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STATUS OF HORTICULTURAL CROPS  
IN SOUTHERN AGENCIES  
OF FEDERALLY ADMINISTERED  
TRIBAL AREAS, CONSTRAINTS  
AND RECOMMENDATIONS FOR  
FUTURE DEVELOPMENT  
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## Preface

The Federally Administered Tribal Areas (FATA) of Pakistan's Northwest Frontier Province lie adjacent to Afghanistan's eastern border. The FATA is comprised of about ten thousand square miles of arid valleys, hills and mountains. The estimated 2.2 million inhabitants of the FATAs are widely scattered and reflect a population density of 80/sq. km. (as compared to 169/sq. km. for the settled areas of NWFP). Most residents are involved in subsistence farming; however, the land resources for farming are limited to valleys and riverbanks. Due to uncertain and low precipitation, high evaporation rate, and limited irrigation facilities, agricultural efforts must concentrate on rainfed or dry land crop production. Other economic efforts of the area focus on animal husbandry, trade, transportation, and timber. The per capita income of the tribal areas is estimated to be 1/3 that of the settled areas of NWFP.

The seven administrative units (Agencies) comprising the FATAs include: North Waziristan Agency, South Waziristan Agency, Kurram Agency, Orakzai Agency, Bajaur Agency, Khyber Agency and Mohmand Agency. Authority and responsibility for all administrative matters within each agency lies with the respective Political Agents.

TADP started its development mandate in all seven Agencies of the FATAs in 1984. Due to overlapping Programs with other international donors, however, the TADP is now operating in only four Agencies (SWA, NWA, KA & Orakzai). Effective January 1989, development opportunities in the remaining three Agencies were left for intervention by other donor agencies. Hence the Scope of Work and questionnaire for this study related only to North Waziristan, South Waziristan, Kurram, and Orakzai (See: ANNEX: Scope of Work, Questionnaire). The study was conducted for USAID/ Peshawar from July 23, 1989-November 30, 1989. The consultants hope that this study and its findings will prove useful in planning agricultural development strategies for this area.

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## Executive Summary

A 1989 horticulture survey of four of the Tribal Areas of Pakistan's Northwest Frontier Province indicated that underproduction of fruit and vegetable crops is unnecessarily prevalent throughout Kurram, Orakzai, and North and South Waziristan Agencies. Lack of training for farmers and insufficient extension services by the Federally Administered Tribal Areas (FATA) Agriculture Extension Services, combined with poor qualities of seed, expensive fertilizers and pesticides, lack of irrigated lands, and marketing constraints are problems identified throughout all four Agencies.

Recommendations offered are specific to the problems identified. Water sources must be increased and more land should be levelled in order to bring more area under cultivation. Better seed/seedling qualities must be provided to farmers, and field staff should develop demonstration plots and model orchards, both on FATA/Agriculture lands and on privately owned plots.

Fruit orchards should be increased in size, quality, and number, and management techniques which can increase the production and quality of fruit must be investigated. Orchards should be intercropped with vegetables and cash crops.

Seeds, fertilizers, and pesticides should be given to farmers at affordable prices, and progeny gardens should be started in order to have high quality cultivars locally available.

Horticultural extension services should be strengthened to include horticulture development activities for specific ecologic zones. A horticulture demonstration and research service should be established to serve as the main training center for field staff and farmers.

Greater logistical support must be provided to Extension Agents if they are expected to actually advise farmers in their fields. This should include field pay and transport facilities, e.g., motorcycle, as well as a more attractive base salary.

Farmers should be encouraged to practice more intercropping, and to plant early, mid, and late varieties of vegetables in order to have marketable produce all year round.

Nuts should be encouraged because of their ease in marketability, and deep plowing should be encouraged for all vegetables in order to eliminate weeds and facilitate root penetration.

Local and exotic green plants should be investigated for large scale marketing potential.

Farmers should be trained to preserve surplus fruits and vegetables for personal consumption.

In cannabis growing areas, credit should be given for cultivation of alternative crops.

In high altitude rainfed areas of South Waziristan, production of potatoes, pears, apples, almonds, pistachios, and walnuts should be increased; and rapeseed and garma melon should be grown in greater quantities in the loam/clay loam soil areas.

Finally, FATA field staff and interested farmers should be offered training at least three times each year. Important topics to include are: scheduling of planting; plant selection, protection, harvesting, preservation, grading, packing, storing, and transporting; and crop rotation.

## Kurram Agency

### 1.0 Introduction

Kurram Agency is bordered by Afghanistan on the west and north, Orakzai and Khyber Agencies to the east, Kohat to the southeast, and Waziristan on the south. It stretches approximately 108 kilometers in a northwesterly direction from Tail (in Kohat District) to Pewar Kotal on the Afghan border. It has a total land area of 3380 sq. km. The Agency is divided into three subdivisions: Upper Kurram, Lower Kurram, and Frontier Regions of Kurram. The area of F.R Kurram is greater than that of Upper & Lower Kurram, but no settlement has been carried out there.

### 2.0 Situational Analysis

#### 2.1 Geography and Topography

The elevation of the Agency varies from 800-2100 m. The principal mountain range, called "Koh-e-Sufaid" (White Mountains) due to coverage of its peaks with snow during most of the year, forms a natural boundary with Afghanistan as well as a watershed between the two countries. This range runs across the central part of N.W.F.P. in an easterly direction up to Attock, where the provinces of NWFP and Punjab meet. The hills are exposed to heavy landslides and erosion. The streams, most of which are perennial, have carved narrow valleys (called tangi) throughout the area.

The Parachinar Plain is south of the Koh-e-Sufaid and has altitudes ranging from about 2000 m. at Pewar in the northwest to 1900 m. at Parachinar and 1500 m. at Malikili, 8 kilometers southeast of Parachinar. Much of this plain has rocky soil and is not very fertile. It is irrigated primarily with runoff water from the north. The water table varies from very close to the surface near the river to very deep in the north. At Parachinar Farm, the depth of the water table is more than 250 m.

The principal river of the Agency is the Kurram River, which originates in Afghanistan and enters Kurram Agency in the west near Kharlachi village. It is joined there by two tributaries called Sythia and Pewar. There are also several springs on both sides of the river.

#### 2.2 Population

According to the 1981 Census Report, the total population of Kurram Agency is 294,362, including 148,222 males and 146,140 females. (See: Appendix 1)

#### 2.3 Climate

Upper Kurram has a temperate climate with cold winters and warm summers, whereas in Lower Kurram the winter is cold and the summer is hot and long. The minimum and maximum temperatures on record for the Agency are 5.7 degrees Centigrade and 27 degrees Centigrade.

### 2.3.1 Planting/Harvesting Seasons

Kurram Agency has two crop seasons. One is the Kharif season, sown in late spring and harvested between September and November. The other is the Rabi season, which is planted in autumn and reaped in July and August. Crops grown during the respective seasons are presented below:

#### (a) Kharif Season

Fruits: apple, pear, peach, plum, persimmon, apricot, pomegranate, walnuts. Vegetables and pulses can also be grown in the orchards.

Vegetables: tomato, potato, onion, turnip, cucumbers, egg-plant, cabbage, cauliflower, garlic, okra, chilies.

Cereals/Legumes: rice, corn, pulses (mung, mash, red bean), soybean, peanut.

#### (b) Rabi Season

Fruits: citrus, loquat (can only be grown in Lower Kurram). Vegetables both in Rabi and Kharif can be grown in orchards, however the best are pulses and soybean.

Vegetables: radish, turnip, spinach, peas, cauliflower and cabbage.

Cereals/Legumes: wheat, barley, lentil.

Other: rapeseed, tobacco.

Generally, frost prevents the planting of fruits and vegetables in Kurram during the winter months.

## 2.4 Rainfall

The Meteorological Department, GOP has recorded rainfall Kurram Agency since 1982. The data is presented in Table 1.

Table 1

Annual Rainfall 1982-88 at Parachinar	
Year	Rainfall (in inches)
1982	37.3
1983	25.2
1984	29.2
1985	21.0
1986	32.9
1987	25.0
1988	29.6

There are two rainy seasons in the area--February through April and July through September. Since the area is heavily cultivated and with much double cropping, this rain provides most of the water supply needed for farming.

## 2.5 Types of Soil

The three types of land/soil found in the area are:

### 2.5.1 Kohi-i-Daman Land

This land ranges from light gravel to sandy loam and is found at the base of the Koh-e-Sufaid Mountains. Because it lacks major plant nutrients, especially phosphorous, fertilizer is required. The water source for this land includes springs, water runoff, and snow melt and is in sufficient supply to allow cultivation throughout most of its 17,370 acres. Almost 50% of this area is double cropped and 40% to 45% is single cropped. Crops grown in this area include:

Rabi Season: Wheat, corn, rice, pulses, fruits (apple, pear, peach, plum, apricot), walnut, radish, spinach, Rabi fodder (shaftal).

