketing capability within the country. Although the PSC, SSC and multinational companies will play a significant role, they cannot meet the farmers' total seed needs. Local, private seedsmen and enterprises play a meaningful role today even without much encouragement. They can become much more effective in the future if properly organized and supported.

The public sector crop research programs need additional outlets for their new varieties to achieve the most rapid adoption. Private seedsmen can serve this role, becoming partners with the research institutions for the mutual benefit of both. The public research programs can also encourage private

research by the private seed sector to develop a network of public and private research programs utilizing the strengths of both.

Local, private seed production and marketing often lowers costs by reducing transportation costs and by utilizing family labor. Such a decentralized system can also supply varieties to meet local environmental needs more effectively than large organizations.

As private seedsmen and enterprises develop in all parts of the country, they will help improve local economies by employing people and improving crop productivity.

Kinds of Seedsmen and Enterprises

Local, private seed production and marketing can be done by a wide range of individual seedsmen and seed enterprises.

Individual Seedsmen

Individual seedsmen can be progressive farmers who produce and sell seed in their village and local area. A seedsman in the cotton area might produce seed of only cotton on a rather large area, gin it and sell it locally. A seedsman in the rice area might have a much smaller farm and produce not only rice seed but also one or two other kinds of seed for local sale. Ginners of cotton who select special fields from which seed is to be raised are also seedsmen.

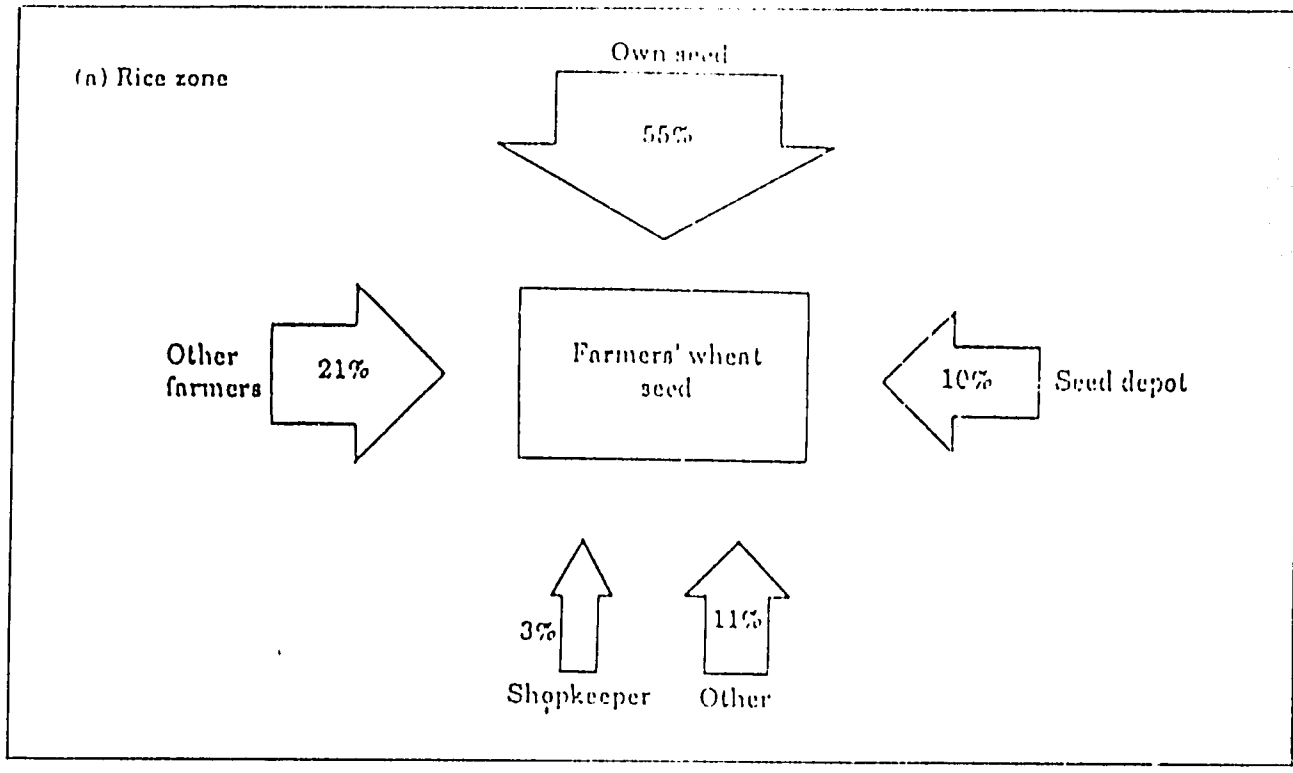
Seed Enterprises

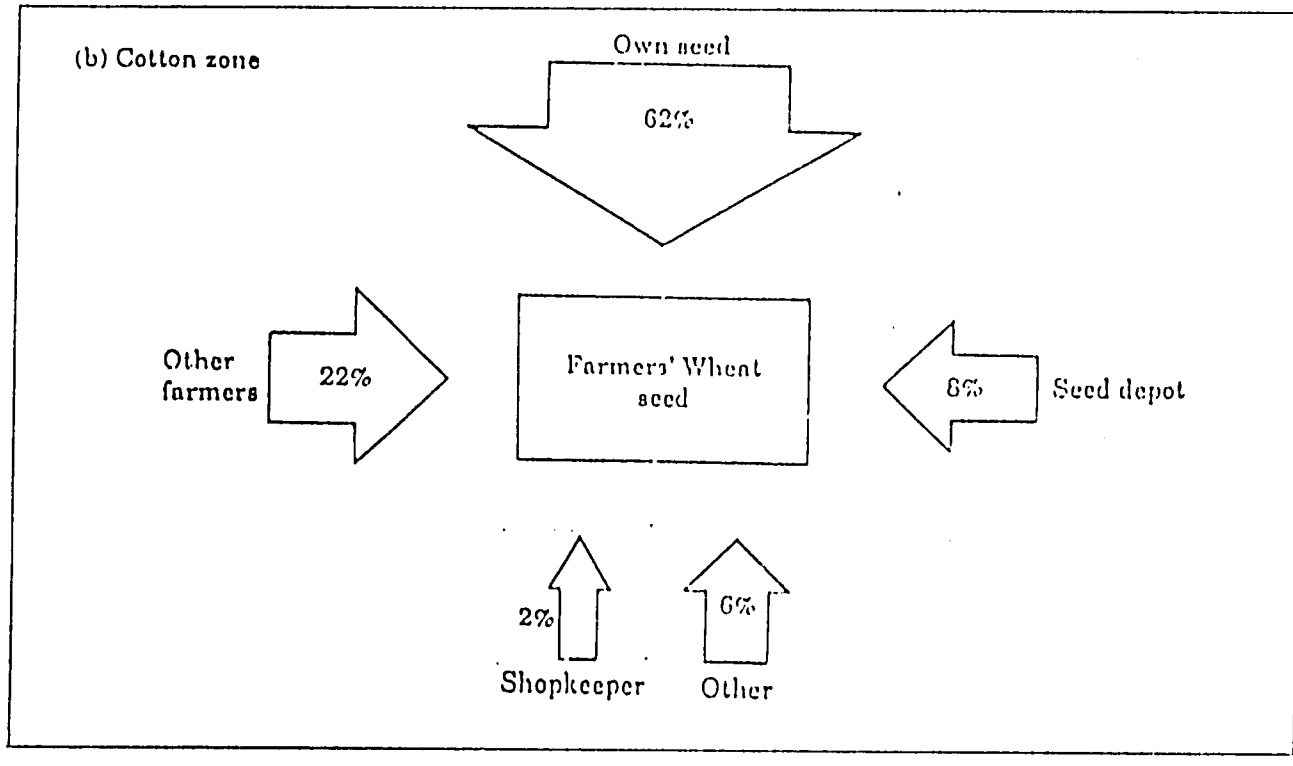
A seed enterprise is any organization involved in seed growing (either directly or through contracts with others), drying, processing, storage, or marketing. It may or may not be involved in plant breeding research. As defined in this paper, it is privately owned and operated. Seed enterprises may be small, medium or large, organized as partnerships, private limited companies, corporations, associations of farmers or cooperatives. They may cater to the needs of a small area or sell seed throughout a province or the entire country.

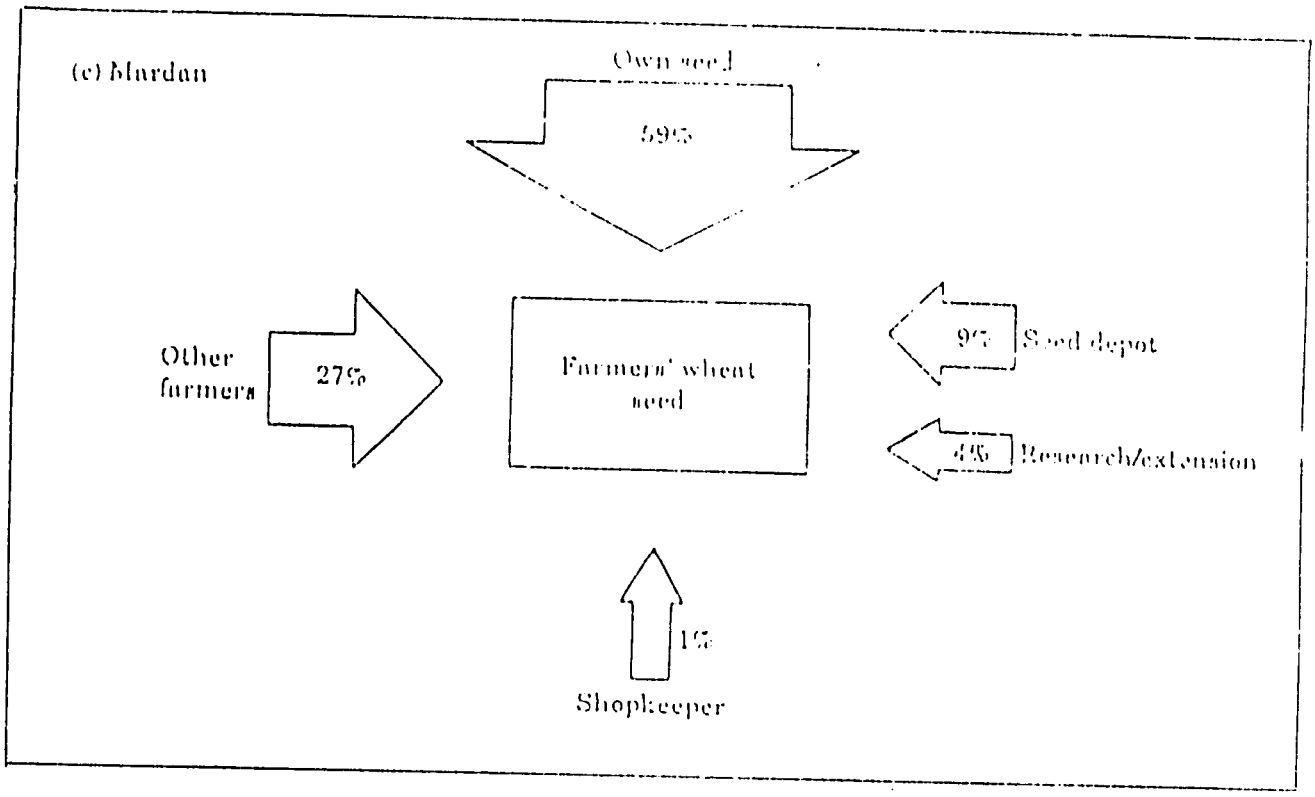
Seedsmen frequently evolve into seed enterprises. Local, private seedsmen and enterprises, as used in this report, are totally owned by local farmers and/or entrepreneurs. Many such seedsmen and enterprises operate in the country today, but no information exists about even a fraction of them. The registered seed companies and some vegetable seed merchants are on lists, but the actual local, private seed sector goes far beyond these lists. They are frequently referred to as the "informal seed industry." Studies of wheat seed sources for varieties currently planted show graphically, in Figure 1, the substantial amount of seed obtained by farmers from sources other than their own farm. (Heisey 1988).

