

**Organization
and Training
in the
Agricultural
Development
and Training
Component (ADT)**



Development Alternatives, Inc.

**AGRICULTURAL SECTOR SUPPORT PROJECT
PRIVATE SECTOR AGRIBUSINESS**

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Prepared by Donald S. Humpal for Development Alternatives Inc., and the office
of the USAID Representative to Afghanistan under Contract Number 306-0204-C-00-9829-00.

Peshawar, Pakistan

September 1990



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INTRODUCTION

This report is the result of a consultancy to the ADT component of ASSP/PSA during the month of September. It treats organization, administration, training, and programming of ADT activities. At the request of ADT management, special attention was paid to wheat seed multiplication, agricultural machinery, and fruit strategies. The final section of the report deals with the monitoring of field activities.

ADT represents close to 80% of the staff of ASSP/PSA. It is larger than many projects. Only recently has it begun to acquire the middle level management staff needed to support its diverse and far-flung operations. It will take time for the re-organized ADT to develop its administration and operations. Consequently, many of the recommendations contained within this report should be regarded as first approximations which need to be fleshed out by ADT staff. This is especially true in administration and training.

The author would like to thank ASSP/PSA and ADT staff in particular for their friendliness and support during this mission. All opinions, mistakes, and misrepresentations are the fault of the author.

I. ADT ORGANIZATION

Figure 1. shows the proposed organization chart for ADT. This chart addresses the concerns of building an organization that can fully support the operations of a field extension service in Afghanistan. It will take time, probably six months, to consolidate the staff and operations presented. Only recently, for example, were the three Deputy Director posts created. The principal organizational challenge facing ADT is to staff its middle management positions with people who take responsibility for executing the major activities of the component and performing most of the day-to-day administration.

At this writing, three of the middle management posts are vacant:

- o Deputy Director for Field Services - recruitment has begun. Until this post is filled Field Service management will occupy a large share of the time of the Director and his Advisor. This recruitment should take highest priority within ADT;
- o Deputy Director for Training - candidate about to be hired, with a Training Consultant bridging the gap until the person comes on board in November;
- o Senior Horticulturist - currently the Senior Agricultural Advisor to the COP of ASSP/PSA provides direction to the horticultural activities of the project. As activities expand in scope, it will be important to put a middle manager in place. Spring or early summer would be the latest target date for hiring.

The Deputy Director for Administration, Major Saadat Hussein, began his duties with ADT in late September. This position should greatly relieve the Director of his current administrative burden and improve procurement.

The Pilot Program in Locust and Senn Pest Control is managed directly by the Director, who has asked his Advisor to take over supervision of the program. The Advisor is by training an Entomologist familiar with the pilot program area. Communication and administrative support to the staff of the pilot program are provided out of Quetta, the supply link to Badghis province from Pakistan.

A. FIELD SERVICES

The Deputy Director for Field Services will have major responsibility for execution of the extension, demonstration, and technology promotion activities of the ADT center staff inside Afghanistan. He will also manage the support of the field staff by the Subject Matter Specialists (SMS). In-house monitoring and reporting on field staff activities will be his charge. A full scope of work is on file with ADT.

Field Services is the largest part of ADT with over 80 personnel. The Extension SMS will be charged with the execution of field activities and reporting to the Deputy Director on progress and problems on a monthly basis. Translation Services are needed to turn reports into English-language documents on field service activities. While ADT is developing Persian/English tables to reduce the amount of text translation required, it is expected that substantial text translation will be needed. Depending on the volume of work, this service could be provided on a contract basis or by hiring a translation staff of two people.

On the organizational chart, the Warm Area Districts and Cold Area Districts are presented¹ to group provinces which have similar activities.

The leader of the Subject Matter Specialists will be selected from among the four specialists by the Director. Their roles are to support and supervise the technical activities of the field staff. Based in Peshawar, they travel between Pakistan and Afghanistan on supervision and training missions. They help develop training programs and instruct field staff during Pakistan training sessions, participate in field testing of technologies, and assist in the development of training and extension materials. Two SMSs cannot travel to Afghanistan. Two trainee vacancies exist among the SMSs. They should be filled with people who can travel inside, and who can communicate in English, as well as Persian, to project management.

B. ADMINISTRATION

ADT represents 78% of the personnel of ASSP/PSA. The transfer of the field staff from VITA to DAI necessarily caused some confusion of administrative procedure. The task of this unit of ADT is to improve standard operating procedures for the administration of advances, salaries, and expenses of field staff; increase the effectiveness and efficiency of procurement; and ensure that there is complete integration of the component with overall ASSP/PSA administrative procedures.

¹. In Figure 1, the two boxes do not represent posts.

Two major challenges face this unit. The first is to prioritize with ADT management the component's procurement program and develop a close working relationship with the Procurement Services Contractor, RONCO. At least once a month, the Director, Advisor, and Deputy Director for Administration will travel to Islamabad to work through specifications, bids and procurement issues. The second challenge is to work out simple, yet effective tools for financial transactions with ADT field staff. Account books, receipt standards, cash reconciliation, petty cash management all need to be improved. The first part of the winter training program starting in January 1991 will be devoted to training staff in these procedures.

ADT administration must hire an administrative assistant and secretary in October.

C. TRAINING

ADT training must focus on:

- o Training trainers and supervisors of the field staff - the managers and SMS;
- o Training field staff as extension agents and as trainers of farmers;
- o Training leading farmers and farm service providers to train other farmers.

To date training programs have used the approaches developed by VITA in developing staff capacity. One exception has been the special Locust and Senn Pest Control program run as a self-contained short-course in August and September. All project senior staff have served as trainers, along with other instructors from outside the project. The Senior Trainer of ADT has been responsible for organizing these training sessions with ADT senior management.

In late September, a Training Specialist was hired as a consultant to the project to accelerate the pace of training program development. A candidate for the Deputy Director for Training long-term position has served as a consultant to the project in August and September. He will return to take up the full-time post in November.

The training unit will operate from the training center in Peshawar which is located just behind the trade center. The site is conducive to the preparation of courses, training materials (it is closer to downtown services than ASSP/PSA headquarters), and training of small groups. The training unit will hire an

artist and a communications specialist to develop training and extension materials for use by project staff and farmers. Part-time assistance from a media consultant will be used for video tape and audio materials for training and extension use.

A special project of this unit will be the testing of approaches to farmer-to-farmer training.

A time line for training programs for 1990-91 is presented in Figure 2 in the training section.

D. HORTICULTURE

Horticultural activities of the project are currently focused on tree fruit (mainly apple) nurseries, orchard establishment, and vegetables as intercrops in orchards. Bubble irrigation training is a secondary activity of the unit.

Currently, studies by Senior Advisor Dr. Abdul Wakil and by High Value Horticulture have underscored the importance of horticultural crops to Afghanistan's domestic and export agricultural economy. Increased emphasis on post-harvest handling, drying, packing, and shipping of dried fruits and nuts, spices, and specialty crops will occur. As these activities expand in the early part of 1991, it will be necessary to fill the Senior Horticulturist slot, and to adjust the composition of the unit's staff. Key will be the identification of responsibilities between ADT and the PSA component. It is recommended here that adaptive testing and production support services to the point of harvest be maintained within ADT, and that the activities post-harvest be staffed and managed from PSA.

E. PHYSICAL PLANT

ADT will occupy the 4-AC Park Avenue Street facility. A floor plan is being developed by ADT management. The training unit will be located behind the Peshawar Trade Center. Additional training facilities will be rented as needed for short-courses when large groups must be seated in one room. The moves, scheduled for October, will be enable the ADT senior management and its middle management to work in the same facility for the first time since the component was absorbed from VITA. This should improve staff communication and effectiveness.

The critical path physical plant concern for management is the preparation of the building behind the Peshawar Trade Center for occupation by the Training Unit. The move should be made in November, after the training staff has had a chance to plan the details of the winter and spring training program with ADT management, administrative, and technical staff.

II. ADMINISTRATION

A series of discussions was held with project staff to raise issues of administrative support to ADT activities. These issues were reviewed and a plan established for dealing with them.