Kharif Season: Potato, tomato, onion, turnip, kharif fodder (corn), rice, apple, pear, peach, plum, apricot, walnut.

### 2.5.2 Sahra Land

The Sahra Land includes approximately 4,500 acres of hard, stony, shallow soil located between the Kohi-i-Daman land and the Kurram River. Because of the lack of fertile soil, agricultural efforts are limited to one crop which is planted during the Rabi season. Formerly, some of the Sahra land was irrigated by surplus runoff from the Kohi-i-Daman lands; however dense cropping there has required that crops grown on Sahra lands be rainfed. Crops grown in this area include:

Rabi Season: wheat

Kharif Season: soybeans, mung, corn

### 2.5.3 Rodghara Land

The Rodghara lands include approximately 17,638 acres of very fertile and productive land adjacent to the Kurram River. The soils are silty to clay loam with good moisture holding capacity. Much of this area is double cropped, and is irrigated with water from the Kurram River and nearby springs. Crops grown in Rodghara lands include:

Rabi Season: radishes, spinach, peas, wheat, Rabi fodder.

Kharif Season: rice, corn, pulses (mung, mash, red beans), soybeans, peanuts, tomatoes, onions, turnips, chillies, pumpkins, bitter gourd, okra, eggplant, Kharif fodders (corn, shaftal).

Quantities of various crops grown in the Kohi-i-Daman, Sahra, and Rodghara lands are presented in Appendices 2-9.

## 2.6 Agricultural Overview

The total area under cultivation area in the Agency is 27,272 hectares, of which 22,000 hectares are irrigated and the remaining 5272 hectares are rainfed. Water for irrigation is provided by springs, snow melt, private katcha canals constructed by the farmers, and the Kurram River. Recently, some Government tubewells have been installed by FATA/ D.C. in the Sahra land of the Agency. Though the Rodghara lands and the lands along the river banks are conducive to deep plowing, none is being practiced at this time. Such plowing would decrease weed growth, even if practiced biannually.

Production of fruit and vegetable crops has become increasingly important because of their high economic return as compared to the cereal crops.

Table 2  
Agricultural Outputs According to Geographic Area  
within Kurram Agency

<u>Crop Grown</u>	<u>Upper Kurram</u>		<u>Lower Kurram</u>		<u>Frontier Region</u>	
	<u>Kharif</u>	<u>Rabi</u>	<u>Kharif</u>	<u>Rabi</u>	<u>Kharif</u>	<u>Rabi</u>
<u>Fruits/Nuts</u>						
Apples	x				x	
Pears	x		x		x	
Peaches	x		x		x	
Plum	x		x		x	
Apricots	x				x	
Pomegranate	x					
Persimmon	x		x		x	
Citrus				x		
Loquat				x		
Walnut	x				x	
Almonds	x					
<u>Vegetables</u>						
Redbeans	x		x		x	
Soybeans	x		x		x	
Peanuts	x		x		x	
Potato	x				x	
Tomato	x		x		x	
Onion	x		x		x	
Chilies	x		x		x	
Turnips	x		x		x	
Eggplant	x		x			
Cucumber	x		x		x	
Cauliflower						x
Cabbage					x	
Kharif fodder	x		x		x	
Mung	x		x			
Mash	x		x			
Lentil		x		x		x
Radish		x		x		x
Spinach		x		x		x
Rapeseed				x		
Peas				x		x
Rabi Fodder		x		x		
<u>Grains/Cereals</u>						
Rice	x		x		x	
Corn	x		x		x	
Pulses						
Barley						x
Wheat		x		x		x
<u>Cash Crops</u>						
Tobacco				x		

Table 2 indicates the agricultural outputs in the three divisions of Kurram Agency. Most of the crops listed are grown throughout the area where water is readily available.

In some areas of the Parachinar Plain, insufficient water supplies limit cultivation to wheat, mung, and almonds.

In the Rodghara lands adjacent to the Kurram river, all crops listed in the table are grown except: almonds, potatoes, eggplant, and Kharif fodder.

The Frontier Region is largely undeveloped and needs irrigation schemes, land reclamation, and marketing initiatives in order for agricultural development to improve.

### 3.0 Cereal/Legume Production

Wheat is the major cereal crop. Because it can be grown throughout all areas of the Agency and on all types of soil, it is grown by almost all farmers. Much of the rice crop has been replaced by pulses because of the high water requirement associated with rice cultivation, though farmers still try to grow enough for their own needs. Corn used to be a prominent crop in the area, too; however some of its popularity has been lost due to problems with pests and diseases (blight), and difficulties in obtaining high quality seeds. Much of the land formerly used to cultivate corn is being used to plant pulses and oil seeds (particular peanut) which, along with beans and mung, gives the farmer a relatively high economic return.

Rice and corn acreage has shown a decline in the past few years for the reasons stated above. There has been a diversion in these areas towards oil seeds, especially peanuts and soybeans.

The Agricultural Extension Service is encouraging soybean and peanut cultivation by planting demonstration plots on privately owned lands and by providing improved seed varieties free of cost. Because peanuts are more marketable and receive greater economic return, however, they are more popular among farmers than are soybeans.

### 4.0 Vegetable Production

All types of vegetables are grown during the Rabi and Kharif seasons in Kurram Agency. Potatoes, tomatoes, and onions are the most important, and along with peanuts and red beans are the main cash crops.

The peculiar geographical situation and political setup makes it difficult to obtain accurate agricultural statistics, however, and this is the first agriculture survey conducted in the area. A 1980 assessment estimated that 1854 of 9257 farms grew potatoes, while 3554 farms grew some other vegetables. In 1980, vegetables represented 7% of the Kharif crop area and 1% of Rabi crop area. Vegetable acreage has been increasing over time because of greater margins of profit as compared to cereal crops.

#### 4.1 Potatoes

Potatoes are becoming a very popular crop, especially in the Parachinar plains and Kohi-i-Daman lands, and are cultivated in the early spring with July harvest. As Table 3 suggests, the area of potato production has increased, but the per acre yield has remained almost constant.

Table 3

Area and Production of Vegetable Crops

Year	Area in Acres	Production in tons	Yield per Acre (tons)
<u>(a) Potato</u>			
1984-85	173	890	5.14
1985-86	173	890	5.14
1986-87	148	765	5.17
1987-88	185	956	5.67
1988-89	494	2000	4.05
<u>(b) Tomato</u>			
1984-85	1001	2835	2.80
1985-86	988	2800	2.83
1986-87	828	2598	3.14
1987-88	920	2600	2.82
1988-89	1483	6000	4.05
<u>(c) Onion</u>			
1984-85	104	558	5.37
1985-86	297	1600	5.39
1986-87	297	1600	5.39
1987-88	494	2666	5.40
1988-89	247	1333	5.39

Source: Agri Census Report 1980

#### 4.2 Tomatoes

There is great fluctuation in tomato production, and yields are low. This may be a result of poor agronomic practices and high infestation of diseases/pests. Most tomato production occurs in lower Kurram, Kirran, Zeran and the Rodghara area of upper Kurram. Tomatoes are planted in February, March and April and are harvested July through October.

### 4.3 Onions

Though onions are an important cash crop, they are sown in a limited area. The present yield of 5.4 tons per acre can be improved considerably through the use of quality seed and better crop management practices.

### 4.4 Other Vegetables

1986-87 statistics indicate that small amounts (124 acres) of okra, squash, pumpkin and egg-plant are also grown during the Kharif season; and spinach and cucumbers during the Rabi season. In Lower Kurram, turnips and other vegetables are grown in the summer, and carrots and radishes are grown in the winter.

### 4.5 Vegetable Crop Yield

Recent interviews with about 20 farmers suggest that crop yields are higher than statistics indicate. Farmers report the following yields per acre:

potatoes	5-6 tons
tomatoes	6-7 tons
onions	5-6 tons

### 5.0 Fruit Production

Deciduous fruits are grown extensively in the irrigated plains and foothills, but throughout the Agency as well. In some pockets of the lower Kurram where the winter is mild, fruits like citrus and loquat are also grown on a limited basis.

The numbers of fruit orchards have increased greatly in the last decade, particularly in the plains of Parachinar where sufficient water is available. Fruit yields are poor compared to vegetable yields, however, because the farmers do not apply fertilizer and/or pesticides to their fruit trees as they do to their vegetable crops. Even those farmers who are interested in applying fertilizer and pesticides complain that they cannot get supplies of either on time and at reasonable prices.

Hailstorms occurring just prior to harvest, and poor post harvest management practices contribute to the development of scab/brownrot, general rotting, and other diseases which results in significant losses of fruit crop (between 20-90%). The Golden and Red Delicious apples, which are harvested relatively late, are most often affected, while varieties harvested by August often escape damage.

The uncertainty of prices in the market and poor transport system further create problems for the growers in obtaining better economic return.

The details of fruit planting and harvesting by geographic area are presented in Table 4.