Similarly, farmers use many sources when buying a variety for the first time as shown in Figure 2. About 50 percent of seed comes from other farmers, and many of them could be classified as seedsmen (or developed into seedsmen). It is this vast, unknown, private seed sector that requires proper identification, recognition and assistance in improving the quantity and quality of seed it sells.

Figure 1. Seed sources for varieties currently planted.

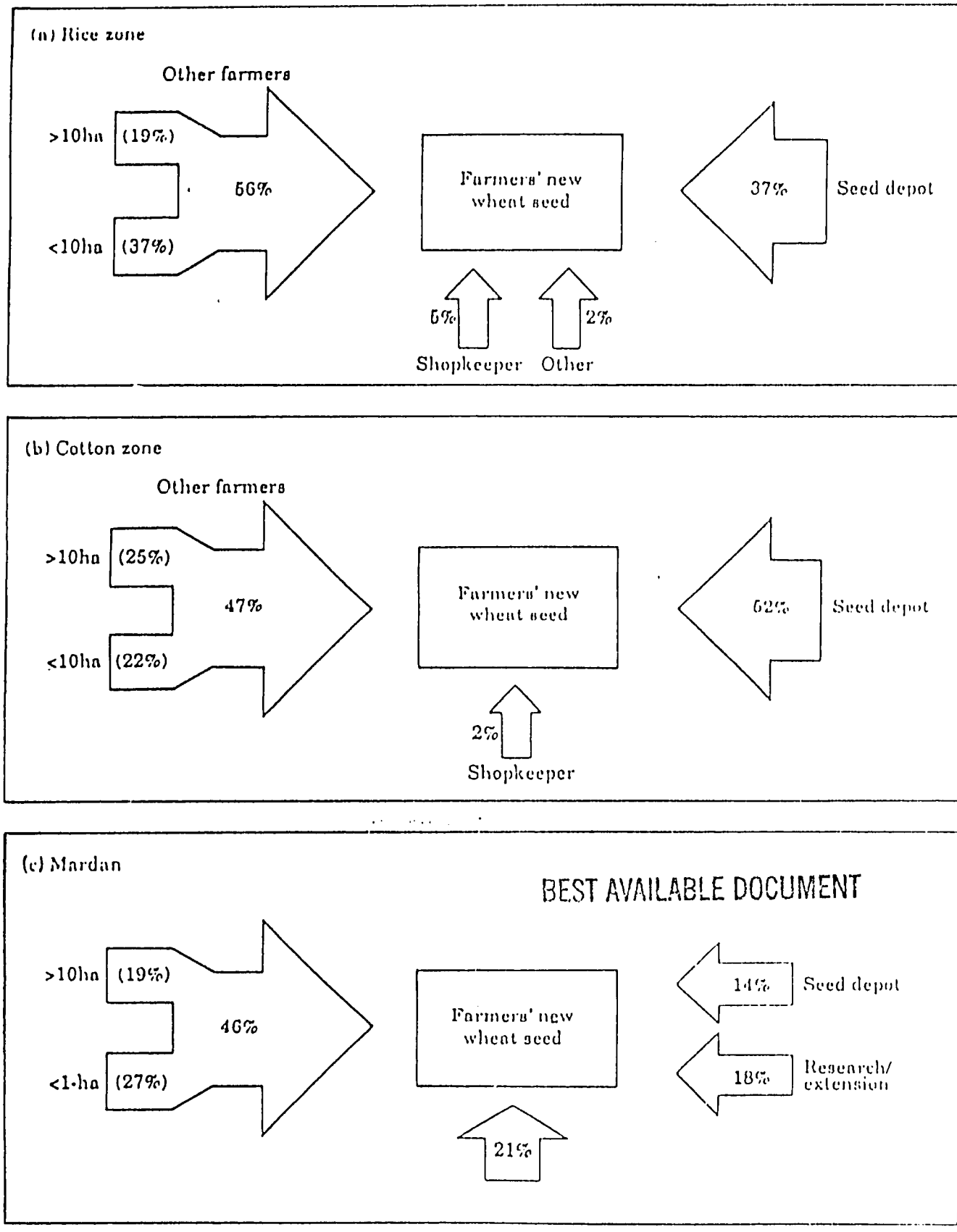






Source: Transferring the Gains from Wheat Breeding Research and Preventing Rust Losses in Pakistan, Edited by Paul W. Heisey, Draft 3, June 1988.

Figure .2. Initial seed sources for new varieties.



Source: Transferring the Gains from Wheat Breeding Research and Preventing Rust Losses in Pakistan, Edited by Paul W. Heisey, Draft 3, June 1988.

Seed Market Improvement

Far more attention must be given to seed marketing if good seed of improved varieties is to reach vast numbers of farmers. A number of factors can contribute to improved seed marketing, including:

1) existence of well adapted varieties wanted by farmers,

2) high germination and purity plus a good appearance of the seed,

3) promotion of the variety and the importance of using good seed,

4) adequate numbers of sales outlets,

5) adequate education and commissions for seed sellers,

6) a bag of a convenient size with an attractive appearance, sealed to prevent adulteration,

7) a seed price that is not exorbitant

8) access to credit for buyers who need it and,

9) a clear economic benefit to the farmers as a result of using good seed of an improved variety.

Brief comments on each of these points in relation to the development of private seedsmen and enterprises follow.

Varieties desired by farmers

The National Commission on Agriculture's Seed Sub-committee's recommendation was, "Research on variety evolution should be accelerated in deficient major crops, e.g., sugarcane and cotton (particularly for Sindh). Aggressive and large scale effort for research in evolution of hybrid varieties of maize, oil seeds, fodder and forages are highly essential and should not be deferred anymore." An increase in on-farm testing of promising varieties and an accelerated release system should be

added to this recommendation. NCA also suggests that research be encouraged in private sector.

Seed quality

Many reports of poor quality seed were noted. As the number of seed suppliers increases, competition among them will force an improvement in seed quality. The seedsmen and enterprises must develop their own internal quality assurance programs. Combined with this step is the need for the FSCD to place added effort to extend the certification service to more private seedsmen and enterprises.

Implementation of the RSCS recommendation that "all seed sold in the market should be truthfully labelled by the sellers..." should enhance the quality of seed sold in Pakistan.

Seed promotion

Increased promotion of good seed of improved varieties is needed by the research programs, extension system and the public and private commercial seed industry. Recognizing that the literacy rate among farmers is low, promotion must be geared to the appropriate level.

Number of sales outlets

Studies on the farmers' source of wheat seed show about 80 percent of the farmers obtaining seed within a five kilometer radius from their farms. This finding further supports the need for the development of more local private seedsmen and enterprises as well as dealer outlets. Fertilizer and chemical dealers need to be brought increasingly into the seed marketing network. It is to their advantage also to be sure the farmer has good seed, so that the benefits of their input are fully utilized.

Education and commissions for the seed sellers

For the seed seller to be most effective he must be well informed about the varieties he sells, the maintenance of seed quality and the best use of the seed. A regular series of educational meetings is needed for seed sellers. Incentives in

the form of commissions, bonuses, trips, etc. should be available to stimulate their interest in selling seed. This practice has been used in many other countries, and it will work in Pakistan.

The seed container

Bags are the most common container for seed, but seed is still handlled in huge bags as if it were grain. Seed needs to be packed in sizes convenient to farmers. Has anyone asked the farmer if he likes 100kg bags? Two or three organizations visited have started to use smaller bags. Other seedsmen and enterprises need to do likewise. An attractive package is needed to convey a good impression and to attract attention. Few seedsmen and enterprises have grasped this point, although vegetable seed sellers utilize this concept better than other seed sellers. Much concern is expressed about adulteration, but properly identified containers that are sealed, and do not need to be opened for individual purchases, can greatly reduce this problem. Providing a proper certified seed label or truthful label on containers will also reduce the risk of adulteration.

Seed pricing

Low seed prices is a major constraint. For example, maize seed prices are among the lowest in the world (CIMMYT - 1986). It is not surprising, therefore, that a private seed sector has failed to develop. Adequate competition is the best way to control seed prices. The development of more private seedsmen and enterprises will set in place a more effective price control mechanism than any other method. When new varieties are introduced, substantial supplies of basic seed can assure wide distribution to many seedsmen and enterprises and help avoid exorbitant prices.

Credit to seed buyers

Wheat seed surveys show that 75% or more of the farmers finance the seed with their own money. For the remaining farmers credit should be readily available. Linking seed supplies with credit can be useful initially in hastening the development of private seedsmen and enterprises if the farmer is free to obtain his seed from private as well as public sources on credit. Colombia and Brazil both have used this technique, but are now

delinking seed and credit as the private seed industry becomes better established.