ADT needs to make the best use possible of ASSP/PSA central services. Where these services cannot meet ADT needs, they should be included in scope of the ADT D/DIR for Administration. Key overloaded central services include:

- o Procurement - RONCO
- o Procurement - Local within DAI contract
- o Transportation of commodities to Afghanistan
- o Monitoring of Field Staff activities
- o Personnel Administration - cross-border payment of salaries, expenses, and management of advances

In addition, the size and scope of ADT activities, and the need to grow to serve additional provinces in Afghanistan, require good internal administration of the component. Key areas here are:

- o Vacant Staff Positions - filling them and using them (Horticulture, Field Services, Training)
- o Physical Plant - getting concrete identification of office space, assignments, allocation of file space, etc.
- o Improved organization of ADT files and records, particularly regarding procurement, but also for personnel, correspondence, reports, etc.
- o Standard Operating Procedures for procurement of transportation and other services.
- o A suspense system to remind ADT managers of the need to follow-up on critical path actions of procurement, progress reporting, program and budget planning, and major programs.

From these issues staff needs for the D/Director were established. The D/Director's staff will include an Administrative Assistant, a Secretary, and a Messenger. They are included in the organizational diagram for ADT.

Annex 1 provides the detailed timeline for critical path administrative action over the next quarter. The spreadsheet used in this exercise is called WHODOIT and can be used by ADT management to track progress. It is currently being used by the ADT Director, his advisor, and the Deputy Director for Administration.

III. TRAINING NEEDS AND PROGRAM

ASSP/PSA project management has recognized the need for substantial revamping of training to increase the effectiveness of Afghanistan operations and Pakistan-based support. During September, ADT decided to elevate training to the level of a Deputy Directorship. A candidate, Dr. Naby Aslamy has been recruited and will start work in this position in November.

Several meetings were held to solicit training needs from the project staff most involved in training field staff. The objective was to specify critical path actions needed to prepare for the winter training program, including training materials, instructional facilities available, sources of training, and more general training. A training consultant took over this work in late September. This report briefly treats the main points and recommendations and presents an 1990/91 draft training schedule in Figure 2.

A. MAIN POINTS

Afghan field workers and supervisors have been cut off from training opportunities for nearly a decade. Those with degrees had little opportunity to obtain experience in their areas of specialization. Additionally, there is a missing generation of agricultural technicians. While they realize that the ASSP/PSA project cannot provide long-term degree training, they ask for ways of improving the quality of short-term training and linking staff to long-term training opportunities, if possible.

Short-course training needs to be oriented to provide good facilities and top-notch courses. Practicums need to be well-organized so that trainees leave with solid knowledge and skills that they can use in the field and pass on to farmers. Field workers must be bringing new information to farmers..

Training is needed in extension methods, organization and management, and farm management (a topic not included in most of their instructional programs). The fruit strategy in this report introduces one enterprise budget which could be used for farm management training.

There is a great need for training reference materials within ASSP/PSA. These need to be procured quickly. ADT staff and advisors have prepared a list of reference materials. It will be incorporated into a procurement request. Farsi language technical materials should be sought from the international centers and U.S. institutions which worked in Iran. The training staff is currently evaluating the availability of documentary, insect, disease, and plant specimens in the Peshawar area.

Extension agents need to go back to the field with field guides to use with farmers. They need to be trained in the use of these field guides by specialists. They will also need to be provided with some basic material for making collections and observations. ADT should make up a list of basic field equipment needed by its extension staff and make a procurement request.

The most important critical path need is the training arrangements for the winter training session for January and February. The priority areas are:

- o Wheat, corn, rice, vegetables, fruit trees (apples, grapes, apricots, almonds, pomegranates), poultry;
- o Seeds, insects, machinery, and soils should be winter practical sessions;
- o Extension methods and use of farmer-oriented materials should be included - this presupposes development of farmer extension and training materials;
- o Project procedures for planning, communication, reporting, bookkeeping.

A draft program has been developed. The overall schedule is found in Figure 2. The detailed topics are being further developed by the training consultant and project training staff.

Training logistics are critical. This means that the program should make advance arrangements to procure: adequate lodging; dedicated transport for moving trainees to training sites; comfortable classrooms; supporting materials prepared in advance of training; instructors firmly scheduled; clear time allocation for administrative matters; and contingency plans made for emergency switches of sites or programs.

Project training equipment is needed. The training center located behind the trade center needs equipment to produce training materials. The center will need:

- o A photocopier or access to low cost, good quality photocopy services;
- o An overhead projector;
- o A tape recorder;
- o Video Camera or a video camera service. A VCR and TV monitor should be procured.
- o A drafting table and drafting supplies.

Development of a mobile training units for farmer training will require careful design. The machinery unit can be specified with Pak-Holland assistance. The general purpose units will require substantially more design and testing of components, before they are assembled and mounted on a truck. Consultant assistance will be required. A time frame for their development is given in Figure 2.

B. MANAGEMENT TRAINING

ADT senior and middle managers have expressed the need for management training. While technically skilled, many have not had training in project management and administration. ADT plans to draw on Pakistan training sources and the USDA course to be held in Pakistan to improve management skills.

C. THIRD COUNTRY TRAINING

ADT will test its senior and mid-level staff for English language skills. A total of six third country trainees have been budgeted for. Intensive English language training will be given to those individuals who are close to achieving the minimum cores needed to qualify for short-term training. IRRI and CIMMYT are the two currently targeted sources of training. The objective is to produce highly skilled trainers of trainers in cereal production and extension.

IV. SEED STRATEGY-SOUTH AND SOUTHEAST

A. BACKGROUND

The FAO, UNHCR, USAID, and many non-governmental organizations (NGOs) have been delivering wheat seed of new and improved varieties since the 1987-1988 production year in Afghanistan. Choice of variety is coordinated by the Swedish Committee of Afghanistan (SCA) of the Agriculture Survey of Afghanistan (ASA). The accepted short-term strategy for all current donor efforts is to replace old warm area (autumn and spring sown) wheat varieties, which have broken down due to rust disease mutation and lack of varietal maintenance, with newer varieties of higher productivity and greater disease resistance. Pak 81 and Pirsabak 85 seed are being sent to Afghanistan in areas where the older variety Mexipak was adapted. In the higher elevation areas above 1800 meters, research has not yet released a variety which can consistently outperform local varieties and produce a flour with acceptable color and flavor.

FAO and UNHCR have been providing seed to NGOs who have, in turn, distributed it free of charge to Afghan farmers. The ASA has encouraged a shift to sale of seed to attempt to put seed multiplication on a more sustainable footing. This year the Agency Coordinating Body for Afghan Relief (ACBAR) has requested NGOs to ask for reimbursement of seed from farmers at the rate of two seers for every jerib planted. USAID, through VITA, distributed wheat seed on contract in 1989-1990, accompanied by fertilizer, requiring farmers to pay back 70 kg of seed per jerib planted. When ASSP/PSA took over VITA's agricultural activities in 1980, it inherited this seed recovery and redistribution activity.

When ADT activities for the 1990-1991 production year were planned, a program to sell 300 MT of certified seed in the South and South-East zones was prepared. In addition, redistribution was programmed for about 50 MT of the Bezostaya variety to be collected from farmers who received the new Bezostaya seed in 1989-1990 from the emergency shipment facilitated by the U.S. Ambassador to Pakistan. Preliminary trial results of the ASA suggest that there are Spanish, Turkish, and US varieties which should outperform Bezostaya in the cold growing areas.

FAO and UNHCR have stocked 2,600 MT of Pak 81 and Pirsabak 85 in Quetta and 1,500 MT of these two varieties in Peshawar. If prior year practices are followed, NGOs will make application to acquire and distribute this seed, agreeing to distribute it in new areas. Most NGOs still distribute this seed free of charge. ASSP/PSA consultant Eugene Saari of CIMMYT/Turkey, has calculated that the amount of seed stockpiled by FAO and UNHCR will meet the needs of warm area provinces in which ASSP/PSA worked last year, assuming that a 1 percent replacement strategy is followed. The

ADT 1990-1991 strategy is to work in areas in which NGOs are not working and to sell seed to a different population of farmers -- medium scale and larger farmers who could provide the nucleus for a commercialized seed supply in Afghanistan.