Table 4  
Fruit Planting/Harvesting by Geographic Area

<u>No. Fruit</u>	<u>Where Grown</u>	<u>Planted</u>	<u>Harvested</u>
1. Apple	Mostly in upper Kurram, Parachinar plains and in the foot hill areas.	Best time Feb/March but it can also be planted	Harvesting of early Apple done in August. Mid season variety in Sep. & late variety in Oct/Nov.
2. Pears	Grown both in upper & lower Kurram	Same as above	Early variety in in mid July & late variety in Sept.- Oct.
3. Peach	Same as above	Same as above	July- Sept.
4. Plum	Grown both in the upper & lower Kurram but mostly in lower Kurram area.	Same as above	last week of June to last week of July.
5. Pomegr- anate.	Grown mostly in Upper Kurram (Kirman, Shublan area)	Same as above	Third week of August to third week of September
6. Persimmon	Grown both in upper and lower Kurram but mostly in lower Kurram.	Same as above	4th week of Sept to Oct end.
7. Apricot	Grown in the entire Kurram valley but it grows well & mostly grown in upper Kurram.	Same as above.	last week of June to last week of July.
8. Walnut	Grows in the upper Kurram, mostly in the hills & foot of hills.	Same as above	August & Sept.

### 5.1 Plums

A few small plum orchards are found in the Parachinar Plain and in Lower Kurram. Otherwise, plums are generally planted with other fruit plants. They are less susceptible to insects and diseases than other fruits, and the life of the tree is longer than that of peaches and pears.

The fruit can compete in the market with those plums grown in the Peshawar Valley, since the latter arrives in the main markets (Peshawar, Rawalpindi) earlier. It cannot compete with those plums grown in Swat/Malakand, however, because they reach the main markets at the same time, and the plums grown in Kurram must be transported farther at additional costs.

The major pests of plum are fruit flies, green and black aphids and gumoses. Diptrex/lebacyid and other thio-phosphates can control fruit fly and aphids, and any copper compound like perenox, copper-oxy-chloride and dithane can control gumosis. A fertilizer dose of 2 Kg. each of N.P.K for a full-grown tree can increase the yield by about 22%.

## 5.2 Nuts

### 5.2.1 Walnuts

Walnuts are the only nut fruit widely grown throughout all parts of Kurram Agency, including the Frontier Region. In Upper Kurram, they are planted both individually and in groves, particularly in the mountainous regions of the Agency. Walnut production in the area could be increased if better varieties were selected.

More fruit nurseries with trained budders and skilled labor are required. The present budders require expert training. Exploration in faster methods of propagation through tissue culture is needed.

### 5.2.2 Pecans

There is a great potential for growing pecans in this area, because unlike walnut, which requires severe cool winters and mild summers and can grow successfully in hilly areas, pecans require moderate chilling and can be grown successfully in both the hilly areas as well as in the plains. No initiative or research has been done in this respect.

## 6.0 New Crops

If production techniques and land development are improved, rape/mustard seed, sunflower, lentil and even some short duration peanut varieties could be introduced.

Fruits, particularly almonds and grapes varieties suitable to the climatic conditions can be introduced in the Barani areas.

Saffron has great potential as a cash crop, and should be used to replace poppy cultivation wherever possible.

## 7.0 Cropping Pattern/Crop Rotation

The following crops are grown during the Kharif season; rice, corn, pulses, fruits, vegetables and fodder.

Wheat/barley, fruits, vegetables and fodder are grown in the Rabi season.

Crops grown during both seasons include: barseem, pulses, beans, wheat, corn and rice.

The crop rotation schedule for Kurram Agency is presented below:

### Rotation Schedule of Crops Grown in Kurram Agency

Irrigated Crop Rotation	Unirrigated Crop Rotation
1. Rice-Wheat-Rice	1. Wheat-fallow-Wheat
2. Wheat-Pulses-Wheat	2. Corn-Soybean/Mung (inter planted with corn)
3. Bean/Pulses-Wheat	
4. Rice-Wheat-Corn	
5. Rice-Shaftal-Rice	
6. Corn-Tobacco	

## 8.0 Irrigation

It appears that there is no planning of water distribution in Kurram Agency and that FATA-DC has no control over tubewells or water utilization. In some places, particularly in the plains, irrigation water is a problem. Situations exist where water available from tubewells is not being used because irrigation channels have not been constructed. In one case, a damaged transformer has not been repaired.

Two tubewells observed are being used appropriately. One accommodates 200-250 acres on which mung and peanut crops are being irrigated through katcha channels. Another tubewell inspected is used to irrigate approximately 30 acres of land. A third tubewell was being used to irrigate 40 acres of land, including an orchard; however, the owner does not allow others to use it. Irrigation methods are detailed in Appendix 10.

## 9.0 Activities of Public/Private Sector

### 9.1 Agricultural Extension Service

#### 9.1.1 Overview

The Agriculture Extension Service in Kurram Agency exists in order to extend advice and services to the farmers. It introduces and supplies pedigree fruit plants to farmers. It also helps the farmers procure essential inputs, e.g. seed and fertilizers, agrochemicals and spray machines. Since there are no representatives of the Fruit Board, A.D.A., or private agrochemical firms in the Agency, the Agricultural Extension Service is the only resource agency available to area farmers.

The AES is staffed by one Extra Assistant Director of Agriculture (EADA) who is assisted by four Agricultural Officers and twenty Field Assistants. The Field Assistants perform their extension activities as well as maintain the fruit farm and fruit nurseries (See: Appendix 11.)

#### 9.1.2 Existing Facilities

The AES has one pick-up truck and two tractors. One driver is hired for the truck, and there is one trained tractor operator. Four unserviceable motorcycles previously purchased for AES use are in the stores awaiting auction. An old katcha barrack has been converted into an office for the EADA, and residences for three of the Agriculture Officers are provided at the Agriculture Farm. In addition to a storage shed, there is a conference hall which is being used for meetings. It has been proposed by the F.A.T.A./Agriculture that this conference hall be used for training purposes.

#### 9.1.3 Coverage Per Farm Family

There are 9257 farm families in Upper and Lower Kurram. [Statistics for the Frontier Region/Kurram do not exist.] Of the twenty Field Assistants, one is assigned to the Frontier Region and the remaining 19 are assigned to families within Upper and Lower Kurram. Thus, one field assistant serves approximately 700-750 farm families. This figure is well above the World Bank suggested service ratio of 1:450-500, hence an inadequate service is being provided by the present extension department.

#### 9.1.4 Current Activities

The Field Assistants are supervised by three officers. In addition to their extension activities, they are responsible for four fruit nursery farms, two fruit orchards, two progeny gardens and one Agricultural Farm. Some of the EADA activities for which field assistants have been primarily responsible include:

1. Distribution to the farmers at concessional rates, 20-25 thousand pedigree fruit plants raised in departmental nurseries.
2. Laying out of 90-acre orchards for farmers (done annually).
3. Promotion of soybean and peanut cultivation, including planting of 40 demonstration plots of each crop/year.
4. Sale of spray hand pumps to farmers at 50% of the subsidized rates.
5. Development of a scheme to supply and distribute pesticides worth Rs. 0.45 million and power sprayers worth Rs. 0.25 million to farmers at a 50% subsidy.
6. Provision of seed and fertilizer to farmers on cash and carry basis, including transportation arrangements for these inputs.
7. Development of cherry cultivation through the distribution of 2000 cultivars each year.

Due to insufficient funds, field assistants are not provided housing, transport, or office space, and salaries are relatively low. It is not surprising, then, that many of the services as outlined are not being provided throughout the Agency.

#### 9.2 Agricultural Research

1. One soil lab exists for the purpose of doing soil analysis for the farmers; however, this lab has minimal facilities, and is staffed by only one research officer.
2. One horticulture research officer is hired to conduct research and extend technical advice. There is no research station, however, to provide the scientific base needed for horticulture research and development.

### 9.3 Agriculture Development Bank of Pakistan

A branch of A.D.B.P. was established in Parachinar in 1968, and another branch opened recently at Sadda. Current records indicate that the A.D.B.P. in Parachinar has loaned a total of Rs. 7.1 million to 900 farmers. During the fiscal year 1988-89, the Bank disbursed loans totaling Rs. 8 million, and the target for 1989-90 is Rs. 9.6 million. This represents an increase of 20%.

The Bank's policy is to lend to farmers owning less than 12.5 acres of land. Both production and development loans are disbursed. Production loans are seasonal loans, given initially for six months, but extendable to 18 months. The maximum loan is Rs. 10,000 with a 12% interest rate. Last year, the A.D.B.P. loaned Rs. 40 million. The A.D.B.P. has advanced Rs. 80,000 for the development of orchards and is encouraging farmers to obtain loans for orchard establishment. The pay-back period for A.D.B.P. loans is five years, with a three year grace period.

## 10.0 Constraints

### 10.1 Manpower Training

No training is provided to farmers. A training center with two instructors and a field assistant is being established at Parachinar to train farmers. The 4-5 day courses proposed will not be able to train farmers in planting, harvesting, crating, and marketing, however.