Economic benefit to the farmers

No amount of marketing effort will be successful unless the farmer is convinced that the seed will benefit him economically. Thus, the price to the farmer has a significant effect on his willingness and ability to buy seed. Depressed prices of some commodities today reduce the actual demand for seed. Targets established by government for increased seed sales will have little impact on the farmers' economic decision about buying seed.

The seed industry, with the assistance of agronomists and economists, needs to generate the economic information required to verify that it is to the farmers' advantage to buy new seed. Economic studies on wheat seed use in Pakistan indicate that yield gains from genetic improvement have been at least 0.75% per year. At this rate of yield gain it will pay farmers to change varieties every four years under current conditions. This study does not take into account any possible benefit from the use of good quality seed. Information on the benefit to be derived from better seed of improved varieties is needed.

VI. Human Resource Development and Training

Importance for private sector

Training in seed production and technology has been limited to the staff of the FSCD, the PSC and other public agencies. Little evidence was found of special training, inside or outside the country, to assist private seedsmen and the staff of seed enterprises. If local seedsmen and enterprises are to be encouraged to multiply and supply more good quality seed, they must have more opportunities for training inside and outside the country.

Mounting in-country training

Currently no single organization is capable of providing the wide range of training needed for the private seed sector. The National Agricultural Commission recommended that the

agricultural universities at Faisalabad, Peshawar and Tandojam add seed production technology to their curricula for both the graduate and post-graduate levels. It was, also recommended that these universities offer short courses. These are excellent recommendations; the development of these university programs should be accelerated.

Potential resource personnel for contributing to training also exist in the NARC, provincial research institutions, the Lahore University of Management Sciences, the University of the Punjab, the FSCD, the PSC, the Fertilizer Corporation and numerous other institutions. Eventually, seed associations may have staff to offer training. Knowledgeable people now exist in many seed enterprises. Rafhan Maize Products, which does not consider itself a seed company, has produced good hybrid maize seed for many years. The challenge is to develop a focal point for organizing training programs for the private seed sector, drawing upon the resources that exist within the country. At times outside expertise may be useful, but 95% of the training can and should be done by Pakistanis.

Kinds of training

The following kinds of training are suggested primarily for personnel in the private seed sector:

1) Seed production and quality maintenance for seed growers.

2) Seed drying, processing and storage for managers and operators of seed processing facilities.

3) Seed marketing for marketing specialists in seed enterprises, seedsmen and other seed sellers.

4) Seed enterprise management for leaders of seed enterprises and seedsmen.

These examples are not intended to be all-inclusive. They are suggestive of the kinds of training needed. These topics could be covered in short courses, workshops, seminars and by tours of good examples of private initiative within the country.

Opportunities should be provided for study tours and training outside the country. Training opportunities should be considered in countries that have developed many local, private seedsmen and enterprises during the last 25 years. Some of these countries are Guatemala, Colombia, Brazil, Chile, Bolivia and India. In the USA and Europe hundreds of small and medium scale seed enterprises exist. Many of them were started by an individual family and continue to operate in that manner. It is reported that the USA has 3,000 seed enterprises. Obviously, vast numbers of these are not multinational companies. Consideration should be given to identifying some of these smaller enterprises when planning tours and training programs.

The International Seed Trade Federation offers an in-service training program where trainees are placed in private seed companies for a period of time. Mississippi State University (USA) offers a two month seed technology short course in June and July. This short course could be combined with in-service training in a private seed company. Visits to seed companies in selected parts of the USA and Europe can meet specific crop interests.

The International Center for Agricultural Research in Dry Areas (ICARDA) in Syria has a seed technology program and could organize courses and tours, especially for the private sector. The International Livestock Center for Africa (ILCA) in Ethiopia has started a forage seed technology program and probably could assist in forage seed production technology. The International Center for Tropical Agriculture (CIAT) in Colombia has a Seed Unit which could assist in developing contacts with seed companies in Latin America. It also has a mini-seedhouse with several kinds of small scale equipment for seed cleaning and drying.

Study tours for groups of private seedsmen and leaders of seed enterprises to small and larger seed companies, foundation seed programs and seed associations are useful in the development of a nation's seed industry.

The advantage of training private seedsmen is that they continue in the business once they are started. Investments in the training of people from the private sector can have a long lasting benefit to the country.

VII. Other Resources

Facilities and equipment

Some enterprises in the private sector already have invested in facilities and equipment, but only a small start has been made in terms of what is needed. Several people visited are prepared to invest more if it is made clear that the federal and provincial governments will develop policies that clearly support the private seed sector.

One of their major problems is to know where to get technical advice about the kinds of equipment needed and about local equipment vendors. Mechanisms are needed to provide private seedsmen with sound advice thus assuring that they make the right investment.

In the early days of the PSC some seed cleaning equipment was fabricated locally. With the development of the large facilities using imported equipment the local effort was dropped. It is understood that PASSCO has made a survey of potential manufacturers of equipment for their needs. Recently the BARD Project has had three seed cleaners made locally. The head of seed processing for the PSC is knowledgeable in this area. Other public sector organizations have mechanical development activities. It appears that the capability exists within the country to build much of the smaller scale equipment needed by the private seed industry.

Some modern prototypes for drying, cleaning, grading, treating and delinting could be imported for use by selected private seedsmen and enterprises, universities, research institutes, and machinery development programs. As experience is gained with this equipment, local improvement and manufacture could be undertaken. The equipment produced should be continuously monitored to assure that sustained and proper performance is achieved.

Most items required by the private sector for seed quality evaluation probably are now available in the country or can be fabricated. Moisture testing equipment is especially needed today.

Improved seed storage is another major need. The means exist within the country to build such stores, but more modern designs suited to the different environmental conditions should be developed. Technical assistance is needed for the private seed sector to construct storage facilities suited to their area and crop storage needs. Well insulated, dry, seed stores are needed especially for pre-basic and basic seed. Locally built potato seed stores were seen that would make good seed stores except that the humidity was being kept high. For seed storage it is only necessary to dehumidify the same kind of store.

Table I illustrates the differences in temperature and humidity in Multan. With this information one could make simple tests to determine how seed should be dried and stored to achieve higher quality. For example, it might be possible to use natural, forced air during periods of the day when the humidity is low. Local tests could verify the potential value of this possibility.

TABLE - I

Meteorological data for Multan, 1971-1980 Ten Years Average

	Max. Temp		Min. Temp		Humidity, 8 A.M.		Humidity, 5 P.M	
	Range	Mean	Range	Mean	Range	Mean	Range	Mean
Jan	20.3-21.6	20.9	2.9-6.0	4.3	73-91	84	36-51	41
Feb	20.7-25.2	23.0	3.9-9.1	7.3	62-84	75	25-47	35
Mar	25.2-32.4	28.5	11.9-14.2	13.1	57-77	68	21-43	32
Apr	34.6-38.4	36.3	18.2-21.4	20.0	46-61	55	21-30	26
May	39.8-44.2	40.7	22.3-26.4	24.9	36-48	44	15-35	22
Jun	40.5-43.8	42.2	26.8-30.6	28.8	46-60	54	25-32	29
Jul	37.9-40.8	38.7	26.8-30.2	28.5	67-81	69	37-49	38
Aug	35.7-39.2	37.8	26.6-28.7	27.9	63-82	72	42-57	48
Sep	34.5-38.5	37.0	23.3-26.3	24.7	62-83	70	33-51	44
Oct	34.0-36.0	35.0	15.0-20.5	18.1	58-73	67	31-41	38
Nov	27.6-30.6	28.9	8.5-12.3	11.7	69-85	78	35-51	43
Dec	21.4-24.6	23.3	4.2-7.9	5.9	83-90	87	44-58	47

Public sector could assist the private seed sector in regard to seed cleaning & storage by leasing surplus facilities to the private seed sector or by doing custom seed cleaning for them. Older seed plants built for the ADC with USAID assistance possibly could be renovated and leased to the private sector to

meet their immediate needs. Some usable portable equipment may exist in the country that could be hired by the private sector. If not, a few prototypes could be imported to be evaluated by interested private seedsmen or enterprises under a hire-purchase arrangement.

Financial Needs

The private seedsmen and enterprises will thrive only if they have an opportunity for reasonable profit. If profit opportunities do not exist, they will invest in something else.

If the opportunity for fair profit exists, most successful seedsmen and enterprises will keep their capital investment as low as possible while assuring that good quality seed is produced. Many of them will need credit to assist them in making the needed investment. Although the seed business must be profitable, it will make likely not be profitable enough for the private seed sector to grow on profits alone. Working capital is required especially to store seed from harvest until planting. Today this kind of credit is scarce or non-existent. Moreover, banks do not distinguish between seed and grain. Banks in many countries do make this distinction and are prepared to loan on the basis of the higher value of seed. Recognition by lenders of the true value of seed is badly needed to assist the private seed sector.

VIII. Seed Associations

Proposals were made in the 1987 Seed Industry Seminar, and the 1989 Seed Industry Workshop regarding the formation of seed trade or seed industry associations, either in provinces or at the national level. Little was proposed about what these associations should do. Associations of seed growers, seedsmen, seed companies, vegetable seed merchants and seed technologists exist in many countries. Sometimes these groups are combined into one organization.

In the USA crop or seed improvement associations give technical assistance to seedsmen and seed enterprises and help to assure good quality seed through their seed certification services. These associations also help promote the use of high quality seed. The Canadian Seed Growers Association serves a

similar function in Canada. Some associations in Brazil, and a few other Latin American countries, provide various services to the seed industry.

Recognizing the many needs of the private seed sector, good justification exists to support the development of local associations and a national federation of smaller associations. The scope and purpose of these associations and federation require close examination to assure that they are organized, not to function primarily as a political forum, but for the purpose of serving the current needs of the private seed sector. Among the needs just reviewed are pre-basic and basic seed supplies, technical assistance, promotion, communication among the many elements of the private seed sector and linkages with public sector organizations. The Ministries of Agriculture in the provinces and at the federal level would find such associations extremely useful as they work to assist the development of the private seed sector and to help the GOP attain its objective of proper seed supply to the farming community. Assistance to government in planning and assessing seed production and determining policies that are needed by the private seed sector are but a few examples of the value of such groups to the ministries. In the next section specific proposals are given regarding seed associations and federations.

Measures Needed to Overcome Constraints and Facilitate Seed Production and Marketing in the Private Sector

A seed improvement association

The accelerated development and growth of local,private seedsmen and seed enterprises can be achieved through a "self-help" program. A "Seed Improvement Association" (SIA) should be formed in an area where the probability of success is high. Other SIAs could be formed on the province level or on the basis of special crop interests (Annex 2).