B. ADT STRATEGY FOR PAK-81 IN THE WARM AREAS

The ADT will recover 350 MT of seed from 1989-1990 multiplication plots and import an additional 300 MT of Pak 81 certified seed from Pakistan. The recovered seed will be classified as commercial, untreated seed. The major change in distribution strategy for the 1990-1991 production year is that seed will be sold for cash.²

1. SEED RECOVERY FROM 1989-1990 PRODUCTION-- In Nangarhar, Helmand, and Kandahar provinces, ADT center staff will sell seed recovered from farmers at up to 105% of the local market price for wheat on the market. Participating farmers will give ADT 70 kg of wheat per jerib planted. ADT staff will collect the seed, clean it (winnowing), bag it, and sell it as commercial seed at the bazaars, through PSA representatives if feasible. An equivalent of 250-300 tons of wheat seed should be collected in cash or kind this year. Two weeks before the last practical planting date, ADT staff will be advised to auction any remaining seed stocks.

Average prices³ for collected, cleaned, and redistributed seed are estimated as follows:

PROVINCE	GRAIN PRICE	SEED PRICE	
		Rupees	Afghanistan
KANDAHAR	3.45 R/KG	3.62/KG	(83.31/kg) (583/seer)
HELMAND	2.3 R/KG	2.42/KG	(55.66/kg) (404/seer)
NANGARHAR	3.11 R/KG	3.27/KG	(75.11/kg) (526/seer)

This seed will be sold in districts outside of those in which the NGOs will make their distribution. NGO target districts have been obtained from ACBAR and are being used to direct extension agent efforts.

² MCI has received 200 MT of Pak 81 seed. It is DAI's understanding that MCI will follow ADT policy in distributing its seed. USAID has the responsibility for enforcing this policy.

³ There will be some monthly fluctuation in price as well as variation among Bazaars.

2. SALE OF PAKISTAN GROWN CERTIFIED SEED-OPERATIONAL STEPS

Seed purchased in Pakistan and delivered to DAI warehouses will be distributed for the fall planting season. The operation consists of the following steps to be conducted by ADT staff:

a. Verify with NGOs where they will distribute seed this year and direct ADT staff to sell seed primarily outside those districts in Helmand, Kandahar, and Nangahar. The exceptions to this approach will be with larger growers who may wish to specialize in seed production⁴. Under current NGO policy, these growers would not be able to receive seed.

b. Sell certified seed for cash to medium and larger-scale growers. ADT staff would work with these growers to ensure good seed production and post-harvest handling of seed. The intent is to gradually reduce the need for continued importation of seed from Pakistan. If cash sales encounter substantial difficulty, there are two major options. The first is to work through the Shuras to provide a group guarantee of seasonal seed credit extended by the project to be paid after the 1991 harvest. The second is to enter into a performance contract with the concerned growers to produce and deliver a fixed quantity of seed to ADT or PSA staff for the 1991/1992 production year. Afghan contract growers would deliver to ADT centers or PSA bazaars for sale to traders for 1991-1992 or to sale to NGOs working under FAO/UNHCR auspices. ASSP/PSA would deliver seed to these growers and supervise seed production. Forward contracting, assisted by PSA staff, would be encouraged.

c. Increase the amount of Pak-81 seed destined for Farah province, a new area, from 30 MT to 50 MT. Bagwah has pump irrigation and could become a potential source of supply of warm season wheat for both Farah and Herat Provinces. If direct ADT cash sales prove to be a problem, then there are two options. The first is to enter into a performance contract with the concerned Bagwah grower to grow and deliver a negotiated quantity to Farah or Herat traders for the 1991-1992 production year. The second is to use PSA procedures to sell the Farah destined seed to a trader.

Average seed prices will be fixed at 10% higher than the grain price, reflecting the higher quality of the certified seed.

⁴. Larger growers are much more likely candidates for seed production since they do not grow solely for home consumption and are normally more familiar with market based commercialization of agricultural commodities.

C. ADT COLLECTION AND REDISTRIBUTION OF COLD AREA WHEAT SEED

Bezostaya stocks are being renewed by the ASA and UNDP/FAO from seed bought in Turkey. Agencies operating in agriculture have determined that Afghans resist this variety because of its color, taste, and rust susceptibility. Another variety needs to be discovered or developed.

However, ADT calculations show there will be a shortfall in the supply of improved varieties of wheat seed to the cold winter wheat areas. ASSP/PSA recovery of 50 MT and FAO/UNHCR existing stocks of 40 MT fall short of the 295 tons of seed estimated as needed to meet the 1 percent replacement strategy. Given the high cost and difficulty of obtaining Bezostaya seed from Turkey, ADT strategy in the cold growing areas will need to be different from that in the warm areas. The following section presents operation options for the 1990-1991 production year.

The shortfall of total seed does not reflect demand for Bezostaya seed. ADT center staff suggest that there should be no major problem in the ASSP/PSA strategy to sell this seed. NGO distribution is not of a magnitude to impair sales. Promising replacement varieties appear to be in the adaptive testing pipeline, but are not yet available. If truly superior varieties are available, then ADT and other efforts will probably turn to replacement of Bezostaya over time.

ADT staff will collect wheat seed from participating farmers, taking 70Kg per jerib, hire labor to clean and bag the seed, and sell the seed at bazaars after giving extension/promotional talks on the wheat seed. This activity will occupy essentially all of the ADT center staff time until late October and require substantial use of the available tractors and wagons.

D. ADT SEED STRATEGY FOR 90/91 HARVEST AND 91/92 DISTRIBUTION

ADT's seed strategy for the 1990-1991 harvest seeks to shift its field personnel from a concentration on seed delivery to farmers to one of promoting the multiplication of good seed within Afghanistan. The main points of this strategy are:

- o Supply of 6 seed cleaners to improve the quality of seed redistributed;
- o Training of ADT staff in seed production and post-harvest cleaning, quality control, and seed treatment;
- o Exploration of the potential and problems in introducing seed treatment with fungicide in Afghanistan;

- o Promotion of links between seed producers and traders who can transport and sell seed for the 1991-1992 year, in cooperation with PSA;
- o Inventory of areas in which seed has already been distributed by ASSP/PSA and other organizations, and identification of areas for introduction of new seed;
- o ADT staff work in testing and demonstration of new cereal crop varieties (wheat, rice, corn);
- o Diversification of varietal supply to include Pirsabak-85 for the 1991/92 production year;
- o Introduction of new rice varieties north of the Hindu Kush.

V. MACHINERY AND FARM POWER STRATEGY

A. OBJECTIVE AND BACKGROUND

The objective of ADT machinery assistance is to restore agricultural productivity by substituting mechanical power for human and animal power on farms in Afghanistan.

Rough estimates are that 500,000 or more oxen were killed during the war (ASA). Replacement of this herd will be slow, estimated at about 3% a year. Continuation of the war will further slow this pre-war rate of growth. The lack of oxen reduces farm power available, especially for land preparation, threshing, and transport. Farm power requirements peak during the summer when wheat fields are harvested for the summer warm season crop and again in fall when the summer crops are harvested and the main wheat crop is planted. Crop yields are reduced when they are planted late. There is a clear need to provide the power for quick turnaround of fields.

With the large number of farmers who are refugees outside the country, there has been a trend towards mechanization in several provinces. Mechanization has been slow, because the supply lines and lending for agricultural equipment have been disrupted. The broken supply lines have made it expensive to purchase all types of equipment and machinery. Dealers and repairmen were also driven out of business by the war. Repair and maintenance services will need to be restored to support the expansion of mechanization.

B. 1990/91 STRATEGY

1. PROMOTING THE USE OF PROVEN EQUIPMENT THROUGH DEMONSTRATION

The objectives of 1990/91 demonstrations are:

- o Moldboard Plows - to demonstrate proper adjustment of plow and tractor to plowing conditions; show how to use plow and harrow to prepare the seed beds; discuss the effect of plow and seed bed preparation equipment on crop establishment and weed control;

- o Tractor Mounted Front-End Reaper - demonstrate proper mounting, inspection, and maintenance of the reaper; show how to open a field and adjust reaper to desired stubble height to optimize straw harvest while avoiding obstructions; present different ways of tying the winrowed grain into sheaves;

- o Large Thresher, Engine Driven - demonstrate procedures for inspecting, maintaining, levelling, and operating the thresher; present ways to organize the supply of grain to thresher, bagging the grain, and handling the chaff; discuss thresher capacity, fuel consumption, and engine maintenance;
- o Small Thresher, Engine Driven - demonstrate the assembly, operation and maintenance, disassembly, and transport of the thresher; show adjustments needed to thresh rice;
- o Corn Sheller, PTO Driven - demonstrate the levelling, operation and maintenance of the sheller; show how to organize supply of corn, bagging of shelled corn, and handling of cobs and chaff; and
- o Corn Sheller, Manual - demonstrate operation and maintenance; discuss the ways of repairing the hand crank and of setting up alternative belt-driven power using a small engine or bicycle.