There is a strong need for practical training in horticulture, and for periodical orientation of Agriculture staff and farmers, particularly malis, budders and orchard growers.

### 10.2 Lack of Technical Expertise

The only orchards which have been laid out properly are those planted by the Agriculture Department. Farmers tend to plant fruit trees with no specific pattern, frequently placing trees too close together. Pruning and trimming of plants and trees is poorly done, even by Agriculture Department gardeners.

Some trees are planted within water courses, causing damage from excessive water; while others are damaged from insufficient irrigation.

The origin and varieties of fruit trees grown is unknown, and the lack of systematic research into the extent and nature of common diseases/infestations precludes effective control measures.

### 10.3 Non-availability of Essential Inputs

The non-availability of improved and high quality vegetable seeds and healthy fruit plants of recommended varieties is a major agricultural problem in Kurram Agency.

The high cost of fertilizer is another problem. Even manure is very costly and is available only in the distant mountain tracts where farm animals are maintained. A tractor load of farmyard manure costs Rs. 300/= and it would cost a farmer Rs. 800-2,400 to apply it to one acre of tomato crop. Pesticides are both expensive and difficult to obtain.

### 10.4 Marketing Problems

Since there is no marketing committee, the farmers have no group to represent their interests. A town committee recovers local taxes and Octroi charges equivalent to Rs. 1.25/maund (40 Kgs).

Approximately twelve (12) commission agents charge Rs. 10 per maund and fix the rate, dominating the market and taking advantage of the farmers' simplicity, poverty and ignorance. Some even advance money to the farmers in exchange for control of their crop.

No train or air service is available, and tribal feuds make private road transport unsafe. NLC trucks which could offer safe transport and competitive rates are unavailable. The only road between Parachinar and other districts is in very poor condition, and transport charges to Lahore can be as high as Rs. 50-60 per 90-100 Kg.

Even crates are expensive (Rs. 5-6/10 kg.) and difficult to obtain, since they are not locally available

The lack of locally available cold storage, canning, and fruit/vegetable dehydration units decreases the farmers' marketing options and therefore the ultimate price they obtain for their crops.

Finally, because farmers do not understand market rate fluctuations, they are unable to plan transport and marketing of their yields at times and places which would prove most beneficial and most cost effective for themselves.

### 11.0 Needs

1. Improvement of Sahra lands, including addition of irrigation capabilities.
2. Increase in the number, size, and quality of fruit nurseries.
3. Increase in the number of progeny gardens.
4. Better logistical support for the AES field staff in order to increase individual productivity and output.

5. Technical training for field staff.
6. A library which provides access to current and relevant journals.
7. Increased exposure to research development institutes.
8. Liberalization of salary and allowances for field staff workers.
9. Increase in the number of fruit demonstration farms and demonstration facilities exposing advanced technology for vegetable growing.

## 12.0 Summary and Recommendations

Kurram Agency's topography provides a great diversity of climate and ecology. This allows a variety of agricultural and horticultural potentials which need to be explored in order to optimize agriculture outputs throughout the Agency. The following measures are recommended:

### 12.1 Horticulture

1. Survey local strains to identify high yield cultivars for specific agro-ecological zones.
2. Evaluate local and exotic green plants for potential yield.
3. Identify nursery management techniques which will increase the production and quality of fruit trees.
4. Explore root stocks.
5. In order to meet the requirements of pedigree fruit plants, at least four more fruit nurseries of five acres each should be established in the main fruit growing areas.
6. The horticulture extension service should be strengthened to include horticulture development activities for specific ecological zones. It should employ trained individuals who must have access to transportation so that they can provide technical advice to farmers throughout the Agency. Field workers should be responsible for establishing model orchards, demonstration vegetable plots, raising pedigree fruit plants and foundation of vegetable seed and organizing practical training programs for the farmers.  
  
The horticulture extension service should also act as a coordinating agency for other development and input supply agencies.
7. A horticulture demonstration and research institute should be established in the main fruit and vegetable growing area. This institute should serve as the main training center for the field staff as well as for the farmers of all FATA agencies.

## 12.2 Agriculture

1. Based on the information presented, the following crop rotation scheme is recommended:

Wheat ----- Corn ----- Wheat  
 Wheat ----- Redbeans ----- Wheat  
 Wheat ----- Peanut ----- Corn ----- Wheat  
 Wheat ----- Soybean ----- Wheat

Orchard should be inter-cropped with pulses and vegetables.

2. Irrigation and water resources must be developed, and levelling and terracing are needed in order to allow cultivation on lands currently unused for lack of these facilities.
3. One progeny garden should be established in each of the three subdivisions of Kurram in order to provide a source of healthy and certified propagating material (budwood, scion, and cuttings).
4. An integrated approach to pest management should be adopted. It should include technical guidance and financial support to the farmers for plant protection.
5. Seeds, fertilizer, pesticides, and agricultural credit must be supplied to farmers in order to allow utilization of the proposed improvements in available technology.
6. Improvements in all factors ultimately affecting marketing must be implemented in order to realize greater economic yields. This includes: scheduling of planting; crop rotation; plant pruning and protection; picking; grading; packing; storing; and transporting.
7. Preservation of surplus fruits and vegetables for local consumption should be encouraged.

### 13.0 Cost Requirements of Specific Recommendations

#### 13.1 Establishment of Four Nursery Farms (5 Acres Each)

##### Expenditure for Five Year Period

1.	Lease of 20 acres of land. @ Rs. 48,000/yr.	Rs. 2,40,000
2.	Cost of fencing.	Rs. 3,20,000
3.	Land development & Layout.	Rs. 60,000
4.	Implements & Tools.	Rs. 50,000
5.	F.Y.M., Chemical Fertilizers and pesticides	Rs. 1,20,000
6.	Seed, seedlings & suckers	Rs. 6,00,000
7.	Variable labor.	Rs. 4,80,000
8.	Store, Chokidar hut.	Rs. 40,000
9.	Regular staff.	
	(i) Field Asstt = 4	
	(ii) Budders = 4	RS. 7,00,000
	(iii) Chokidar. = 4	
	(vi) Field worker. = 8	
	<b>Total</b>	<b>Rs. 26,10,000</b>

#### 13.2 Financial Aspect for providing mobility to the field staff of FATA Agriculture in Kurram Agency.

The following requires a total Rs.37,52,160 non-recurring costs and Rs.27,32,160 as recurring charges for five years.

Supply of one motorcycle to each of the eight Agriculture Officers and twenty-six Field Assistants of the Agriculture Extension Service, Kurram. Costs for the motorcycles will be deducted from each person's pay at a rate of Rs.200.00 per month for the Agriculture Officers and Rs.50.00 per month for the Field Assistants.

Agriculture Officers must travel at least 12 days/month and Field Assistant 20 days/month. Daily allowance and POL will be provided. Repair charges will be the responsibility of the staff. If any member of the field staff leaves the service himself or is terminated by the department within three years of the supply of transport, the entire amount of the motorcycle will be recovered from him in a lump sum.

Thus a total amount of Rs.64,84,320 needs to be provided. The detail of the expenditure worked out is as under:

##### A. Non-Recurring Expenditure: Purchase of Motorcycles.

Cost of 34 Motorcycles at Rs.30,000 = Rs.10,20,000

B. Provision of Daily Allowance to the Field Staff (Recurring Expenditure)

<u>Designation</u>	<u>Number</u>	<u>Rate per day (Rs.)</u>	<u>No. of days in month</u>	<u>Annual Cost (Rs.)</u>	<u>Total Expdtr. for 5 years (Rs.)</u>
Ag. Officers	8	90	12	103,680	518,400
Field Asstts.	26	60	20	374,400	1,872,000
Sub-Total (B):					2,390,400

C. Provision of P.O.L. Charges

<u>Designation</u>	<u>Number</u>	<u>Rate per day (Rs.)</u>	<u>No. of days in month</u>	<u>Annual Expdtr. (Rs.)</u>	<u>Total Expdtr. for 5 years (Rs.)</u>
Agri. Officers	8	2 Ltrs	12	18,432	92,160
Field Asstts.	26	1 Ltr	20	49,920	249,600
Sub-Total (C)					341,760
Total recurring expenditure for 5 years:					2,732,160
Total of non-recurring and recurring expenditures					Rs.: 3,752,160

As proposed above, the monthly recoveries will be made from the Agriculture Officers and Field Assistants. The income accrued may be deposited in a PLA account to be opened in a bank as revolving fund in the name of head of F A T A Agr. and to be used to purchase more motorcycles or to replace motorcycles as needed.

13.3 Financial Aspect for the layout of 20 No. Vegetable demonstration plot (2 kanal each) of Tomatoes & Potatoes in farmers' fields (for 5 years).