The primary objective of a SIA would be to increase the quantity and quality of seed available to farmers through the development of local, private seedsmen and seed enterprises. Membership in the Association would be open to all who are interested in helping to make good quality seed available to farmers.

Activities of a SIA

A SIA would provide a wide range of services to members to assist them to become as effective as possible in seed production and marketing. The items below include the most significant activities envisaged.

Basic seed supplies

To improve access to basic seed from public crop research programs, a SIA would obtain pre-basic seed from research institutes and multiply it for sale to members as basic seed. To avoid developing a large staff and infrastructure, the SIA would contract with its members to produce basic seed. Members wanting basic seed would place orders a year in advance to help the SIA plan for production. Surplus seed beyond the members' needs would be sold to other growers. Table II shows estimated quantities of basic seed of several crops that could be produced by a SIA for the Punjab province.

Seed purchases and sales by the SIA could best be financed from a rotating fund established for the purpose. If a fund is not possible, a line of credit would be needed.

A SIA must develop an equitable distribution system that could be used when new varieties are released or seed stocks are in short supply because of unavoidable reasons.

The preferable arrangement for the SIA to acquire services for seed processing, quality testing, and storage would be to rent these from publicly-funded research institutions and provincial seed corporations. It may be necessary to improve the equipment available at some of these research stations through grants for the purchase of equipment. Hopefully funds would be made available from the Government of Pakistan or international assistance agencies.

Facilities for seed processing, quality testing and storage to strengthen pre-basic seed production programs and for use by the SIA would preferably be located in the premises of government institutions in case these are provided through grants or donations from government or foreign agencies. The SIA should develop agreements with these organizations for the use of those

facilities as needed. Similarly, office space may also be arranged with such organizations.

Table-II

Seed Position in the Punjab Province

	1989-90 Area 000 ha	Seed Requirement (M.T.) Cert. seed	Basic seed	Present seed availability Cert. seed M.T.	%	Likely S.I.A. Share M.T.	Estimated Profit/ M.T. Rs.	Total
Cotton	2086	52150	1304 (35208)	14500	27.8	740 (50%) (20000)	2500	1850000
Wheat	5589	510779	20431 (551637)	41401	8.1	1656(8.1%) (44713)	500	828000
Rice	942	22875	228	1647	7.2	16 (7.2%) (432)	500	8000
Maize	356	14240	285	505	3.5	94 (33%) (2539)	1250	117500
Gram	860	34440	1722	619	1.8	20 (540)		
Jowar	211	8440	422	-	-	100 (25%)	500	50000
Bajra	303	6060	151	-	-	38 (25%)	500	19000
Fodder (Kh)	1056	42240	845	-	-	2000(12%)	2500	5000000
Berseem	782	19550	978	-	-	400 (20%)	400	160000
								8032500

1. Estimated profit is a projection to be achieved after SIA is well established.

Other direct assistance to members

Training in many forms should be developed to enhance members' capabilities and skills. A combination of courses, workshops and tours within the country would be used. In addition a SIA would seek support for training and study tours abroad for members. The staff of SIA would draw upon the staff members of research institutions, universities, the FSCD, the PSC and the SIAs own members to contribute to training activities. Training aids including audiovisual aids and printed materials would be prepared as well as obtained from outside the country to support training activities.

The SIA staff would guide seedsmen and seed enterprises in the development and implementation of their seed production and marketing plans. A newsletter would be published to continually supply members with technical and marketing information.

Advice on the kinds of equipment needed to dry and process different kinds of seed would be given. Simultaneously, guidance would be provided to local manufacturers on the kinds of small scale equipment most needed by the private seed sector. Equipment could be imported or fabricated locally for lease or sale to smaller seedsmen.

Supplies of inputs not readily available to members, or that could be obtained at lesser cost with larger orders, could be made available. Examples would include chemicals for weed and pest control, seed treating materials, fumigants for stored seed and bags with the SIA name and logo that could be personalized by members.

Promotional and educational material would be prepared for use by members, dealers and the extension service to stimulate more seed use. Public service information on seed would be prepared for radio and television by the SIA in cooperation with the provincial and federal information services. Directories of members would be prepared giving sources of seed supplies.

Market surveys would be made and the results supplied to members. During the sales season seed supplies would be monitored among members and assistance given to help move surplus supplies to deficit areas.

A SIA would help develop lines of credit to assist members in obtaining loans. Perhaps the SIA could guarantee loans obtained by its members. It would also encourage lending agencies to recognize the value of seed when making loans. The staff of the SIA could provide technical support to the preparation of loan requests.

Assistance to government

A SIA could provide private representation on the National Seed Council and the Provincial Seed Councils. Through such representation a SIA could contribute to policy development and at the same time provide support to meeting government seed production objectives.

It is expected that large numbers of seedsmen and seed enterprises will emerge if sufficient encouragement is given. A SIA could assist government by maintaining a register of seedsmen and seed enterprises, avoiding the need for individual seedsmen, many of whom will have quite small units, and seed enterprises to apply to government directly.

Information on the total private seed production in the province could be readily available from the SIA's office to assist government planners.

Links with research institutes

The work of a SIA through its members will accelerate the use of improved varieties. SIA members could assist in testing improved material and provide valuable feedback to researchers. The SIA members could contribute to the identification of research needs especially related to problems of the varieties/hybrids in seed production, quality, storage, processing operations and marketing. SIA should take the lead in helping to foster close public and private research cooperation.

Links with extension

Members of SIA would be encouraged to collaborate as closely as possible with the extension staff as they conduct demonstrations and hold farmer meetings. Extension information could be provided to seed users through the SIA members.

Cooperation with private research organizations

Since the vitality of the private seed sector depends upon access to a continuing flow of improved germplasm, a SIA would be free to collaborate with any private research group inside or outside the country, as well as the public sector, to further its objective. For example, the Gurmani Foundation is initiating a private research project, and the SIA members could draw upon those results in due course. Rafhan Maize Products has hybrid lines that might be used by members of the association, and steps could be taken to develop a close working relationship with that organization. Foreign sources could be tapped. Arrangements could be made for the multiplication of hybrid vegetable material by members. A SIA objective would be to explore all avenues to help assure that Pakistan farmers a supply of seed of the best germplasm possible.

Crop priorities

SIA activities ultimately should extend to all seed used by farmers. Recognizing that all crops cannot be incorporated into the program immediately, it is proposed that cotton seed be given priority at first because of the assured demand for seed and the current interest of seedsmen and seed enterprises in the cotton area. Subsequently, priorities would be determined by the leadership of the SIA based upon the interest of members, the availability of superior varieties and hybrids, farmer interest in seed of different crops, the activities of the PSC and government priorities. These factors to deterine crop priorities would apply regardless of the methods used to form SIAs as discussed in Annex 2.

International contacts

Membership in the International Seed Trade Federation would be sought as a way to enlarge the private seed sectors links with international associations and companies. Through these links a SIA could open opportunities for the export of high value seed.

X. Organization

A SIA would be organized under the Societies Act as a non-profit organization. The normal procedure for organizing such an association would be followed. A Board of Directors and officers composed of seedsmen and seed enterprise representatives would be established. An Additional Secretary responsible for seed, the Director General Research and the Dean of the agricultural university would be invited to participate with the leadership of a SIA to help assure proper linkages and commitment from these groups to the association.

Method of operation and staffing

The small permanent staff would have to be mobile to achieve their mission. A staff of three technical people is suggested with responsibility for initiating the SIA work in basic seed production and quality control; seed processing facility development and processing operations; and training, promotion and information. Consultants, locally and from abroad could support their activities. Annex 2 details the responsibilities of the staff.

Initially the key operational area in the cotton belt should be established, around which a core of seedsmen and seed enterprises now exists. Subsequently, other key locations should be identified and SIA's formed there.

There are many special projects throughout the country which often have small seed production units. Private groups within these projects can become future seedsmen and seed enterprises. Some examples are the small Seed Centers started by the BARD project, farming systems research projects, irrigation projects, and various non-governmental projects. The staff could enlist the help of these projects in developing private seedsmen and seed enterprises at the local level and, if desired, supply them with basic seed for multiplication. Some crop specialization would result in the different locations because of existing cropping patterns.

The SIA staff should seek to maximize the development of each seedsman and enterprise, so they can flourish as individual units. SIA should in no way attempt to hamper individual

initiative. New entrants in the private seed sector should always be welcomed into a SIA. The SIA must not become a restricted membership association controlled by a few. In no case should a SIA become involved in selling commercial seed to farmers at the retail level because this would compete with its own members.

Benefits to members

The primary benefit to members would be easier access to good quality basic seed. The opportunity to be selected for contracts to produce basic seed would benefit a few growers. The technical support and training would help members produce and sell more seed of better quality. The SIA's assistance to policy formulation and associated activities would help overcome many existing difficulties that now hamper the private seed sector. The promotional activities would increase sales for the members. The opportunity for increased communication among members would increase seed trading and benefit all members and farmers.

Government Interest and Commitment Necessary

A SIA would require strong interest and long-term commitment by both the federal and provincial governments. Key areas in which support would be needed are given below for both the federal and provincial governments.

Provincial government

Provincial Seed Councils now function in some of the provinces. These Councils require new mandates and reorganization. Today the Councils deal only with variety release. To properly support a SIA and the emerging private sector, they should focus on overcoming bottlenecks and assuring the implementation of policies that contribute to the development of private seedsmen and seed enterprises. The SIA should be represented on the Council by at least four members representing different areas, crops and sizes of operations. In addition the Councils should include representation from research institutions, the extension program, the agricultural university, FSCD, PSC and coopted members as needed.

The Councils could have sub-committees to deal with variety release and seed certification operations. The latter sub-committee should draw at least 50 percent of its members from SIAs. The Seed Certification Sub-Committee would deal with issues limiting the use of the services of the FSCD by the private sector and handle problems that arise with seed certifiers.

In the Department of Agriculture an Additional Secretary (Seed) should have a small seed cell. This cell would be the Secretariat for the Provincial Seed Council and would have responsibility for implementing decisions taken by the Council. In general it would implement government decisions, assure policies are followed, manage the educational program and enforcement of truthful labelling, coordinate all aspects of the seed sector and promote the use of good seed. (Fig. 3).