Protocols for the first four demonstrations were developed by the DAI, Agricultural Engineering Consultant, Dr. Joseph Campbell, and are on file in ADT. Protocols for the corn shellers are being developed by the ADT Agricultural Machinery staff (Mr. Saif).

2. COMPARISON AND CHARACTERIZATION OF FARM MACHINERY FOR 1991/92

Land preparation, reaping, and threshing are four operations which cause peaks in seasonal demand for farm power. A range of machinery is available to do these operations. For machinery which already has a track record in Pakistan and Afghanistan, the project will proceed directly to demonstration and promotion of demand. Machinery that has not been widely used in Afghanistan will be tested first in Pakistan and, to the extent possible, in Afghanistan. Comparison of machinery from different manufacturers needs to be done to ensure that the machine will work, and that it can be maintained and repaired under conditions in Afghanistan. Finally, the specifications for larger orders of selected equipment need to be carefully detailed to ensure that procurement is not plagued by a manufacturer's cutting steel quality, parts standards, or removing machine features in order to win bids on a cost basis. In Pakistan, machinery manufacturers modify standard and optional features frequently, as S. Eubanks has pointed out in his report on the machinery industry.

Comparison and characterization procedures and forms have been developed by Dr. Campbell for the following equipment. ADT has ordered this equipment and will execute field tests during the fall rice and corn harvest and wheat planting periods.

1. Cutting grain with a mower
2. Walking Reapers
3. Self-Propelled Reapers
4. Front-Mounted Reapers
5. Moldboard Plow
6. Tine Tiller
7. Thresher - large
8. Thresher - small

The major purpose of these tests is to determine how solid Pakistan-manufactured machinery is compared with imported equipment and to determine the trade-offs between the higher cost of imported equipment and the higher repair and maintenance costs reported for machinery manufactured in Pakistan. Pakistani farmers buy cheaper equipment because there is a dense network of blacksmiths, mechanics, spare parts suppliers, and dealers. These conditions do not hold true in Afghanistan. There are relatively few blacksmiths and mechanics, and their access to good quality steel, spare parts, and equipment is poor. Therefore, the machinery sent in should have a lower repair requirement than is the norm for Pakistan equipment. Specifications which balance cost with quality will be an important part of this screening. At the very least it will identify the most common and help the project estimate requirements for spare parts and for the training of operators and farm mechanics.

3. TRAINING IN 1990/91

Three major training activities are planned for 1990/91:

- o Winter short-course for tillage and thresher operators and farm mechanics;
- o Summer and early fall testing of a mobile Operations & Maintenance (O&M) training unit; and
- o Training of farmers and mechanics in Afghanistan in equipment O&M.

The first two will be executed by the training unit. The last will be done primarily by the field services staff with the assistance of the project SMS in agricultural machinery.

The major features of the winter short-course are shown in Figure 2 in the training section. The tractor and thresher operators will first undergo a debriefing, administrative

processing, and reporting on their field work. They will then pass to a three to four week period of practical work on plowing and seed bed preparation, probably at Charsadda. A six week course at Millat Tractor is being organized at the recommendation of Scott Eubanks, Machinery Consultant to the project. The course will put operators on the assembly line for three weeks and give them three weeks of intensive training in the repair and maintenance of tractors. At the end of the course, they will receive the basic tools needed for repair and maintenance of the tractors. Reaper, thresher, sheller operators will most likely be trained at the Battala works in Faisalabad, at the Agricultural Machinery Institute in Mardan on small engine maintenance and repair, and with a Mardan reaper manufacturer. All tractor and thresher operators will receive training in demonstration methodology, farm training, and survey assessment methods for farm machinery.

Tractor and thresher operators will return to Afghanistan in early May prepared to carry out demonstrations and training of Afghan farmers and custom machine operators. Part of their task, along with the ADT crop extension staff, will be to survey the most frequently encountered repair and maintenance problems of the machinery they use or observe being used in their areas.

Summer and early fall testing of a mobile training unit for farm machinery operation, maintenance, and repair has to be preceded by the design of the training program to accompany the unit. The order for a truck equipped with maintenance and repair equipment has been placed, with detailed specifications to follow during the month of October. A firm order with complete specifications should be made by the end of the year. One trainer from DAI should be involved in the development of training aids to be used with this unit. The best opportunity for developing these aids will be the winter staff training. Videotaping and still photography should be used. Their use should be planned with the communications consultant to the project.

4. THE FIELD POWER SUPPLY APPROACH OF ADT

The overall approach of ADT to field power supply is summarized in the following steps:

- o Identification of Need
- o Identify the Range of Solutions
- o Procure Equipment for Testing
- o Test
- o Demonstrate Successful Equipment
- o Extension Assistance to Promotion of Equipment
- o Training Program for Equipment
- o Communications Assistance for Commercial Promotion
- o Strategy Revision

Actions to date have been focused on plowing, reaping and threshing demonstrations and field days. Three consultancies, one by Dr. J. Campbell and two by S. Eubanks have developed the machinery specifications, testing and demonstration procedures, and identified the issues involved in procurement, operation and maintenance of the range of equipment of interest to the project. The problems encountered and possible solutions are outlined below:

a. Procurement - Specifications have been made by Dr. J. Campbell; bidding and procurement procedures have been specified to ensure competition by S. Eubanks; administration and monitoring of the RONCO procurement process has now been localized in the office of the new Deputy Director for Administration; inspection procedures will be established with the SMS agricultural machinery for inspection of delivered machinery. There remains the need for a better demand estimate from demonstrations and survey information.

b. Transborder transport - Tractor, trailers and equipment must go in together as a single unit to ensure delivery and reduce transportation cost. The improvements in the procurement process should enable this to happen in 1991.

c. Reception and storage at ADT centers inside Afghanistan - Storage is a problem and the ADT may need to hire guards to protect equipment used for demonstration and training. This should not be an extension agent or operator's responsibility.

d. Testing and Demonstration - Seasonally, more tractor drivers and thresher operators are needed. There is an urgent need to identify the local capacity to maintain and repair as PSA gears up for commercial supply of machinery. The training program for drivers and operators may be used to promote the establishment of private custom operators inside Afghanistan. ADT will test the use of a mobile unit mounted on a truck to train operators in the servicing of project machinery. The mobile unit would also be used to move and demonstrate self-powered threshers, shellers, and huskers. ADT needs to establish a policy for the auctioning of older equipment.

e. Extension Promotion - Extension material, particularly related to machinery types will be developed by the project in conjunction with other agencies. Improved manufacturer advertising, perhaps aided by PSA, would be valuable contribution, particularly as it addresses questions of pricing of equipment, costs and benefits; demand estimation is critical to this promotional effort. ADT should work with custom service providers to improve the quality of machinery and tillage practices offered.

f. Training Program - As described above, it will be heavily based on practical experience and work with manufacturers. In addition to the advantage in terms of hands-on work, it will begin to establish contact between manufacturers and potential custom operators.

g. Communications improvement: Flyers and text for silk screens or other materials to be placed in local bazaars is needed. While commercial supplies may be available, simple materials to assist potential purchasers evaluate different suppliers should be produced by ADT.

5. WEED CONTROL: HERBICIDES TO REDUCE FARM POWER REQUIREMENTS

The Swedish Committee's ASA has published a report calling for the testing of herbicides as a way of bridging the gap between pre-war and post-war farm power availability. Farmers plough up to five times before for sowing. For wheat, two passes are normal. Multiple plowing is used to knock down germinating weeds in the field. The ASA strategy recommends broad spectrum desiccant herbicides pre-plant and selective herbicides post-plant. The intention is to increase the area sown with the same power supply. Obviously, increased area would also increase power demand at harvest and the pressure on tillage equipment to turn fields around for the summer crops.

Discussions with ADT staff also highlighted two other herbicide applications which need investigation. One is weed control in fruit tree orchards and nurseries, a problem evident from pictures taken of apple and pear orchards in Afghanistan by ADT staff. The second is the recovery of valley farms which have been overgrown with shrubby plants or sedges after being abandoned.