<u>Potato</u>	<u>Expenditure per year</u>	<u>Expenditure for 5 years</u>
Seeds	20,000	1,00,000
Fertilizer	22,000	1,10,000
Sowing, earthing up.	5,000	25,000
Pesticides	2,000	10,000
Misc charges.	1,000	5,000
Total:		Rs: 2,50,000

Tomato

Cost of seed	200	1,000
Cost of nursery	2,000	10,000
Fertilizer.	11,000	55,000
Pesticides	2,000	10,000
Sowing, transplantation	600	3,000
Staking sticks	3,000	15,000

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Total:		Rs.	94,000
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Grand Total(A+B)	=	Rs.	3,44,000
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#### 13.4 Financial Aspect of Full Plant Protection Coverage to Orchards in Kurram Agency.

The financial aspect of full coverage from all pests and diseases of economic importance in Kurram Agency is presented below:

- 1) One dormant spray will be given to all fruit plants for the control of scab, mildew, etc in apple; shot hole disease and gumosis in apricot, plum, and peaches; and split in disease of pomegranate.
- 2) One calyx spray and 3-4 post calyx sprays will be given to apples and pears to control codling-moth scale, aphids, scab, mildew etc.
- 3) Three sprays:
  - one at leaf stage before flowering;
  - a 2nd at fruit formation stage; and
  - the third at fruit yellowing stage

on apricot, peach and plum for the control of flat headed borer, fruit fly, all aphids and shot hole borer/shot hole disease.
- 4) Two sprays--one at calyx formation and another at fruit yellowing--for the control of fruit borer and splitting disease on pomegranate.

The total cost of the spraying/plant protection component is presented below:

(A)

(1)	Total expenditure for power sprayer.	Rs. 24000 x 15 =	3,60,000
(2)	Total expenditure for dust respirator.	Rs. 35 x 50 =	1,750
(3)	" " " Gum boot.	Rs. 150 x 50 =	7,500
(4)	" " " Goggles.	Rs. 60 x 50 =	3,000
(5)	" " " Rubber gloves	Rs. 25 x 50 =	1,250
(6)	" " " set of tools plus screw driver, wrench.	Rs. 110 x 15 =	1,650
(7)	Set of plastic Liquid measures.	Rs. 20 x 15 =	300
(8)	Total expenditure for buckets	Rs. 70 x 50 =	3,500
(9)	" " " empty drums.	Rs. 100 x 15 =	1,500

Total expenditure on durable goods. Rs. 380,450

(C)

(1)	Total expenditure for pesticides for five years	Rs. 650,460
(2)	Total expenditure on 24 laborers for five years (worked out for 200 days/yr. @ Rs. 30/day)	Rs. 720,000

(D) Recurring Expenditure

Five years recurring expenditure for pesticide	Rs. 6,50,460
Five years recurring expenditure on labor charges.	Rs. 7,20,000
Total recurring expenditure for five years.	Rs. 13,70,460
Total expenditure for complete plant protection coverage of fruit orchards in Kurram Agency.	Rs. 14,00,000
	Rs. 17,80,000

### 13.5 Spray Schedule for Apples and Pears

(Codling moth, scales, aphid, scab, powdery mildew)

<u>Spray</u>	<u>Pesticide</u>	<u>Dose/yr.</u>	<u>Price/yr.</u> <u>(Rs).</u>	<u>Pest/Disease</u>
Dormant	Trimiltox spray	1kg.	120	Downy mildew Scab
Calyx	Actellic spray	1ltr.	167	Codling moth, Scab/Aphid etc.
Post calyx	Karate or Dithion	250-300ml.  1-1.5kg.	167  105	" "
2nd spray	"	"	"	"
3rd spray	Karate Dithion	"	150 105	" "
4th spray	Actellic Nimrod	1ltr. 1-1.5kg.	167 65	" Powdery mildew
5th spray	Actellic Nimrod	1ltr. 1-1.5kg.	167 65	" "

Total Expenditure per acre for five sprays  
on Apple.

	=	Rs.	1,261
Total Expenditure for 300 acres of apples	=	Rs.	3,78,300
" " " per acre of pears	=	Rs.	1,029
" " " 100 acres of pears	=	Rs.	1,02,900

## Orakzai Agency

### 1.0 Introduction

Orakzai Agency is located southeast of Kurram Agency, south of Khyber Agency, and northwest of Kohat. Formerly called "Tirah Area", it was recently designated a Federally Administered Tribal Agency, and its administrative headquarters are in Hangu (subdivision of Kohat District)

### 2.0 Situational Analysis

Orakzai Agency is mountainous with large fertile valleys. It is an extremely backward area. Due to the extreme poverty and illiteracy of the farmers, there is little understanding of crop holdings, yields, or farm income.

Though primary and secondary schools exist throughout the Agency, they are underutilized. People seeking to improve their standard of living migrate to the settled districts where they obtain petty jobs.

### 3.0 Agriculture Status

The fertile valleys in Orakzai are conducive to agricultural development. Currently, the major grain crops are corn and coarse rice in the Kharif season and wheat in the Rabi season. Wheat cultivation is limited to the barani (rainfed) tracts.

Apples, potatoes, and red beans are grown in irrigated areas and have significant potential to become major cash crops for the area.

Olive trees grow wild on the mountain slopes throughout the Agency, and olive production represents a major potential in the area.

FATA/Agriculture has initiated olive tree grafting/budding in the area with limited resources; however, more serious involvement with additional inputs are needed to introduce olive production as a cash crop within the area.

#### 4.0 Problems

1. Cannabis represents the major agricultural problem in the area. It grows wildly and is also cultivated in some belts, since it brings enormous income to the farmers.

One acre of cannabis yields an average of Rs. 20,000, a much greater profit than any other crop grown in the area.

2. Irrigation facilities, agricultural extension services, agriculture incentives, and marketing facilities are extremely limited throughout the Agency.
3. Poor roads impede transport from production centers to major markets.
4. A high incidence of pests and diseases, and the poor orchard management systems decrease the potential yields of apples.
5. Frequent hailstorms damage and deform crops, both in the early stages and at the ripening stage.
6. Vast areas of land which are currently unused require agricultural development through the use of tractors and bulldozers.
7. The AES in Orakzai is limited to one EADA, and three field assistants, and one vehicle. Since two of the field assistants are assigned to the two fruit nurseries established in the Agency, only one is available for extension work.

#### 5.0 Recommendations

1. The land and water resources of the Agency should be developed to bring more area under cultivation.
2. Standard fruit nurseries should be established for the production and distribution of pedigree fruit plant.
3. Model orchards of 5-10 acres should be developed in different areas on the farmers' land.
4. Seed production of selected vegetables should be undertaken to meet local requirements and to sell in other areas.
5. A demonstration fruit and vegetable farm should be established for the practical training of the field staff and farmers.
6. High value crops like olives, pistachios, and saffron should be introduced.

7. A well equipped and adequately staffed horticulture extension service should be established to develop scientific production of fruits and vegetables.
8. Arrangements should be made for the timely supply of inputs including seeds, plants, fertilizers, and pesticides.
9. The marketing system should be improved to allow delivery of fresh produce to markets.
10. Communication networks should be improved to enhance economic development.
11. Credit for non-cannabis crop cultivation should be made available to farmers on acceptable terms.

## North Waziristan Agency.

### 1.0 Introduction

North Waziristan Agency (NWA) is adjacent to South Waziristan and south of Kurram Agency and Kohat District. Bannu is located to its east and Afghanistan to its west and northwest.

NWA has a total land area of 4,707 square kilometer (558,396 hectares), and includes three administrative units: Miran Shah sub-division, Mirali sub-division, and Razmak sub-division. Each sub-division is further divided into tehsils.

### 2.0 Situational Analysis

#### 2.1 Geography and Topography

The elevation of the Agency ranges from 3,000-6,000 feet. 12,048 hectares of the total 558,396 hectares are cultivated--the remainder represents forests and culturable wastes.

#### 2.2 Population

The 1980 population figure for North Waziristan Agency is 238,910, representing a population density of 508/sq. km.  
The male : female ratio is 107.3 : 100.

There are 17,036 farm families in NWA. Of these, only 36 farmers have land holdings of at least 150 acres.

The tenure system prevails in the Agency. Land use is classified as: by owners only, by owners with tenants, and by tenants only.

The two main tribes living in the Agency are the Wazir and Dawar tribes.

#### 2.3 Climate

The climate of North Waziristan Agency includes hot summers and cold winters. The average mean Maximum and Minimum temperatures are 23.78 degree Celsius and 9.84 degree Celsius respectively.

#### 2.4 Rainfall

Annual rainfall in the Agency ranges from 211mm. to 315mm.

## 2.5 Types of Soil

The banks of the Tochi River which flows through NWA contains rich alluvial soil, conducive to the cultivation of: corn, wheat, rice, and sugar cane.

Soil in the plain area consists of silty clay and sandy loam, and represents various concentrations as: clay loam, loam, sandy loam and gravel.

## 3.0 Agricultural Overview

12,048 hectares of land are cultivated in NWA. Of this, 10,000 hectares are irrigated, and the remaining 2,048 hectares are rainfed (See: Appendix 12).