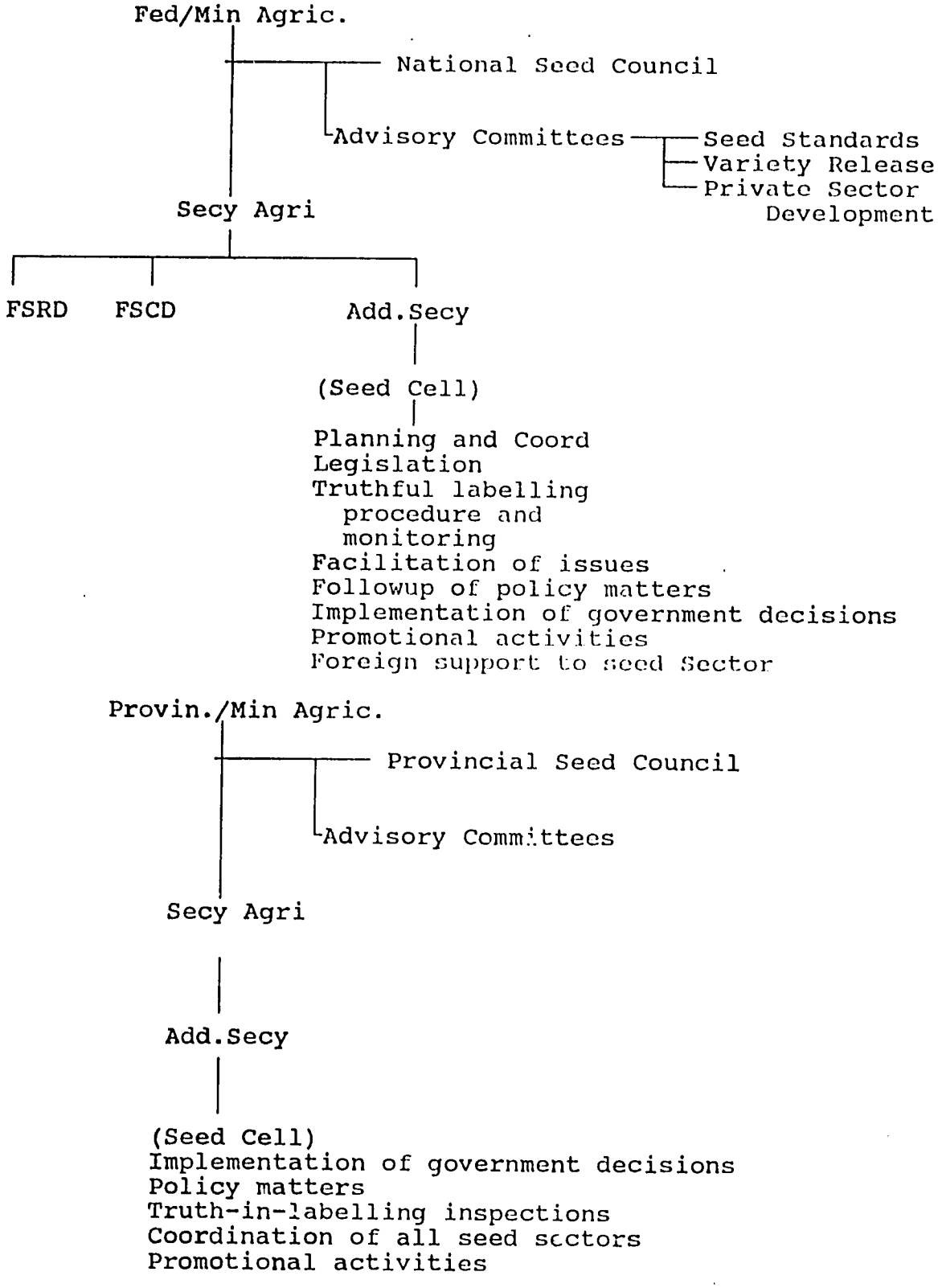
Federal Government

As in the case of the Provincial Seed Councils, the National Seed Council (NSC) requires a new mandate and reorganization to properly support private seed sector development and SIAs. The NSC should include both a public and private representative from each Provincial Seed Council in addition to research, extension, and MINFAC. The Minister of Agriculture should nominate two or more additional private sector representatives.

The NSC should also have sub-committees on such topics as variety release, seed standards and private sector development.

To provide an implementing arm for the NSC, an Additional Secretary should have a small seed cell. This cell would have responsibility for 1) planning and coordinating seed activities from the federal level, 2) seed legislation, 3) procedures and monitoring of the truthful labelling program, 4) follow-up on policy matters, 5) implementation of government decisions, 6) facilitating the handling of issues of concern to the private seed sector, 7) coordinating foreign support for the federal and provincial seed activities, and 8) promotional activities.

Fig.3


Fed/Min Agric.
National Seed Council
Advisory Committees
Seed Standards
Variety Release
Private Sector Development
Secy Agri
FSRD
FSCD
Add.Secy
(Seed Cell)
Planning and Coord
Legislation
Truthful labelling procedure and monitoring
Facilitation of issues
Followup of policy matters
Implementation of government decisions
Promotional activities
Foreign support to seed Sector
Provin./Min Agric.
Provincial Seed Council
Advisory Committees
Secy Agri
Add.Secy
(Seed Cell)
Implementation of government decisions
Policy matters
Truth-in-labelling inspections
Coordination of all seed sectors
Promotional activities

The Federal Government should make clear policy statements that

1) acknowledge the need for healthy coexistence of the public and private sectors with strong support for the development of local, private seedsmen and seed enterprises to fill major gaps in seed supplies for all crops,

2) facilitate the creation of an appropriate forum such as SIAs in the provinces so the private seed sector can help government in streamlining and enlarging the sector to more fully meet the country's seed needs and to identify the kind of support most needed by the private sector,

3) reinstate earlier tax exemptions to help the budding industry to develop,

4) provide for the proper recognition of the private seed sector with preferred credit sources, exemption from import duties on equipment and seed, especially those seed required to support seed multiplication and testing as well as plant breeding research,

5) assure that public sector seed corporations and organizations take into account all direct and indirect costs when establishing seed prices while allowing seed prices in the private sector to be established on the basis of competitive market forces,

6) assure that seed subsidies in the public sector are not reinstated,

7) keep seed certification on a voluntary basis as now stated in the Seed Act,

8) add truthful labelling provisions to the Seed Act with appropriate support for its implementation,

9) make a clear statement in the Seed Act assuring a significant role for the private seed sector, and

10) assure that the banking system provides credit on the basis of the actual value of the seed (not grain or lint-cotton values).

Public Sector Research Organizations' Support

As a SIA assists its members with basic seed supplies and other technical support it would interact closely with research organizations in the public sector. Specific suggestions for research organizations follow:

1) Review pre-basic seed production and allocation policies, recognizing the needs of a growing private sector and a SIA's plans for basic seed production.

2) Provide for a seed production technologist with responsibility for pre-basic seed production (in cooperation with breeders), quality control, stored reserve stocks, implementing seed allocation policies and seed production research. Some institutes have an economic botanist for seed production; this person's responsibilities might need to be enlarged. In many cases this step could lead to "seed divisions" in these institutions as proposed in the Report of the Sub-Committee on Seeds (RSCS).

3) Intensify research on hybrids and assure adequate supplies of parental lines for multiplication by the private sector.

4) Assist training activities for the private sector organized by a SIA.

XI. Pakistan Agricultural Research Council (PARC) and National Agricultural Research Center (NARC)

Recognizing the importance of the local, private seed sector to the utilization of crop research results nationally, the PARC should

1) Provide any support possible to the private sector and SIAs especially.

2) Provide leadership in developing strong public and private linkages in plant breeding to assure that the maximum results are achieved by each group for the benefit of Pakistan's farmers.

3) Develop an applied seed technology research division as proposed in the NCA with a small advisory group to help pin-point the most pressing seed production and technology problems.

4) Coordinate the seed technology research program with similar research in provincial institutes and universities.

5) Cooperate with the FSCD, the MINFAC seed cell and SIAs in identifying training courses that can best be organized at the federal level to support provincial seed development activities.

6) Review how the Information Unit and the provincial units can assist a SIA's promotional activities in the province and support the increased use of good seed of improved varieties.

7) Encourage the Farm Machinery Institute to consider the private seed sector's equipment needs in cooperation with the SIA and determine how it could contribute to overcoming current problems.

8) Provide local and foreign consultancies to assist SIAs.

XII. Federal Seed Certification Department

The FSCD currently provides its service mainly to the public seed sector. In cooperation with a SIA the FSCD should focus on increasing its seed certification services to more private

seedsmen. The well-trained FSCD staff should assist the private seed sector in developing effective, internal quality assurance programs to complement their seed certification program. Other specific steps the FSCD should take include:

1) Offer seed certification services for both publicly and privately developed varieties and hybrids on a comparable basis,

2) Continue offering seed certification on a voluntary basis,

3) Keep procedures simple so that the service truly helps the private seed sector and does not delay and restrict seed processing and marketing operations,

4) Review seed standards, especially varietal purity levels, and assure they are attainable (the rejection rate on seed to be certified seems excessively high),

5) Utilize the certified II class as a way of expanding the use of certified seed and to provide greater flexibility in the program, and

6) Consider how its staff could assist in solving the most urgent seed production problems.

XIII. Provincial Seed Corporations

The PSC has raised the consciousness of farmers and the people who are just starting into seed production and marketing about the importance of good quality seed. The PSC will continue to play a role as it further improves the seed it markets.

The PSC currently supplies about 30 % of the total seed requirements for the cotton crop. About 8% of the wheat seed needs are met by the PSC. For other crops the percentage is much less. These levels have been nearly constant during the last four years. Therefore, the PSC should help the private sector to make up the deficiency in seed availability in the national interest. This may be done by:

1) Offering part of their basic seed of all crops they produce to the private seed sector,

2) Assisting the SIA staff in identifying suitable seed processing and handling equipment to be procured by the private sector,

3) If possible, providing custom seed cleaning services to the private sector on a rental basis,

4) Establishing prices that definitely cover all direct and indirect costs so that the private seed sector has an opportunity to operate at a profit without unfair public sector price competition, and

5) Seconding staff to private seed enterprises to assist on specific activities if requested to do so.

Recognizing that the SSC is at a different stage of development than the PSC, it might choose to re-examine its role totally in the light of the formation of SIAs.