All of these applications will require cost:benefit and risk:benefit analysis to determine if they are practical and environmentally sound. USAID procurement of herbicides, and all other pesticides, is guided by Environmental Regulation 16, which basically requires all projects to follow U.S. EPA standards and registrations, to explore and rule out alternatives to chemical use, and to conduct impact assessment if on-farm use is intended. Applicators or supervisors are generally required to be trained to the level of a Certified Pesticide Applicator. These conditions should not be used to eliminate herbicide use from the project's testing program. The project should test herbicides as part of its adaptive testing activities. A precedent has been set with locust and senn pest control pilot program that should enable herbicide testing to proceed.

However, it is clear that special effort will be needed to obtain USAID approval to embark on major procurement of pesticides. DAI should obtain from the EPA the current listing of pesticides for which registrations have been removed or reduced. The US agricultural attache had only an outdated publication dating to 1985. Herbicide tests should be planned and the necessary training and protective gear provided for applicators who will be involved in the testing. In parallel with these technical tests, which will require special assistance from a weed scientist, ADT should pursue a survey of demand and potential lines of supply for herbicides, in cooperation with PSA staff. According to the ASA study, herbicides have not been used extensively in Afghanistan because of their cost, lack of extension, and low availability. Before embarking on a major program of promotion, these questions must be addressed by ADT, PSA, and PPA.

The ASA herbicide recommendations and this consultant's comments are listed below:

- o Wheat - broadleaf weeds: 2,4-D recommended by ASA. This is an accepted USEPA registered use. Care must be exercised in areas where vegetables and fruit trees are grown to avoid drift and damage to these crops.

- o Broad spectrum cleanup: Glyphosate (Round-Up) recommended by ASA. This is an expensive cleanup herbicide. While it has low toxicity and dissipates rapidly, it is probably better used as a spot spray in orchards than as a general clean-up herbicide.

- o Broad spectrum cleanup: Paraquat (Gramoxone). This is a cheaper herbicide than Round-Up, but its persistent residues and toxicities to bees and invertebrates has led to restriction of its registered applications by the EPA.

- o Woody species cleanup: 2,4,5-T cocktail (Silvex) recommended by ASA. This herbicide is now banned for all applications other than painting the stump of felled trees. Even this application is likely to be banned soon. The problem is dioxin contamination.

A weed management consultancy is advisable to address the herbicide issues in the project.

VI. ADT STRATEGY FOR FRUITS AND NUTS

A. BACKGROUND

Afghanistan has a long history of fruit production and export. Tree and vine fruits, including apples, apricots, plums, table grapes and raisins, and pomegranates have long been an important part of trade with surrounding nations, particularly Pakistan and India. Before the Soviet invasion of Afghanistan, the country was also a major international exporter of currant raisins. Slowly, trade in tree fruits is re-establishing itself as transportation and communication links improve. However, many orchards were destroyed during the war, and even more have passed into senescence because farmers could not risk replanting. The war also impeded the delivery of inputs, wrecked irrigation works, and interrupted the flow of new varieties and production techniques.

ADT's objective is to restore the productivity of agriculture in Afghanistan. It has concentrated much of its efforts on cereal crops. At the same time ADT is expanding and modifying work begun by NGO's to rehabilitate the tree fruit and nut industry, along with vegetable crops, as part of its horticulture program. ADT helps farmers to improve production from their existing orchards by providing the planting material and expertise needed to start new orchards, and by building links between farmers and the sources of improved fruit and nut technologies outside Afghanistan.

Reconstruction of the industry will not occur unless private suppliers of trees, vines, inputs, and services come into being who can replace the project field staff. Inputs and trees are in particularly high demand already. Traders and shopkeepers carry pesticides and fungicides. Trees are brought in from Pakistan. The project seeks to accelerate this process while helping to put the industry on a sound competitive footing. ADT works on the production side of the industry, while PSA works on the commercialization of input supply and the improvement of marketing arrangements. The following sections outline the general ADT strategy for rehabilitation of the fruit and nut industry. High Value Horticulture (HVH), subcontractor to DAI, is developing a horticultural export crop component for ASSP/PSA. Elements of the strategy presented here should be modified in light of the findings and recommendations made in the HVH study. Discussions with the HVH team, indicate however, that ADT should move forward with its horticultural production assistance and training. ADT will help lay the production groundwork for HVH's export product development work.

B. FRUIT TREE COMMERCIALIZATION

ADT has concentrated its fruit tree work in the colder areas of the country, generally the winter wheat belt at elevations higher than 1800 m. Fruit is generally the most important cash crop in these areas, along with vegetables. In areas where severe winters kill a portion of the wheat crop, fruit trees are even more important.

ADT has concentrated its horticultural efforts to date on apple production. It is the fruit in greatest demand. The Senior Adviser to the ASSP/PSA is a pomologist who worked for 30 years to establish the apple industry in Afghanistan. The approach for apples provides a good example of how other fruit should be promoted. It is based on the general strategic steps for ADT, preceding from the search for adapted technologies to their testing, demonstration, and extension to farmers. Following successful extension, the project seeks to turn over the process to the private sector. In the case of apples this means:

- o Identifying rootstocks and apple varieties of commercial interest;
- o Testing of materials at project controlled nurseries;
- o Demonstration nurseries;
- o Extension-assisted establishment of orchards and nurseries;
- o Nursery contracts written to stimulate farmers to become nurserymen supplying improved trees in their area;
- o Study of the expansion of production and the marketplace to determine if diversification is required and how it should take place.

C. ROOTSTOCKS

Dwarfing rootstock was introduced before the war. However, most farmers produced apples from varieties grafted to seedling rootstock, producing trees that grew tall. Semi-standard trees with seedling rootstock but grafted with more compact varieties were also wide spread. During the war, farmers noticed that apple trees on dwarf rootstock deteriorated more rapidly than those on seedling rootstock, which appeared to be more tolerant of drought, competition from weeds, and low soil fertility. However, use of seedling rootstock slows the onset of production and the development of full yield potential. Also, the amount of pruning effort to control tree growth is increased.

In 1989/90, the project distributed apple trees on seedling rootstock and planted demonstrations of apple trees on dwarfing rootstock. Financial analysis show that dwarfed trees provide early and higher returns to growers (Annex 2. This annex is printed from a partial budget spreadsheet which can be used in training of project staff in the evaluation of costs and returns from changes in management practices.). The key problem in the supply of trees on dwarf rootstock is the supply of rootstock. ADT will address this problem over time by the training of nurserymen capable of maintaining stool beds for the continuous production of rootstock. In the near term, the project will have to continue to purchase rootstock in Pakistan and import disease free rootstock from overseas.

D. APPLE VARIETIES

The type of apple most in demand by producers in Afghanistan is Red Delicious. Golden and White Delicious are accepted, but these types are better appreciated when varieties with a red blush are presented. Apple varieties commonly grown in Afghanistan or ADT nurseries are shown in the table below. HVH studies suggest that Afghanistan has lost substantial market share in Pakistan to Pakistani producers during the war years. Therefore, most apple production will be sold on the Afghanistan market.

Major Apple Varieties

Variety	AF	PK	Comments
RED VARIETIES			
Red Chief	X	X	Red Delicious
Summertime	X	X	Red Delicious
Kandahar Early	X		Crab apple - like spring
Kooloo Red	X	X	
Quetta Red		X	An old Red Delicious accession?
WHITE VARIETIES			
Golden Delicious	X	X	
Kooloo White	X	X	
Quetta Golden		X	An old Golden Delicious accession?

E. DIVERSIFICATION

Market saturation will occur over time. Before this occurs, diversification to other fruit, including the major warm area grape and nut zones should be well underway. Grapes, pomegranates, apricots, pistachios and almonds should be included in this diversification effort. It should be noted that the diversification strategy is one that requires patience. ADT efforts on the production side will take years to take effect, because of the years required to grow a fruit bearing tree. It will also continue its work with vegetable crops as intercrops in fruit orchards, an approach which promises earlier returns to farmer investment.

ADT will concentrate its effort on development of the skills needed by nurserymen, producers, and small-scale processors of fruit. It will explore the supporting supply lines of pesticides, fertilizer, and services in cooperation with PSA to identify ways to improve their availability to farmers. Key issues are types and sources of supply of trees, commercialization of nurseries, layout and production practice extension, post harvest handling and drying, and organization of marketing for export as well as Afghanistan and Pakistan sales.