The main water sources are the Tochi and Kaitu Rivers. Water from these rivers is diverted through private canals. Some government tubewells have also been installed in ravine and non-ravine areas. Springs and Karez are also available and account for a portion of the irrigation coverage.

### 3.1 Current Status of Horticultural Crop

The climate of North Waziristan Agency is conducive to the growing the following fruits: plums, peaches, apricots, apples, dates, loquats, walnuts, almonds and grapes.

Vegetables grown include: tomatoes, potatoes, onions, cucumbers, and cauliflower.

The estimated area under cultivation and production of fruits/vegetables reported during the years 1984-89 are shown in Appendices 13-18.

Those fruits/vegetables grown commercially in North Waziristan are: apples, apricots, plums, loquats, walnuts, dates, potatoes, and tomatoes.

### 3.2 Cropping Patterns/Crop Rotation

Major crops grown in North Waziristan Agency include: wheat, corn, rice, sugar cane, burseem, potatoes, tomatoes, and other Kharif and Rabi vegetables.

Sugarcane, tomatoes, and potatoes are the cash crops of the area.

The crop rotation schedule most often used in NWA is:

wheat	-	corn
wheat	-	tomato
potato	-	wheat
rice	-	wheat

#### 4.0 Tomatoes/Potatoes

Most tomatoes and potatoes are grown in Miran Shah and Razmak Sub-Division. They are grown as cash crops, but farmers require training in proper cultivation and crop management in order to maximize their profits.

#### 5.0 Fruit and Nut Production

##### 5.1 Apricots, Plums and Loquats

Apricots, plums, and loquats are grown primarily in Miran Shah Sub-Division. Very few regular groves exist in the area; instead, mixed (diffused) plantation is usually practiced, using only indigenous varieties. Trees are not properly spaced--the groves are often thickly planted causing overcrowding of branches. Cleaning, pruning, and pest control are all ignored, causing unnecessary fruit loss.

##### 5.2 Apples, Grapes, and Walnuts

Apples, grapes, and walnuts are grown in Razmak as well as Miran Shah sub-division in the form of scattered plantation. Local varieties are grown. No systematic or intensive programs for fruit development have been launched for fruit development in the Agency because neither the manpower nor proper planning exists.

The FATA Agriculture Department has established three fruit nursery farms at Miran Shah, Paikhel and Dosalli, however. These farms are producing quality fruit plants for distribution to the growers (See: Appendix 19).

During the field survey of Razmak area, it was noticed that Afghan refugees are growing "cannabis" in the area. They obtained the land either on lease or share crop basis. Forty acres of cannabis cultivation was observed, and the area under cannabis cultivation is increasing every year.

Special efforts must be made to replace this crop with fruit trees, potatoes, tomatoes, and pumpkins. Area farmers are ready to cooperate provided proper orchards are laid out for them. The FATA Agriculture Extension Agent has laid out 4 hectares of apple orchards, but this work must be expanded.

##### 5.3 Dates

Dates are grown primarily in the Mirali Sub-Division, covering an area of 50 hectares, with an annual production of 850 tons. Very few regular orchards were noticed in the area; rather trees are scattered throughout land holdings. The varieties are indigenous and of poor quality.

In order to encourage date cultivation, the FATA Agriculture Department has implemented a scheme which distributes 600 high quality date suckers every year among the growers. Twelve acres of land have been planted with the

improved varieties in Haider Khel area, but this scheme needs encouragement for its expansion.

The FATA Agriculture Department has also established a progeny garden for dates at Haider Khel, including the following varieties/quantities: Dahki/135; Halini/32; Mobin/7; Sarkari/4; Zaidi/79; Sandor/22; and Aseel/4. This garden is now old, though, and produces a limited number of suckers.

## 6.0 Activities of Public and Private Sector

The following public/private sector activities were observed in the area:

- Agricultural Engineering:** One unit supervisor is posted to monitor land levelling and land reclamation in the Agency.
- Private Enterprise:** The National Fertilizer Agency operates in the area.
- Agricultural Extension:** One EADA is assisted by three Agriculture Officers and 18 Field Assistants. The duties of the Agriculture Extension field staff are:
1. Raising/distributing fruit plants to the growers.
  2. Transporting seed/fertilizer to farmers.
  3. Plant protection services i.e. supply of pesticides and equipment on full payment.
  4. Lay out of Demonstration plots on crops like wheat, corn, paddy.

No cooperatives, credit facilities, research stations, or agrochemical businesses exist in the Agency.

## 7.0 Problem Identification

### 7.1 Problems of the Fruit/Vegetable Growers.

1. Codling moth, scale infestation on apples.
2. Flat headed borer on plums, peaches and apricots.
3. Blight and leaf curl.
4. Aphids on tomatoes/potatoes.
5. Fruit flies on loquats.

6. High cost of pesticides which is beyond the purchasing power of the poor people, because the pesticide subsidy has been completely withdrawn by the GOP. This has resulted in a tremendous increase in the prices of pesticides for the poor farmers of the Agency.
7. Non-availability of improved varieties of plums, peaches, apples, apricots, potatoes, and tomatoes.
8. High cost of fertilizers, precluding their use.
9. Lack of technical expertise.

#### 7.2 Problems of FATA/Agriculture

1. Inadequate field staff.
2. Lack of practical training facilities for field staff and for farmers.
3. Restricted field work due to a lack of funds.
4. Lack of vehicles for field work.
5. Low staff morale among FATA Agriculture field staff, caused by low salaries and poor working conditions.

#### 7.3 Technical Problems

1. Almost all varieties of fruits and vegetables grown are indigenous, and of inferior quality.
2. Fruit orchards are laid out in irregular patterns and are thickly planted, without proper aeration and sunlight.
3. Pruning of fruit trees is not practiced, resulting in overlapping of tree branches.
4. Poor maintenance of fruit orchards. No fertilizer is applied, and irrigation consists primarily of flooding. Weeding is not practiced, leading to a major pest problem. The growers are not acquainted with improved methods of fruit gardening and vegetable growing.
5. Tomato and potato fields are infested with aphids/blight. Most small growers are not able to apply pesticides or fertilizers because of the high cost.

## 8.0 Recommendations

1. Improve date production to include more area under cultivation and better seedling varieties. This should include laying out a regular date orchard (1-2 acre) of the improved varieties on a total acreage of 40 each year.

The costs of this initiative are presented below:

Field Assistant	2x1200x12	=	Rs. 28,800
Field Workers	4x1000x12	=	Rs. 48,000
Cost of plants	.....	=	Rs. 80,000
Fertilizer	.....	=	Rs. 2,000
Land preparation	.....	=	Rs. 4,000
Plant Protection	.....	=	Rs. 1,000
Casual and other unforeseen charges		=	Rs. 5,000
			-----
Cost Per Year	.....	=	Rs.168,800
Total Cost for 3-Years	= 168,800x3	=	Rs.506,400

2. Establish large scale demonstration plots for apples, pears, apricots, walnuts, vegetables, potatoes, and cucumbers in the Ramzak area in order to encourage their production and to discourage cannabis cultivation.

35 model fruit farms (1-2 acre each) on farmer fields are recommended for each sub-division of North Waziristan. This will acquaint the grower with improved technology of fruit cultivation i.e. spacing, irrigation, fertilization and protection from pests/diseases. Model farms shall be located as follows:

Miran Shah Sub-Division	=	10
Mir Ali Sub-Division	=	5
Razmak Sub-Division	=	20

Costs for this activity are presented below:

Field Assistant - 2x1200x12	Rs.	28,800
Field Workers - 4x1000x12	Rs.	48,000
Cost of Plants - ...	Rs.	25,000
Land Preparation - ...	Rs.	10,000
Fertilizer/F.Y.M - ...	Rs.	45,000
P. Protection charges-	Rs.	8,000
Fencing of farms for Razmak area @ 8000 per acre	Rs.	160,000
C/Labors and other unforeseen charges	Rs.	30,000
		-----
Cost Per Year:	Rs.	354,800
Total Cost for 3-Years: 354800x3	=Rs.	1064,400

3. Vegetable demonstration plots should be established on farmers' fields so that farmers can see the impact of improved methods of potato, tomato and pumpkin cultivation. 30 vegetable plots (10 1-2 kanal plots each of tomato, potato and pumpkins) are proposed. The proposed budget is presented below:

Staff required		
Field Assistants - 2x1200x12	= Rs.	28,800
Field Workers - 4x1000x12	= Rs.	48,000
Cost of seed - ...	= Rs.	8,000
Land & seed bed preparation	= Rs.	8,000
Fertilizer/F.Y.M. - ...	= Rs.	15,000
P. Protection - ...	= Rs.	4,000
Miscellaneous - ...	= Rs.	20,000
	-----	
Cost Per Year ..	= Rs.	131,800
Total cost for 3-years = 131800x3	= Rs.	395,400

4. Provide training to field staff and interested farmers at least three times per year--before the Rabi season, before the Kharif season, and before the plantation period for fruits. The training should include:

Land and seed bed preparation  
 Plant population  
 Sowing methods  
 Irrigation  
 Fertilization  
 Pest/disease control  
 Layout of fruit orchards  
 Plant spacing  
 Pruning, picking and packing  
 Marketing

Estimated costs for this training are presented below:

Service charges for resource person	<u>Rs.</u>	<u>Rs.</u>
Rs.300 per lecture. 300x10x3 =		9,000

Entertainment/Refreshment charges		6,000
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Rent of Materials etc.		10,000
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Cost Per Year =	-----	25,000
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Total cost for 3-Years = 25000x3 - Rs. 75,000

5. Motorcycles should be provided to all field staff to allow them to perform their assigned tasks. It will involve the following expenditures:

No. of Field Assistants = 10		
Motorcycle=	10x35000	... Rs. 350,000
P.O.L.	= 10x 5000	... Rs. 50,000
		-----
Total Cost:		... Rs. 400,000

5. In order increase staff morale, the following payment schedule of honoraria is recommended:

EADA (1)	= 2000x1x12	= Rs. 24,000
Agr. Officer(2)	= 1200x2x12	= Rs. 28,800
Field Assist.(10)	= 600x10x12	= Rs. 72,000

Cost for one year = Rs. 1,24,800

Total Cost for 3 years = 1,24,800x3 = Rs. 3,74,400

## South Waziristan Agency

### 1.0 Introduction

South Waziristan Agency (SWA) lies adjacent to Baluchistan's northern boundary; to its east is D.I. Khan, and North Waziristan shares its northern boundary. SWA extends over 6620 square kilometers, and includes three administrative units--Wana, Ladda, and Sarwaki Subdivisions, which are further divided into tehsils.

### 2.0 Situational Analysis

#### 2.1 Geography and Topography

The elevation of the agency varies from 1000-2000 m. The total geographical area is 984,824 hectares, including 11,800 hectares of cultivated land. The remaining 973,024 hectares is culturable waste and forests.

#### 2.2 Population

1980 Census data reports a population of 309,354 in SWA. This includes 19,220 farm families, living on farms ranging from 1.0-7.5 acres. 16,385 of these families farm their land alone, while 2,825 families farm their land with the help of tenants.

#### 2.3 Climate

The mean maximum and minimum temperatures in the Agency are 25.4 degrees Celsius and 10.5 degrees Celsius, respectively. The climate includes cold winters and temperate summers which fulfills the chilling requirements for all fruit grown in the area.

#### 2.4 Rainfall

The annual rainfall of the Agency ranges from 239-313 mm.

#### 2.5 Types of Soil

Loamy and humus rich alluvial soil predominates throughout the Agency. The pH ranges from light alkaline to calcareous, as indicated below:

<u>Area</u>	<u>Type of Soil</u>
Wana Plain . . . . .	Rich loam, sandy loam, silty plain
Spin Plain . . . . .	Clay loam and loam
Birmal Plain . . . . .	Loam, sandy loam
Hilly areas of . . . . .	Clay loam and loam
Sarwaki and Ladda Subdivisions	

Nitrogenous fertilizers are required throughout the Agency, due to nitrogen deficiencies in the soil.

All Kharif and Rabi vegetables can be grown in all the three plains, but potatoes and tomatoes are preferred because of their higher economic return. Major crops grown throughout the Agency are presented below:

Table 5  
Major Crops Grown By District in SWA

<u>Crop Grown</u>	<u>Wana Plain</u>	<u>Spin Plain</u>	<u>Birmal Plain</u>	<u>Hilly Areas</u>
Apples	x	x	x	x
Apricots	x	x	x	x
Citrus		x		
Guava	x	x	x	x
Grapes	x		x	
Melons	x	x	x	x
Peaches	x	x	x	
Pears	x	x	x	
Plums		x		
Almonds	x		x	
Peanuts	x	x	x	x
Pistachios	x		x	
Walnuts	x		x	
Corn	x	x	x	x
Fodder	x	x	x	x
Rape Seed	x	x	x	x
Rice	x	x	x	x
Potato	x	x	x	x
Tomato	x	x	x	x
Wheat	x	x	x	x

## 2.6 Agricultural Overview

South Waziristan Agency includes 984,824 hectares of land, 11,800 of which are cultivated. The remaining 973,024 hectares are forests and culturable wastes. Agricultural efforts include planting in both rainfed (barani) and irrigated areas.

### 2.6.1 Cropping Patterns in Rainfed (Barani) Areas of SWA

In the rainfed Areas of South Waziristan Agency, one crop is usually grown each year. When sufficient rain falls, two crops, e.g., both corn and wheat, can be grown in one year.

The usual cropping pattern practiced in the rainfed areas includes wheat, corn, and fodder in the following rotation schedule:

Wheat ---	Corn
Corn ---	Wheat
Wheat ---	Fodder

### 2.6.2 Cropping Patterns in Irrigated Areas

Crops grown in irrigated areas of SWA include: wheat, corn, rice, potatoes, tomatoes, Kharif/Rabi vegetables, and fodder.

The crop rotation schedule followed in the irrigated areas is presented below:

Wheat	—	Corn
Corn	—	Wheat
Potato	—	Wheat
Tomato	—	Wheat
Corn	—	Burseem
Wheat	—	Rice

### 2.6.3 Agricultural Extension Service

Agriculture operations and initiatives within the Agency are the responsibility of the Extra Assistant Director for Agriculture/Wana (EADA/Wana). At the present time, FATA has assigned one Agriculture Officer and 10 Field Assistants to provide extension services and plant protection. Two field assistants work in Wana subdivision, and the remaining eight are assigned to the Ladda/Sarwaki Subdivisions, though they are almost entirely inaccessible.

Activities include the establishment of five nursery farms with a distribution target of 50,000 plants (See: Appendix 20).

## 3.0 Fruit and Nut Production

The climate of South Waziristan is conducive to the growing of the following fruits and nuts: apples, pears, peaches, apricots, walnuts, almonds, pistachios, pomegranates, garma melons, and grapes (See: Appendix 21).

Commercial production, however, is limited to apples, apricots, and peaches.

Pests are a problem in the fruit orchards. Trees are usually attacked by gummosis (a trunk borer) and green and black aphids, decreasing the fruit yield. In cases of severe infestation the entire tree appears burnt and soon dies.

Fertilizer is not applied to fruit trees due to economic constraints. This affects both the quality and quantity of yield.

Like vegetables, 90% of fruits are marketed outside the area of production, while approximately 10% are consumed locally.

### 3.1 Apples

Agriculture Department data indicates that 50,000 metric tons of apples are produced annually in South Waziristan, covering 3,000 hectares of land. (See: Appendix 21).

Apples indigenous to South Waziristan are of unknown origin. They are characterized by small size, early maturation, and inferior quality. They are grown early in the season on a large scale in order to take advantage of early market prices and to avoid attack by codling moths and scales.

Groves of improved cultivars include Red Delicious, Golden Delicious, and Amri. These improved varieties have not been cultivated as much during the past few years due to a severe infestation of scale and codling moths, both of which occurred several years ago.

### 3.2 Peaches

Approximately 600 metric tons of peaches are produced annually, grown on 60 hectares of land (See: Appendix 21).

In addition to local varieties, Alberta varieties of peaches are grown in the area, usually in the form of diffused plantations. The potential for increased production is great, especially for such varieties as Charmaghzi and Shakarpara.

The presence of flat headed bores found on some peach trees was noted and should be considered a major impediment to increased peach production in the area.

### 3.3 Apricots

Approximately 3,000 metric tons of apricots are produced annually in South Waziristan, covering 180 hectares of land.

### 3.4 Plums

No groves of plums were noticed during the survey of South Waziristan/North Waziristan. Instead, plum trees were found in the apple groves. All plums are consumed locally, so marketing is not an issue.

### 3.5 Other Fruits

Melons grown in the area were noted to be of appreciable size, but of impure variety. It was also observed that seedless grapes and pistachio trees

thrive in the area, but could be replaced by strains better suited for the locality.

### 3.6 Nuts

Almonds, chalgoza (pine nuts), pistachios, and walnuts are grown in the birmal area, but on a small scale, since the relative return is low compared with that of fruit.

There is great potential for nut tree plantation throughout the Agency, but high quality trees must be introduced.

## 4.0 Cereal and Vegetable Production

A wide variety of vegetables and cereals are grown throughout South Waziristan Agency, as shown in Table 6 and in Appendices 22-25.

Average yields of vegetable and cereal crops based on cultivation in barani (rainfed) vs. irrigated areas is presented in Table 7. As with fruits, 90% of all vegetables are market outside the area, while 10% are consumed locally.

### 4.1 Tomatoes and Potatoes

Tomatoes and potatoes are the major cash crops in SWA. They are grown under irrigated conditions in the lower areas, and potatoes are also grown under rainfed (barani) conditions in the hilly areas.

Aphids and blight are common problems for both crops.