XIV. Extension's Role in Support of the Private Seed Sector

The Report of the Sub. Committee on Seeds stresses that a "seed extension service" be organized to complement seed marketing. More demonstrations are needed in farmers' fields to show the value of improved varieties and good seed. As indicated earlier, the private sector could assist extension with demonstrations and follow-up meetings. The SIA could be helpful to the extension system to help develop close links between extension and the private seed sector.

The recommendations to farmers about where to obtain seed need revision in light of the larger role to be played by the local, private seedsmen and seed enterprises. The directory prepared by the SIA of its member seed suppliers should be used by the extension staff to guide farmers on seed sources in addition to the PSC.

As reported elsewhere, over 50% of the wheat farmers save their own seed. Studies by Heisey and others show that over half of these farmers do not attempt to maintain seed purity or store seed separately. Similarly, studies of maize farmers by PARC and CIMMYT show that only 1% select their seed in the field before harvesting the main crop. Most make a selection before shelling.

These studies show that the extension service has a huge task in developing improved methods of seed saving practices for the farmer when he does keep his own seed.

The extension system clearly should place a much higher priority on seed quality. A few "extension seed specialists" to provide leadership to this effort are greatly needed. Their help is essential to accelerate the marketing of more good seed of improved varieties.

XV. Seed Sector Contributions

As the private seed sector develops and receives profits from the sale of seed, it may be possible for it to contribute jointly to research that has a high priority to the sector. In addition this select group of leaders can recommend to government that strong crop research programs in the public sector should be continued. A SIA could develop special awards to recognize the contributions of researchers or provide other incentives for them.

A SIA could also lend support to maintaining and improving the extension system. SIA's could recognize and honor extension workers who have made exceptional contributions to the increased use of good seed of improved varieties.

As seedsmen and the staff of seed enterprises become more experienced, they will generate their own problem-solving activities and develop information that could complement work done by research and extension. They can offer services to farmers and hold their own educational meetings with them, perhaps in cooperation with research and extension personnel. They can truly become partners in the agricultural development process.

XVI. Linkages

SIA's can develop stronger linkages between the private seed sector and research and extension programs. One reason the private seed sector has not developed more rapidly is that they are isolated from public organizations. Obviously, to develop strong linkages requires a willingness for all parties to cooperate to achieve common goals. The kind of cooperation that

is needed does not develop without good will and a sincere effort on the part of all concerned.

XVII. RECOMMENDATIONS

Throughout this report suggestions have been made for increasing local, private seed production and marketing. Key recommendations are listed below.

1. To accelerate the development and growth of local, private seedsmen and seed enterprises, it is recommended that a "Seed Improvement Association" (SIA) be formed in the main cotton production area initially and that it serve as a focal point for numerous activities to support the private sector.

2. Subsequently, SIAs would be farmed in each Province or a special crop interest area. In both cases a Federation of Seed Improvement Associations would be formed.

3. SIAs should be organized under the Societies Act as a non-profit organization with a Board of Directors drawn primarily from its membership.

4. The public research institutions should fully support SIAs and sell a significant part of their pre-basic seed production to the Association to produce basic seed which will be used for further multiplication by its members.

5. A rotating fund should be established to help finance purchases of contracted basic seed and for holding it until sale.

6. If the existing facilities for processing, quality testing and storage of pre-basic and basic seed are inadequate, SIAs should locate additional facilities at research institutes/universities through grants from the GOP or from foreign donor agencies.

7. The first SIA should develop a range of technical services to support the development of local, private seedsmen and seed enterprises including assistance in facility design, processing equipment selection, seed production technology, preparing for loans and promotion/market development.

8. A combination of training courses, workshops and tours should be organized by the SIA in cooperation with other

organizations to upgrade the capability and skills of seedsmen and the staff of seed enterprises.

9. Assistance to provincial and national governments should be provided through representation on councils and committees, maintaining a register of seedsmen and seed enterprises, and providing the government with up to date information about private seed production.

10. Members of the SIA should cooperate with research institutes to assist in testing improved germplasm, providing feedback to researchers and helping to identify problems needing solutions in various aspects of varietal/hybrid development, seed production technology and marketing; thus, research institutions should plan such activities with SIA assistance.

11. The SIAs or Federation should seek membership in the International Seed Trade Federation as a way to enlarge the private seed sector's links with international associations and companies.

12. The Provincial and National Seed Councils should be reorganized with adequate SIA representation and given a new mandate to focus on issues of concern to the private sector, help overcome bottlenecks and properly reflect the increased emphasis on the local, private seed industry development.

13. At both the provincial and national level a small seed cell should be established within the MOAs with responsibility for implementing decisions taken by the respective Councils, as recommended in the 1989 Seminar at Peshawar in 1989..

14. This cell should be under an Additional Secretary and act as Secretariat for the Provincial Seed Council to deal with a range of issues concerning the public and private seed sectors and to pursue solutions to problems with the proper authorities. A similar pattern is recommended for the federal level with a seed cell under an Additional Secretary acting as the Secretariat for the National Seed Council. Existing Additional Secretaries could assume this responsibility -- new positions are not required.

15. The responsibility for administering the truthful labelling program should be with seed cells at the provincial level to separate this function from seed certification and to improve the quality of all seed sold commercially.

16. The Federal Government after due consultation with the National Seed Council should fully endorse the formation of SIAs on a gradual basis; reinstate earlier tax exemptions; develop other incentives to encourage the private seed sector such as preferred credit sources, exemption from import duties on equipment and certain kinds of seed; assure that the public and private seed sectors can coexist by not subsidizing public sector operations; maintain seed certification as a service that may be used voluntarily by both the private sector as well as the public sector; and assure that the truthful labelling program is implemented with a strong emphasis on education.

17. At the provincial level research institutions should provide for a seed production technologist with clear responsibility in the seed area, intensify research on hybrids and assist training activities organized by SIAs.

18. PARC and NARC should provide leadership in developing strong public and private linkages in plant breeding, develop an applied seed technology research unit with a public/private sector advisory committee, coordinate seed technology research, contribute to training, encourage linkages between the Information Unit and a SIA.

19. The FSCD staff should assist the SIA to improve their own quality assurance programs; review field and seed standards, especially on varietal purity levels to assure they can be attained by most seed certifiers; and utilize the certified II class as a way to expand the use of certified seed.

20. In the national interest the PSC and SSC should support private seed sector development as a way to make up the deficiency in seed availability.

21. The extension services should assist private seed sector development through an increased emphasis on the value of improved varieties and good seed of them, revise their guidance on seed sources to include members of a SIA, develop some "seed

extension specialists" and develop improved methods for use by farmers who are saving their own seed.

22. Key universities should develop curricula with a strong seed technology component recognizing that graduates with a seed technology/plant breeding specialization would find positions in the growing private seed sector.

23. As recommended by the NCA, the private sector should be encouraged to undertake research to supplement the efforts of the public sector.

24. All of the above recommendations can be managed by the GOP if the decision is made to move forward. An "Action Plan" is provided in Annex 1 as a guide for steps to take in the immediate future. Annex 2 provides more details on the staff responsibilities and the evolution of SIAs.

XVIII. CONCLUSIONS

The seed program of Pakistan has reached the stage where positive action is required to greatly accelerate the development of local, private seedsmen and seed enterprises. During the last three years many studies and meetings have been held that emphasized this need. Although these studies and meetings have included numerous valuable proposals, several of which are repeated in this report, they have been short on exactly what steps should be taken to activate the embryonic private seed sector.

A substantial portion of this report focuses on a strategy that involves the private seed sector fully in the execution of the plan. The public sector must completely support and assist the actions to be taken. Thus, the public sector would shift from carrying the total responsibility to enlisting the private seed sector in developing and leading a program designed to serve the needs of the nation. Action of this kind by the GOP would represent the highest order of government inventiveness.

Many details not covered in this report need to be considered by those who are involved in moving forward with the plan. The way to determine if the plan will work is to try it on a small scale in one province initially. If the SIA is successful in capturing the support and imagination of the seedsmen and leadership of seed enterprises as well as those in the public sector, the concept will spread rapidly throughout the country. The end result would be a firmly established, dynamic seed industry that solves the "seed shortage problem" in the country. The farmers would be delighted because they at last have a wide variety of choices from where they can purchase good quality seed of the best varieties at reasonable prices. An action plan that outlines several of the early steps that are needed to get started is given in Annex 1.

Annex 1

ACTION PLAN

The focus of this report has been on a mechanism to help the development of local, private seedsmen and seed enterprises. A key focal point in the plan is the formation of a Seed Improvement Association (SIA) in one location as a way to start. Such SIAs could ultimately be established in different areas of the country. A "Federation of Seed Associations" could develop in the future. However, this action plan is prepared as a guide to anyone who undertakes the initial step of starting the first SIA. The following is a list of actions proposed:

1. Call a meeting of potential seedsmen and leaders of seed enterprises to review the concepts discussed in this report. Determine their level of commitment by discussing the financial obligations that would be involved in developing the staff and program activities envisaged. Emphasize the importance for membership to be open to anyone interested in the objectives of the Association. Make it clear that the SIA must be assentially a financially self-supported institution.

2. If the reaction of the group is positive, take the steps necessary to form the association under the Societies Act as a non-profit association including the election of officers, the Board of Directors and identification of functionaries. Establish categories of membership and membership fees. In the constitution and bye-laws assure that clear statements exist regarding the necessity of members to subscribe to the importance of only selling seed with good quality and the operation of a business with high ethical standards.

3. The SIA should develop its program of work for the initial stages, including such items as the requirements for basic seed, the initiation of technical support services, the sponsoring of educational meetings, and other specific actions.

4. Inform the Federal and Provincial Governments of the formation of the SIA and discuss its planned activities with the concerned officials. The SIA should request the Federal and Provincial Governments to lend moral support to the association as it works to develop and strengthen private seedsmen and seed enterprises. Offer the support of the SIA to the National and

Provincial Seed Councils as they work to assist the private seed sector in increasing supplies of good quality seed to farmers.

5. Request the Government to review the composition of the National and Provincial Seed Councils to assure adequate representation from the SIA/private seed sector.

6. Request that small seed cells be established at the provincial and national levels to implement decisions taken by the respective Councils, to deal with the problems faced by both the public and private seed sectors and to coordinate seed activities in keeping with the national objectives.

7. Ask the Government advise the research institutions to make available to the SIA adequate supplies of pre-basic seed for multiplication by its members for further allocation to all interested members so they may produce basic, certified/commercial seed.