F. TRAINING

Apple nursery and orchard training is the most conceptually and operationally advanced ADT horticultural activity. It can be divided into four steps:

- o Nursery production of trees, types of trees, types of rootstock, maintenance of a rootstock stool-bed, fertilization, disease and insect control, irrigation, bud-grafting, whip-grafting, training, bare-rooting, transport, site preparation and planting;
- o Orchard establishment including: lay-out, fencing, planting, weed control, intercropping, training, pruning, fertilization, disease and insect control;
- o Production practice including pruning, fertilization, disease and insect control, weed control, staking, and harvesting; and
- o Post harvest operations including grading, packing, and shipping.

In 1991, training in the first three areas will be held at project nurseries, the Tarnab Research Station outside Peshawar and the Quetta Fruit Research Institute. Programming of this training has begun and will continue with the assistance of the

Training Consultant hired in September. The objective is to train trainers who can work with nurserymen and farmers to transfer skills inside Afghanistan.

Following investigations by the Senior Advisor to ASSP/PSA in Pakistan, Afghanistan, the USA and Turkey, apricot production and drying has been selected as a training and extension focus for the project. Trainers will be brought from the Aga Khan project in Gilgit, or from Turkey or Australia in apricot production, improvement and drying. An important issue in training in apricot drying is the selection and development of women trainers who will be able to work inside Afghanistan training other women.

Part of the training for these tree crops will be the development by trainees and project staff in Peshawar of field extension training aids. A preliminary schedule for this training is given in Figure 2 in the training section.

VII. MONITORING ADT FIELD ACTIVITIES

Perhaps the most difficult task facing management of the ADT is the monitoring of ADT field activities. ADT center staff in each province are basically independent field agents while they are inside Afghanistan. Currently, field staff return to Peshawar once every quarter. Most administrative and technical reports are delivered to ADT management at this time. These visits are supplemented in three ways: courier service to deliver information and carry reports back to Peshawar about once every two months; supervision visits by ADT SMSs who can travel into Afghanistan; and contacts by PPA monitors conducting surveys in the provinces. Photographs of demonstration fields, equipment demonstrations, nurseries, orchards, and field days are taken during the supervision and survey trips to document written reports.

Field staff reports are written in Persian and are generally organized as a chronology of field work. Sites, farmers, facts and figures are given, but they are generally spread throughout a report. ADT has started translating these reports into English, but the volume of translation is high. The ADT Extension Unit will have a small service cell to translate Persian reports into English and to translate English language extension materials into Persian. However, text reports and information categories need to be standardized into monthly reporting forms. ADT should work with PPA to design these forms. Besides general information identifying the extension area, worker, and date, the following categories should be considered for inclusion:

- o Field Visits: location, farmers, topics;
- o Input Distribution: Seed varieties and quantities, fertilizer types and amounts, pesticides and amounts distributed by location;
- o Machinery Demonstrations: Location, number of farmers, equipment type and ID number, demonstration characterization data sheet, problems encountered;
- o Nurseries: Location, farmer, fruit species and varieties and quantities, observation of survival, graft takes, disease, insect, and weed control status (extension agents will need to be trained in scoring techniques for these), price of trees sold to farmers;
- o Orchards: Location, farmer, species and varieties, surface area, tree survival, disease, pest and weed control status, intercrop; yield estimation;

o Seed Multiplication Fields: Location, farmer, disease, pest and weed status of crop at each critical growth stage, rouging, yield estimation using sampling rings, seed sample quality;

o Crop Production: Yield estimation in four types of fields in a given locality -- local variety no fertilizer, local variety with fertilizer, extended variety without fertilizer, extended variety with fertilizer. The number of fields in which estimates should be made should not be exceed 20 to 30 fields. The purpose is to obtain comparative rankings, not to estimate crop production for a given district or province; and

o Field Days and Farmer Training Sessions: Location, number of farmers, topics, comments.

Forms should provide tables for each major topic, with headings in Persian and in English. Units of measure should be standardized across all provinces to permit aggregation and reporting to management. A small booklet format may be a better format than full letter-size forms. Reporting forms should be collected monthly within each province and forwarded to Peshawar ADT Extension Officer for aggregation, summarization, and forwarding to ADT management. For a monthly reporting system to work, courier frequency across the border will have to increase. Courier service should be provided for all project field staff, not just ADT.

SMS supervision visits should be scheduled to permit observation of extension agents during demonstrations, field days training sessions, and yield estimation. Photography of demonstrations, field days, and seed fields should be continued for two reasons. First, it provides evidence of physical activities. More importantly, the photographs made can be used to develop training, extension, and publicity materials for the project.

PPA, ADT, and PSA component managers have suggested that more frequent monitoring of field work could be undertaken by a Provincial Chief who reports to the administration of the project, rather than individual components. This approach is under consideration by the project.

Independent surveys managed by PPA will continue on topics of special interest to the project. PPA monitors will continue to be asked to provide independent observations of extension agent activities and extension impact.

ANNEX 1. ADMINISTRATIVE ACTIONS

DESCRIPTION	TASK CHART	ADT ACTIONS/DECISIONS		
	ACTION	PERSON	DATE	COMPLETED

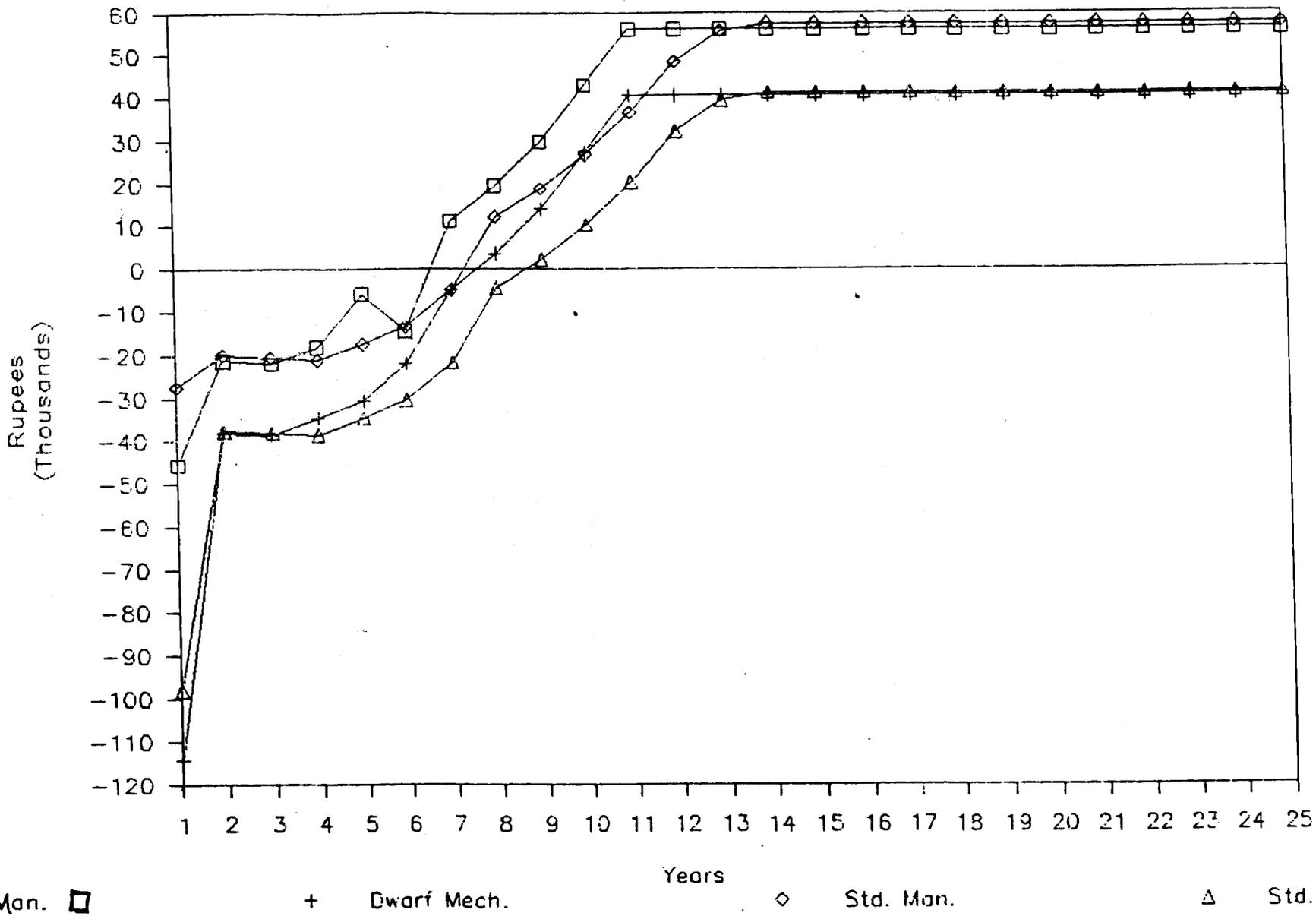
DIRECTOR'S OFFICE				
1. D/Director Field Services Candidate	Discuss w/ candidate & decide	Noori	30/9	
2. Ag Machinery Strategy/Staff	Draft strategy for review	Humpal	22/9	24/9/90
3. Field Staff Expansion Program	Estimate new/old ctr needs	Haws	25/9	
4. Hire for Vacant Posts	Identify/recruit	Noori	N/A	
5. Hire/assign AASSP Provincial Chiefs	Prepare Pro and Con Case	Humpal	20/9	24/9/90
6. Allocate Pesh. Staff to Programs	Allocate	Noori	19/9	19/9/90
6.1. Locust and Senn Pest Control	Khalilul to be coopted	Haws	28/2	
6.2. Agroforestry	Naqibullah to be notified	Haws	1/10	
6.3 Poultry	Contract finalization	Saadat	30/9	
6.4. Rootfuel	Sufi to be notified	Haws	20/9	
6.5 Agricultural Machinery	Saif to work on strategy	Humpal	20/9	
7. Cooperation with other agencies	PR for CIMMYT/Pakistan	Haws	20/9	22/9/90
7.1. Atay 85	Written notification RLS	Haws	20/9	20/9/90
7.2 Atay 85	Follow-up and payment	Saadat	1/10	
7.3 Atay 85	Negotiate ASA seed increase	Noori	1/10	
8. Seed Fumigation	Project to fumigate seek comp.	Noori	N/A	
9. LOP Procurement Needs	List to be prepared	Haws	24/9	

D/DIR FOR ADMINISTRATION

1. Add Secretary to Staff	SOW and justification	Saadat	24/9	
2. Add Admin. Asst. Proc.	SOW and justification	Saadat	24/9	
3. Pay Hel/Kand/Bag salaries from Quetta	Find draft letter authoriz.	Saadat	23/9	
3.1 Payment of Salaries from Quetta	Draft letter to Mr. Habib	Haws	23/9	
3.2 Payment of Salaries from Quetta	Copy empl. contracts to Habib	Saadat	30/9	
4. Procedures for Advance Accounts	ADT and Admin Task Force?	Saadat	15/10	
4.1 Size by volume of program	Estimating procedures	N/A	N/A	
4.2 Bookkeeping requirements	Persian/English forms	Saadat	15/11	
4.3 Reconciliation procedures	As per project policy	N/A	15/12	
4.4 Authorized Items	N/A	N/A	15/12	
4.5 "Banking" arrangements inside	N/A	N/A	15/12	
5. SOP for Local Procurement	Procedures established	N/A	N/A	
6. SOP for RONCO Procurement	Set priorities for Ronco	Saadat	4/10	
7. Improve specifications in PR's	Monthly trip to Ronco	Saadat	7/10	
8. Warehouse shared space	Communicate issue to COP	Noori	20/9	
9. Cross-border transport permits	Communicate issue to COP	Noori	20/9	
10. SOP for Service Contracts	Design half page form	Saadat	23/9	
11. Guard for machinery inside Afghan.	Request authority for field hire	Noori	24/9	
11.1 Machinery Guard	Inform ADT heads	Saadat	N/A	
12. Office Space Plan	Develop and discuss	N/A	N/A	
13. ADT Field Staff working w/o contract	Formalize employment contract	Saadat	15/12	
14. Equipment, machinery, etc. catalogues	Procure	Saadat	N/A	
15. Our Staffing Plan		Noori	30/9/90	

Comparison of Net Returns from Apples

Dwarf Compared with Standard



ANNEX 3 Dwarf Trees: Projected Production and Net Income

Category	YR1	YR2	YR3	YR4	YR5	YR6	YR7	YR8	YR9	YR10	YR11	YR12	YR13	YR14	YR15-YR:
Production (kg)	1	0	0	0	1500	3000	6000	12000	15000	18750	23437	28000	28000	28000	28000
Gross Value (R)	3.1	0	0	0	4650	9300	18600	37200	46500	58125	72656	86801	86801	86801	86801
Fixed Cost															
b. Manual	34830	13126	13126	13126	13126	13126	13126	13126	13126	13126	13126	13126	13126	13126	13126
c. Mechanical	92330	18876	18876	18876	18876	18876	18876	18876	18876	18876	18876	18876	18876	18876	18876
Labor Cost															
a. Permanent	6523	6523	6523	6523	6523	6523	7078	7543	8124	8851	9558	9558	9558	9558	9558
b. Manual	3437	348	522	813	1277	1858	2672	3253	3892	4431	4785	4785	4785	4785	4785
c. Mechanical	3263	0	0	117	407	814	1454	1861	2326	2691	3045	3045	3045	3045	3045
Materials Cost (R)															
a. Manual	852	1342	1832	2322	2812	2902	2992	3082	3172	3262	3262	3262	3262	3262	3262
a. Mechanical	12352	12842	13332	13822	14312	14402	14492	14582	14672	14762	14762	14762	14762	14762	14762
Net Return (R)															
a. Manual	-45641	-21339	-22003	-18133	-14438	-5809	11332	19496	29811	42987	56071	56071	56071	56071	56071
b. Mechanical	-114467	-38241	-38731	-34687	-30818	-22015	-4700	3638	14127	27477	40561	40561	40561	40561	40561
Production Sensitivity	1 Yield														
		Price Sensit		1 Price											
25 Year Net		Ave. Annual Income													
a. Manual	817330	32693.1													
b. Mechanical	370000	14799.9													
		MANUAL MECH													
	EST DISCOUNT	IRR CALC	IRR CALC												
IRR	20.00%	0.17162	0.06072												

YEAR	DWARF		STANDARD	
	MANUAL	MECHANICAL	MANUAL	MECHANICAL
1	-45641.	-114467	-27488.	-98194.
2	-21338.	-38240.	-19972.	-37650.
3	-22002.	-38730.	-20636.	-38140.
4	-18133.	-34687.	-21300.	-38630.
5	-5809	-30818	-17605.	-34761.
6	-14438	-22015	-13509.	-30491.
7	11332.1	-4699.8	-4880.7	-21688.
8	19496.1	3638.15	12260.1	-4373.8
9	29810.6	14126.6	18703.7	2243.76
10	42987.1	27477.1	26697.6	10411.6
11	56071.0	40561.0	36607.1	20321.1
12	56071.0	40561.0	48498.4	32212.4
13	56071.0	40561.0	55633.2	39347.2
14	56071.0	40561.0	57436.8	41150.8
15	56071.0	40561.0	57436.8	41150.8
16	56071.0	40561.0	57436.8	41150.8
17	56071.0	40561.0	57436.8	41150.8
18	56071.0	40561.0	57436.8	41150.8
19	56071.0	40561.0	57436.8	41150.8
20	56071.0	40561.0	57436.8	41150.8
21	56071.0	40561.0	57436.8	41150.8
22	56071.0	40561.0	57436.8	41150.8
23	56071.0	40561.0	57436.8	41150.8
24	56071.0	40561.0	57436.8	41150.8
25	56071.0	40561.0	57436.8	41150.8