8. Request Government to advise the banks to appraise seed stocks at the proper value for loan purposes.

9. Request Government to recognize membership in the SIA as equivalent to federal registration for seed purposes.

10. Meet with representatives of the provincial and national research institutions to inform them of the plans of the SIA and to review with them the nature of assistance they may provide including pre-basic seed supplies, technical assistance in seed production, availability of processing and storage facilities for pre-basic and basic seed and support to training activities.

11. Based upon the plan developed by the association for seed production, request specific quantities of varieties of interest to the members for planting in 1991.

12. Meet with officials of the PSC to determine how the Corporation can assist the SIA in the supply of pre-basic and basic seed, in seed processing and in the use of staff with specialized skills.

13. Review with the FSCD leadership the plans of the SIA and indicate a desire of the membership to participate in the seed

certification program. Request the FSCD staff to work with the members in developing internal quality assurance.

14. Advise donor agencies of the plans of the SIA, and identify the areas where such agencies may help the Association achieve its objectives.

15. Organize study tours of seed enterprises of different sizes, seed associations and foundation seed stock organizations.

16. After determining how the processing and storage facilities of the research institutions may be strengthened to support the SIAs basic seed production program, identify sources of assistance for this work.

17. Explore mechanisms whereby the members of SIA may more easily obtain seed processing, delinting and other equipment to upgrade their seed operations.

Staff Responsibilities and the Evolution of SIAs

Throughout the report it should be clear that more than one SIA would be formed. What is not too clear is the evolutionary process through which these changes would occur. It is impossible to predict exactly what will happen, but that uncertainty is a strength, because the dynamics of the process will determine how fast and how far the SIAs move. Yet, the leadership of the first SIA needs a working plan and a vision of how they expect to evolve. As an aid to those leading this development, the responsibilities of the proposed staff and the plan are outlined below.

The First SIA

As proposed, the first SIA would be started in a major cotton area such as Multan. The Executive Secretary of the SIA would be its chief administrative officer. This person would be responsible for hiring the staff and for performing the following duties:

1) leading the technical team and supporting them as needed;

2) managing the affairs of the SIA and maintaining linkages with Provincial and Federal Government officials, heads of research institutions and universities, FSCD, PSC, SSC, banking institutions and others with whom the SIA should relate;

3) preparing annual budgets and assuring that funds are available for the SIA to achieve its objectives;

4) meeting with the Executive Committee, Board of Directors,officers and members as required to set policies and manage of the affairs of the SIA;

5) assuring that issues of concern to the members of the SIA receive proper consideration in the PSC and the NSC;

6) providing technical support to loan approvals with support from the staff;

7) maintaining linkages with donor agencies, projects that could help identify and start seedsmen and seed enterprises (SASEs);

The staff proposed and their duties are outlined below.

Seed production and quality assurance staff member

1) Identify SASEs to participate in the program.
2) Develop with each SASE a seed production and marketing plan including how much certified/commercial seed will be produced, what production of basic seed for the SIA might be undertaken and the amount of seed stock required.

3) Review the seed certification requirements and encourage the producer to apply for certification of the seed crop, but the choice is his. (All basic seed produced for the SIA would be subjected to seed certification if the variety/hybrid is eligible).

4) Ensure that seed supplies reach the grower well ahead of planting.

5) Provide technical guidance in seed production including specific points that need to be observed such as roguing, isolation distance, detasseling for maize, time to harvest, etc.

6) Closely supervise all basic seed production fields and spot check certified/commercial fields.

7) Monitor harvesting and seed drying and assure that the seed processing specialist with the team is aware of the production, has reviewed seed processing and storage plans and will provide proper guidance on seed processing and storage.

8) Similarly, as the production plan is developed, ensure the plans for marketing are prepared and reviewed with the seed market development team member.

9) Help develop and contribute to training courses and workshops.

Seed processing equipment and facilities staff member

1) Assist SASEs with their plans for seed processing including either development of their own facilities or arrangements for custom processing.

2) Guide members on the kind of seed processing equipment most suitable for their needs.

3) Assist in obtaining the equipment from outside or within the country.

4) Help install equipment or identify a person the SASE can use. (In either case a charge should be set for this service).

5) Provide training for the staff on seed processing in courses and on an in-service basis.

6) Identify equipment that could be manufactured locally and work with the manufacturer to develop high quality units.

7) Work closely with the staff members of the research institutes/universities to improve the operations for seed processing and storage of pre-basic and basic seed.

8) Closely supervise the processing and storage of all basic seed and assure that the purity, germination, moisture content and the start of insect attacks are monitored.

Seed market development, information and training staff member

1) Assist SASEs in developing their seed marketing plans.

2) Maintain information on seed supplies and assist as needed in helping to move seed from surplus to deficit areas.

3) Work closely with the information units in the NARC/provinces to assure adequate and reliable technical information flows to farmers on seed quality, improved varieties, the SIAs role and activities, ways to locate good seed, etc.

4) Develop informational and promotional material for use by SASEs and extension. (Some promotional material could be prepared, so members could personalize it).

5) Prepare an annual training plan including courses, workshops, seminars and tours within or outside the country to offer to members and their staffs on topics most relevant to their current needs.

6) Develop details for each training activity planned, handle the organization and conduct of the event, and utilize the SIAs staff and members plus others from outside the Association to handle the lectures and practicals.

Subsequent SIA and Federation Development

The development of subsequent SIAs could follow two different methods. These two methods are outlined below.

Provincial Method

Using the provincial method, the first unit started in a province would continue to identify other SASEs in the province. Although these SASEs might work together in certain areas, they would all belong to the provincial association. In some cases a special effort would be made to develop a group of SASEs to

concentrate on seed of a particular crop or group of crops that can be grown well in a specific area of the province. If necessary, additional seed production and quality specialists would be added to the staff to support developing production areas. The seed processing and market development specialists would shift their emphasis from the first area to new areas and probably avoid adding new staff for these purposes.

Other provinces could start similar programs at any time with their own SIA. As provincial SIAs develop, a federation of the four associations could be formed. The federation would concentrate on information, promotion and market development from the federal level. Leadership in equipment development and manufacture would shift to the federation. Guidance in seed production, quality assurance and processing would remain with the provincial associations. The responsibility for basic seed production would remain with the provincial associations; but the federation's office would play a coordinating role to assure that adequate basic seed is produced nationally.

In the end a "National Seed Improvement Federation" and a SIA in each province are formed.

National Method

Using the national method, no attention would be given to provincial or district boundaries. A special focus would be placed on the most suitable seed production areas from an ecological/agronomic criteria and the interest in seed production and marketing in the area. For example, the first SIA would be formed in a primary cotton area; but if SASEs especially interested in cotton in the Sindh wanted to join, they would be free to do so. The next SIA might be located in a good hybrid maize seed producing areas of the NWFP and Punjab Provinces and include SASEs who are primarily interested in maize seed. Of course SASEs in these associations would produce other kinds of seed, but an emphasis would be placed on a lead crop. Thus, the second and subsequent SIAs could be formed in any province depending upon interest and crop priorities.

As in the provincial method, a Federation of Seed Improvement Associations would be formed; but the member

associations would have a special crop/area interest and could be headquartered anywhere in the country depending upon the interest of their members. The federation of associations would need to be formed early to provide some services nationally while encouraging the local associations to pay for their own technical support especially in seed production, quality assurance, seed processing and training on seed production practices. (The total staff for the federation and the associations probably should be recruited nationally with benefits the same regardless of whether they work on a national basis or in an SIA).

The federation would provide leadership in seed production, quality assurance, and seed processing and facility development support especially in new areas; seed processing equipment development; national promotion, information and guidance on market development; training on most topics; and national and provincial linkages.

The Choice

Recognizing that seed production and the use of varieties/hybrids does not follow provincial or district lines, the latter approach has some advantages from a technical, seed production point of view. This method might be more difficult to manage, but it probably would be less influenced by provincial politics.

The provincial method fits the existing pattern of provincial administration, seems less radical in nature and probably would cause less political reaction. The provincial associations will not be equal in strength, but that probably will be true of the other, more crop specific associations also. The federation would be formed later in this case and the management of the program at the provincial level easier.

In both cases more than one SIA would exist and a federation would link them together ultimately. The individual associations would be allowed to develop according to their own capability and needs.

Annex 3

TERMS OF REFERENCE
FOR
SEED INDUSTRY CONSULTANT
MR. JOHNSON DOUGLAS

Introduction: Though the importance of good seed is widely recognized, it is not always easy to recognize good seed at the time crucial buying decisions are being made. There are few industries where so much depends on good faith.

Although Pakistan has expended a great deal of money and a good deal of effort to establish the seed sector and has invited multi-national seed companies to enter into business in Pakistan, good seed is not yet available at the doorsteps of most farmers.

Recently there was a series of seed industry workshops which was followed by the establishment of at least three international seed companies in Pakistan. As valuable as their activity may become as they produce and market certain kinds of seed in Pakistan, most seeds (in both volume and kind) will continue to be produced and marketed in the traditional ways. Most farmers may still not have ready access to good quality seed. Much seed likely will continue to be marketed principally in mandi towns and cities.

To produce and market all kinds of seeds in a more modern way to all kinds of farmers spread all over the country, a change is needed. Pakistan needs to develop a system based on widely dispersed farmer based seed associations where government's role is mainly advisory and supportive; essentially the provision of breeder's seed.

Purpose of the consultancy: The main purpose of this consultancy is to study the possibilities of establishing farmer-based seed associations for production and marketing of a wide range of seed and or associations to assist this development. Initially such seed would be produced with parental material available from public sources here and abroad, but main reliance would be placed on the coordinated national crop improvement programs. To accomplish this goal the consultant will work with Dr. Mahbub Ali, founding Manager Director of the Punjab Seed Corporation, former Director of the Central Cotton Research

Institute and other interested individuals and groups, as well as Federal and Provincial officials concerned with seed production and marketing.

To do this work, a review of the reports of relevant workshops and consultancies and detailed survey of current production and marketing practices needs to be done. Also the attitudes of GOP officials and farmers regarding the need for and usefulness of farmer-based seed associations needs to be determined.

Meetings with seed producers who market their entire crop in bulk, seed merchants who obtain their "seed" in the grain market, progressive farmers who live in cities, farmers who live in villages, and government agricultural officers shall be arranged in several places to ascertain the need for and feasibility of an association of seed producers and marketers based somewhat on an adaption of the state crop improvement associations of the United States. These crop improvement associations were the means by which support and encouragement was given to seed producers who multiplied and sold seed of varieties developed by state land-grant universities.