Category	Unit Cost	Units	Fixed Costs		(Rupees)		Notes
			Cost/Ha	Amortization	Cost Amort	Cost Amort	
				Years	Per Year		
:1. Trees							
: a. Standard Seedlings	10	400	4000	25	160	Tree selection affects years to first harvest and full production cost of trees, number of trees/ha, management intensity required for pruning, irrigating, and fertilization.	
: b. Dwarf Rootstock	25	750	18750	25	750		
:2. Land & Water Rent							
	11200	1	11200	1	11200		
:3. Tiller							
	57500	1	57500	10	5750	Hand tillage is an option requiring hand labor to spade land.	
:4. Land Preparation							
	1000	1	1000	25	40		
:5. Layout/Pegging							
	250	1	250	25	10		
:6. Sprayer							
	1200	1	1200	5	240		
:7. Tools							
: a. Pruning Shears	345	2	690	5	138		
: b. Saws	345	2	690	5	138		
: c. Shovels, etc.	500	1	500	1	500		
:8. Harvest Baskets							
	5	10	50	5	10		
:9. Step Ladders (Made on farm)							
	100	5	500	5	100		
:TOTALS: MANUAL STANDARD			18200		11760		
: TILLER STANDARD			77580		18286		
:TOTALS: MANUAL DWARF			34830		13126		
: TILLER DWARF			92330		18876		

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Category	Unit Cost	Units	Cost/Ha	Notes

:Permanent Labor				
: a. Annual Salary	5218	1	5218	Includes skilled operations and orchard mgmt
: b. 5% Prod. Bonus	0.05	1 See Prod. Table		Up to full production, 1305, after full production then 5% of production
		Fall		Spring
:Planting - Standard	43.5	40	1740	870 10 holes/work days in fall when dry
: - Dwarf	43.5	75	3262.5	1533.375 20 holes/work days in Spring when wet
:Tillage & Fert.	43.5	20	870	After bloom builds by 10% to full production
:Thinning	43.5	20	870	Start Year 5, build by 20 % for five years
:Picking	43.5	50	2175	Based on 1 kavar (560 kg)/work-day. Use production table to calculate.
:Tillage & Fert.	43.5	20	870	After harvest, builds by 10% a year from 20% base.

:All calculations need to be made by year following the phase in schedules mentioned in the notes.

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ANNEX 3

Materials and Services Costs (Rupees)

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Category	Unit Cost	Units	Cost/Ha	Notes
:-----				
Fertilizer (Bags)				
: Urea	150	6	900	Builds by 10% a year from year 1
: DAP	217	5	1085	Applied once every 3 years or 1/3 each year
: Iron Sulfate				Some areas of high pH require micronutrient supplementation.
: Plant Protection	200	10	2000	Builds by 20% a year Need to detail and also look at alternative management measures
: Tiller POL&Spares	11500	1	11500	Replaces hand tillage manual labor Need to find actual consumption and spares figures

ANNEX 4

Machinery and Mechanization

Province	Cold or Warm	Ave Farm Size Jeribs	Years to Oxen Herd Regener.	Tractors	Wagons	Accessory Equipment Set	Threshers PTO	Threshers Engine	Corn Shellers	Rice Husk-ers	Power Till-ers	Walk- ing	Reapers Self- Propel.	Spray- Front- ers	Herbicides
Ghazni	Cold	31	43	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Kunar	Cold	6	4	Yes	Yes	Yes	Yes								
Laghman	Cold	7	NA	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes
Logar	Cold	13	14	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Paktika	Cold	12	30	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes
Paktya	Cold	8	24	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes		Yes	Yes-Wheat
Wardak	Cold	6	14					Yes			Yes	Yes		Yes	Yes
Baghlan	Warm	13	18	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes-Wheat
Helmand	Warm	41	42	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes-Wheat
Kandahar	Warm	46	70	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ningrahar	Warm	7	6	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes-Wheat
Kabul	*Cold	13	26					Yes	Yes	Yes	Yes			Yes	Yes-Orchard
Kapis	*Cold	6	NA					Yes						Yes	Yes-Wheat
Parwan	*Cold	5	25					Yes		Yes	Yes			Yes	Yes-Orchard
Badakhshan	*Warm	51	7	No				Yes			Yes				
Badghis	*Warm	32	NA											Yes	
Balkh	*Warm	59	14	Yes	Yes	Yes	Yes	Yes						Yes	Yes
Bamyan	*Warm	16	12					Yes						Yes	Yes
Farah	*Warm	35	25	Yes	Yes	Yes	Yes	Yes						Yes	Yes
Faryab	*Warm	43	10	Yes	Yes	Yes	Yes	Yes						Yes	Yes
Ghor	*Warm	17	9				Yes	Yes						Yes	Yes
Herat	*Warm	13	14	Yes	Yes	Yes	Yes	Yes					Yes	Yes	Yes
Jowzjan	*Warm	81	22	Yes	Yes	Yes	Yes	Yes					Yes	Yes	Yes
Kunduz	*Warm	24	12	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes
Nimroz	*Warm	69	27	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes-Wheat
Gruzgan	*Warm	38	19	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes
Samangan	*Warm	31	6	Yes	Yes	Yes	Yes	Yes					Yes	Yes	Yes-Wheat
Takhar	*Warm	60	4	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes-Wheat
Zabul	*Warm	37	62	Yes	Yes	Yes	Yes	Yes	Yes				Yes	Yes	Yes

* : Areas in which AASS/PSA/ADT is not working*****

ASA averages for farmers surveyed in Afghanistan. Camp figures used if no data were collected inside Afghanistan.

TRAINING SCHEDULE 1990-1991

FIGURE 2

DESCRIPTION	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TRAINEES	

HORTICULTURE																	7 DAI
Nursery Practical			<=====														7 OTHER
Nursery-Orchard Class					<=====												7 DAI
Budding-Grafting										<							
Apricot Drying																	10
Selection																	
Training									<====>								
ADT EXTENSION - WINTER			<=====														21 DAI
Administration																	21 OTHER
Core Technical																	
Core Methodological																	
1991 Program																	
ADT EXTENSION - SUMMER																	21 DAI
Core Technical																	21 OTHER
Core Methodological																	
EXTENSION MOBILE UNIT																	
Design					<=>												
Procure						<=====											
Test Elements																	
Test Unit																	
TRACTOR/THRESHER OPERATOR:																	
Admin																	
Tillage Practical																	15 DAI
Millat Tractor Course																	5 OTHER
Battala Thresher Course																	
Small Engine Maint.																	
Demonstration Methods																	
Demand Surveying									X	X							
Farmer Training Methods										X	X						
MACHINERY MOBILE UNIT																	
Design																	
Procure																	
Test Elements																	
Test Unit																	
LOCUST/SENN PEST PILOT																	
Evualtion/Debriefing																	24 DAI
Training										<=>							
AGROFORESTRY																	
																	TO BE SCHEDULED

TABLE-1

300 M.T NEW SEED PAK-81 & BEZOSTAYA SEEDS FOR MULTIPLICATION 1990-91

Provinces	Location	Amount of Seed M.T	Variety	Area Under new Variety Jeribs	Urea Needed M.T	D.A.P Needed M.T	Expected Wheat Seed M.T	Expected Wheat Seed M.T.
Kandahar	Khwaja Mulk	20	Pak - 81	714	36	18	400	200
	Maroof	40		1428	71	36	800	400
	Panjwayi	50		1786	89	45	1000	500
Helmand	Shamalan Darveshan	-	-	-	-	-	-	-
	New Area	60	Pak - 81	2142	108	54	1200	600
Back Wa	New Area	30	Pak - 81	1071	54	27	600	300
Negarhar	New Area	100	Pak - 81	3572	179	90	2000	1000
Ghazni	Andar	5	Bezostaya	125	6	3	100	50
	Deh Yak	5		125	7	4	100	50
	New Area	4		100	5	2	80	40
Logar	Baraki Barak	5	Bezostaya	125	6	3	100	50
	Chark	5		125	7	4	100	50
	Baraki Rajan	7.50		186	9	5	150	75
Wardak	Chak	3	Bezostaya	75	4	2	60	30
	Sheikhabad	3		75	3	1	60	30
	Other	2.50		63	3	2	50	25
Paktika	Yahya Khel	5	Bezostaya	125	6	3	100	50
	Orgun	3.75		94	5	2	75	38
Total		348.75		11930	600	300	6975	3489

Note : Seed that are to be collected from the contracted farmers (Panjwayi, Helmand and Khogyar) will be sold back to interested farmers in the region through market cays.

In high elevation regions (Logar, Ghazni and Wardak) Bezostaya seed will be redistributed.

Expected wheat seed taken at 50% of total production.

DESCRIPTION	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TRAINEES	
MANAGEMENT TRAINING	<>						<=>										6
CIMMYT TOT SHORT COURSE									<----->							2	
IRRI TOT SHORT COURSE									<----->							2	