ACKNOWLEDGEMENTS

It was a delight to meet and work with many people during this brief consulting period in Pakistan. Everyone met was most gracious and helpful. Seeing the dedication of many people in both the public and private sectors was most gratifying. Throughout this period every effort was made always to consider what would be the most satisfactory way to help the farmers of Pakistan have more and better quality seed. It was a challanging experience.

Especially do I wish to acknowledge the wise advice and guidance of Dr. Mahbub Ali who accompanied me during much of my visit and assisted in the preparation of this report. Dr. Takumi Izuno developed an excellent tour to see both public and private seed activities and persons who provide leadership to the seed program. His long experience in Pakistan was especially useful as we considered options for helping the private seed sector to develop more rapidly. Dr. Bill Wright and his staff provided excellent support throughout this consultancy, and especially in preparing this report.

The leadership and staff of the Federal and Provincial Governments' seed activities, PARC, research institutions, the university at Faisalabad, and PSC were extremely helpful. The seedsmen and leadership of seed enterprises who frankly expressed their concerns and so kindly met and hosted us was greatly appreciated.

The Pakistan seed program is at a critical stage of its development. It is hoped that these days with so many colleagues will contribute in some small way to the further development of local, private seedsmen and seed enterprises.

ITINERARY AND SCHEDULE
SEED INDUSTRY CONSULTANT
(1990)

September 1 and 2

- Travel from Rockville, London to Islamabad and review Pakistan seed reports.

September 3, 1990

- Arrive in Islamabad
- PARC and MINFAC
- Orientation in MART/Winrock

September 4, 1990

- NARC
- USAID
- RONCO

September 5, 1990

- CIMMYT
- Review documents
- Flew to Lahore

September 6, 1990

- Review documents
- Drove to Faisalabad

Faisalabad

September 7, 1990

- Meeting seedsmen and visit to seed production farm
- Prepared draft outline for report

September 8, 1990

- Ayub ARI - Director General and research leaders
- Ch. Mohammad Siddiq Seed Store

September 9, 1990

- NIAB - Mutation Breeding Director
- University of Agriculture - Registrar and Faculties of Agronomy and Plant Breeding and Genetics
- Rafhan Maize Products, Travel to Lahore

Lahore

September 9, 1990 (Cont.)

- Director General Agriculture (Extension and Adaptive Research)

September 10, 1990

- Secretary of Livestock and Dairy Development
- Pioneer, Unilever, Cargill, Punjab Seed Corporation

September 11, 1990

- Secretary of Livestock and Dairy Development
- Travel to Multan, Discussion with potential seedsman and cotton scientist

Multan Area

September 12, 1990

- Central Cotton Research Institute, Multan
- Cotton Research Station, Multan Institute, Al-Seemi Bokhari Farm and Al-Seemi Industries, Nawan Shehr

September 13, 1990

- Drove to Bahawalpur
- Regional Agricultural Research Institute
- Syed Iqbal Mustafa Farm
- Discussions with seed producers and ginner

September 14, 1990

- Drove to Vehari
- Mehfooz Seed Corporation
- Sardar Jhandhir Seed Farm

September 15, 1990

- Drove to Burewala
- Vehari vegetable seed sellers
- Jullunder Seed Corporation, Arifwala
- Naeem ul-Haq Seed Farm, Vehari
- Burewala Textile Mills, Burewala

September 16,1990

- Zaheer Seed Corporation, Burewala
  Prospective seed producer/seller
- Drove to Multan

September 17, 1990

- To Khanewal and return
- Punjab Seed Corporation
- Federal Seed Certification Department
- Worked on report

September 18, 1990

- AASK Seed Corporation
- Gurmani Foundation site and Brig. (Retd.) Ghazanfar Mohammad Khan, Thatta Gurmani
- Evening meeting with seedsmen, a pesticide agent, CCRI agronomist and growers

September 19, 1990

- Worked on report at Multan

September 20, 1990

- Worked on report at Multan

Karachi

September 21, 1990

- Travel to Karachi by air
- Worked on report

September 22, 1990

- Meetings Secretary of Agriculture and Deputy Secretary of Agriculture for Sindh
- Worked on report
- Travel to Islamabad

Islamabad

September 23, 1990

- Director of Seed Certification, FSCD
- Worked on report

September 24, 1990

- Worked on report
- Meetings with Murray Dawson, MART and George Metcalfe, RONCO

September 25, 1990

- Visit seed centres with BARD staff
- Worked on report

September 26, 1990

- Member (Crops), PARC
- Worked on report

September 27, 1990

- Meeting USAID
- Completed report

September 28, 1990

- Travel Islamabad - London

September 29, 1990

- Travel London - New York - Indianapolis - Rockville

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Pakistan Agricultural Research Council, Islamabad
- Dr. C. M. Anwar Khan, Chairman
- Dr. M. Hanif Qazi, Member (Crops)

National Agricultural Research Centre, Islamabad
- Dr. C. A. Ozair, Director Training Institute
- Dr. Rashid Anwar, Coordinator Plant Genetic Resources

Ministry of Food, Agriculture and Cooperatives, Islamabad
- Dr. Imtizaj Hussain, Agriculture Development Commissioner
- S. Irfan Ahmed, Director General, Federal Seed Certification
- M. H. Saleemi, Director, Seed Certification
- Ch. Abdul Ghafoor, Deputy Director, Federal Seed Certification Department, Sahiwal

Ayub Agricultural Research Institute, Faisalabad
- Dr. Manzoor Ahmad Bajwa, Director General
- Dr. Altaf Hussain, Director, Vegetable Research Institute
- Dr. Muhammad Iqbal Khan, Director Oilseed Research Institute
- Dr. Tufail Ahmed, Pulse Research Institute
- Mr. Ahmed Saleem Akhtar, Pathologist

Central Cotton Research Institute, Multan
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Nuclear Institute of Agriculture and Biology, Faisalabad
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University of Agriculture, Faisalabad
- Mr. Muhammad Akram, Registrar
- Dr. Muhammad Shafi Nazir, Chairman Department of Agronomy
- Dr. Saeed Ahmad, Professor, Department of Agronomy
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Dr. Iftikhar, Associate Professor, Department of P.B.G.

Ministry of Agriculture, Lahore
Mr. Abdul Qayum Khan Dasti, Director General Agriculture
Mr. Ghulam Mohammad, Director of Agriculture (Headquarters)
(Dr. Ghulam Rasool Chaudhry, Secretary Agriculture unfortunately was not available during this visit)

Ministry of Livestock and Dairy Development
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Connie Church

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Barani (Rainfed) Agricultural Research and Development (BARD), Islamabad
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Dr. Wilf Janke, Agronomist (Advisor)
Dr. John Dueck, CIDA

CIMMYT, Islamabad
Dr. James Longmire, Agricultural Economist

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Rao Abdul Rashid, EADA Burewala
Abdus Sattar, EADA, Mailsi
Chaudhry Zulfiqar Ali, Agriculture Officer, Tibba Sultan Pur

Others
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M. Rashid Ali, Managing Director, Rafhan Maize Products Co.
Dr. Khan Bahadur, Rafhan Maize Products Co. Ltd.

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Muhammad Hussain Chaudhry, Deputy Managing Director, Punjab Seed Corporation
Dr. Essam El Gressi, Managing Director, Pioneer Pakistan Seed Ltd.
Mohammad Jahangir, Agri Projects Manager, Lever Brothers Pakistan Ltd.
Mohammad Altaf, Assistant Manager (Agri Projects), Lever Brothers Pakistan Ltd.
Dr. A. Rahman Khan, General Manager, Cargill Pakistan Seeds (Pvt) Ltd.
Mohammad Rafiq, Deputy Manager (Research) Cargill Pakistan Seeds (Pvt) Ltd.

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M. Siddiq Akbar Bokhari, Managing Director, Al-Seemi
Mian Ghulam Ahmad, Sardar Jhandhir

Badar Gilani, Grower
Mr. Majid, Managing Director, El-Hilal Vegetable Ghee Mills and Ginner
Mr. Ghulam Muhammad Abbasi, grower/seedsman

Bahawalpur

Mian Khurshid Zaman Qureshi, Seed Producer-Seller
Syed Iqbal Mustafa, Progressive Farmer and Seed Producer-Seller
Sohail Zafar, Incharge gin operation of Akramia Cotton Ginning Factory
Mushtaq Ahmad, Incharge seed growing for AKRI Cotton Ginning Factory

Mailsi

Mian Mahfooz Ahmed, Mahfooz Seed Corporation
Mahmood Mian Jhanghir, Sardar Jhanghir
Mian Masood Jhanghir
Mumtaz Ahmad Khan Kichi, Chairman Zila Council Vehari

Vehari

Abu Fasil Seed Store
Naeem-ul-Haq, hybrid parent seed producer for Rafhan and does contracts with other seed enterprises
Chaudhry Zulfiqar Ali, Agricultural Officer, Vehari District

Arifwala

Naveed Tariq Chaudhry, Director, Jullundar Seed Corporation
Nazir Ahmad Bazmi, Technical Advisor

Burewala

Fayaz Mohammad, Processing Operations, Burewala Textile Mills
Mohammad Idrees, Deputy Commercial Operations, Burewala Textile Mills

Zahir Abad

Shaikh Zaheer, Manager, Zahir Abad Seed Corporation

Khanewal

Ch. Abdul Shakoor, Director Procurement and Farms, Punjab Seed Corporation
Mohammad Aslam Sadiq, Director Processing PSC

Sher Mohammad Bhatti, Deputy Manager Marketing, PSC
Rana M. Abdus Salam, Deputy Director FSCD

Karor Pacca

Mr. Khurshid Ahmad Khan Kanjoo, AASK Seed Corporation
Sajjad Akhtar, Manager Marketing, AASK Seed Corporation

Potential Seedsmen met during visit

Sadiq Khan, District Multan
Mr. Nasim Qureshi, District Multan
Dr. M. Hayat Zafar, District Multan
Javed Raza Gardezi, District Multan

Potential Seedsmen not met but advised of interest

Zafarullah Cheema, (Vegetable) District Gujranwala
Rana Latif, (Oilseed), District Bhakkar
Mohammad Hussain, Manager for Yahya Khan, (Oilseed) District Bhakkar
Mumtaz Muhammad Khan, District Vehari

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