Potato/tomato cultivation practiced in the Agency needs improvement. Potatoes are sown on flat land with no tilling of the soil. Tomato seedlings are thickly planted on both sides of the ridges, causing low yields.

Table 6  
Vegetable/Cereal Production in South Waziristan

<u>Crop</u>	<u>Month of Sowing</u>	<u>Month of Harvesting</u>
Corn**	June/July	Sept/Oct
Rice	"	"
Potatoes*	March/April	Sept/Oct
Tomatoes*	"	"
Peanut (Barani)	July	Nov/Dec
(Irrigated)	April	Sept/Oct
Turnips**	March/July	Aug/Oct
Radishes	"	"
Carrots	"	"
Spinach	"	"
Cauliflower*	Aug/Oct	Oct/Feb
Cabbage	"	"
Peas	May/June	Sept/Oct
Garlic*	Oct	April/May
Wheat* & **	Oct/Nov	June/July
Barley	"	June
Rapeseed	"	March/Apri
Gourd	March/April	June/Augus
Bitter Gourd	"	"
Pumpkin	"	"
Squash	"	"
Okra	"	Sept/Oct
Egg plant*	"	June/Nov
Chili*	May/June	Sept/Oct
Onion*		

\* 1 year crop rotation schedule

\*\* 2 year rotation schedule

Table 7  
Average Yields/Acre) of Vegetables/Cereals in SWA

<u>Crop</u>	<u>Irrigated Areas</u> <u>Maunds*/Acre</u>	<u>Barani Areas</u> <u>Maunds/Acre</u>
Wheat	12-16	7-10
Barley	12-16	8-10
Corn	15-20	
Sarson	5-10	
Peanut	10-15	
Sugarcane	300-400	

#### Vegetables

Tomatoes	200-250
Potato	150-160
Garlic	80-100
Chilies	80 (fresh) 20 (dried)
Onions	200 (bulb)
Cauliflower	150-200
Turnips	200-250
Carrots	150-200
Radish	150-200
Gourd/Pumpkin	125-200
Bitter gourd	100-120
Cucumber	100-150
Water Melon	150-175
Egg plant	125-150

\* 1 maund = 40 Kg.

#### 5.0 Crop Pattern and Crop Rotation

For the major crops produced in the area, the following crop rotation schedule is used most often:

wheat--corn  
corn--wheat  
wheat--tomatoes  
potatoes--wheat  
corn--fodder

#### 6.0 Irrigation

Canals, tubewells, wells, karez, and tanks provide water for irrigation throughout the Agency (See: Appendix 26). Expansion of electrification projects has allowed farmers to increase the total land area served by irrigation through tubewell installation.

### 6.1 Dabkot Karez Irrigation Scheme

Located in Wana subdivision, this irrigation scheme has a flow discharge of 3 cu. sec. and serves 56 acres.

The loam/clay loam soil allows the following crops to be grown:

Cereals/Legumes: corn, wheat, peanuts

Vegetables: tomatoes, potatoes, summer/winter vegetables

Fruits/Nuts: apples, pears, peaches, apricot, garma melon, walnuts, and pistachio.

The crop rotations recommended in the command area of this irrigation project are:-

Potato	---	Wheat
Tomato	---	Wheat
Wheat	---	Peanuts
Corn	---	Wheat
Wheat	---	Rice
Corn	---	Burseem

### 6.2 Lower Tatai Surface Irrigation Scheme

This irrigation scheme covers 404 acres with a flow discharge of 10 cu. sec. It accommodates the needs of two complete villages benefitting 500 people through three water channels.

The area is ideal for fruit growing and a limited number of apple, apricot and peach groves have been planted.

The loam/clay loam soil facilitates the growth of all fruits and vegetables.

### 7.0 Consumption and Marketing of Fruits and Vegetables

Approximately 10% of all fruits and vegetables produced in South Waziristan are consumed locally, allowing the remaining 90% to be marketed for sale in other areas. Produce from South Waziristan is generally marketed in the following ways:

#### 7.1 Potatoes and Tomatoes

Potatoes are usually packed in gunny bags weighing 90 kg. while tomatoes are packed in 10 kg. wooden crates. Yields are generally disposed of through open auctions in the local markets, and are then transported by wholesalers to those areas commanding the highest prices.

## 7.2 Fruits

Small orchard owners bring their produce in crates or gunny bags to the Wana market where it is sold by open auction to fruit dealers who market the fruits throughout the area. Large orchard owners may either harvest and market their produce themselves or sell their entire orchard to fruit dealers from Peshawar, Rawalpindi and Lahore who then become responsible for all aspects of fruit collection and marketing. Most harvesting and marketing of apples in South Waziristan is actually being handled by wholesalers.

Virtually all peaches and apricots produced in the Agency are auctioned locally and then sold in other parts of the country.

## 8.0 Problems

Based on discussions with FATA Agriculture staff, data gathered from available statistics, and through observations made during the field survey the following problems were identified:

### 8.1 Problems of the Fruit and Vegetable Growers

1. Coddling moth, scale, and scab infestation on apples; flat headed (peach shoot) borer on peaches.
2. Blight and leaf curling (caused by the White fly) in tomato fields, causing plants to appear burnt.
3. High cost of pesticides and fertilizer, which is beyond the purchasing power of most of the fruit growers. The Government has withdrawn subsidies, causing prices to increase.
4. Non-availability of reliable fruit plants.
5. Poor communication system, including katcha (mud) roads, delaying transport of ripened produce.

### 8.2 Problems of FATA/Agriculture

1. Lack of:
  - a. Field staff.
  - b. Staff mobility staff due to insufficient funds and vehicles.
  - c. Laborers @ Rs. 15/day wage allowed by the Government.
  - d. Practical training facilities available to the growers and extension field staff (In-service training provided to the field assistants tends to be theoretical rather than practical.)
2. Inability of FATA/Agriculture to establish fruit/vegetable demonstration plots on farmers' fields due to inadequate field staff.

### 8.3 Other Technical Problems

1. Inferior varieties of apples and tomatoes produced in the area, producing yields of small size and poor quality.
2. Lack of progeny gardens which would allow FATA to insert quality buds for propagation.
3. Common practice of private acquisition of nursery plants from unregistered sources rather than through officials channels which would allow for better quality control.
4. Poor organization and maintenance of apple groves, as evidenced by irregular, thickly planted groves with overlapping branches, and a lack of pruning/trimming, even of diseased branches.
5. Poor organization and maintenance of potato and tomato fields, as noticed by excessively thick planting.
6. Failure to remove weeds from grounds beneath fruit groves, and to keep groves free of all wild vegetation, causing vegetation to flourish as an area for pests to hibernate during the winter months.
7. Common practice of flood irrigation rather than the basin system of irrigation which is more appropriate for fruit trees.
8. Inadequate applications of fertilizer due to high cost.
9. Failure by the fruit growers to thin the fruits from the trees.
10. Inappropriate fruit picking, i.e., breaking branches, dropping fruit, causing bruising and overall decrease in marketable yield.
11. Late harvesting of produce, so that fruits and vegetables are overripe upon reaching markets.
12. Use of gunny bags and/or crates with inadequate packing materials for storage and transport of produce, causing bruising. "Topping", i.e., placing large, healthy fruits on top of a basket holding small bruised fruits, discrediting the owner/dealer.
13. Lack of understanding by the majority of fruit growers regarding proper organization/maintenance/harvesting of fruit.

## 9.0 Recommendations

Based on the problems identified through direct observation and discussion with relevant individuals, and through examination of relevant data, the following suggestions are offered as a possible means of improving agricultural services within South Waziristan:

1. Restore aerial spray operations eliminated by the GOP to destroy disease-causing pests affecting the fruit crop in the area.

Aerial spraying was discontinued in 1985, and was replaced by ground spray to be carried out by the farmers. Most farmers could not afford the pesticides, however, even with a 50% subsidy. The result has been inadequate spraying with a noticeable increase in disease and pest ridden fruit.

2. Distribute hand sprayers/pesticides to farmers whose orchards are not accessible to aerial spraying.
3. Establish a 20 Acre Progeny Garden/Training & Demonstration Center.

This would provide improved varieties of the various fruit strains to the local farmers, leading to a prolonged fruit season with an overall increase in yield of a higher quality fruit. This Center would also serve as the training site for all Extension field staff, as well as for local farmers. The proposed layout would include:

Progeny Garden---5 acres  
Fruit Nursery----10 acres  
Vegetable Nursery--3 acres

4. Establish model fruit orchards on farmers' fields in each Tehsil of Wana subdivision in order to acquaint the growers with improved technology of fruit cultivation (spacing, irrigation, fertilization, etc.)
5. Establish demonstration vegetable plots in order to provide examples of improved methods of tomato cultivation and harvesting.

Survey findings indicate that demonstrate plots have a great impact, provided the plots are located in highly visible locations, i.e., roadsides. Demonstrating that "seeing is believing", people are more likely to adopt new methods when the value was obvious.

6. Strengthen the FATA/Agriculture field staff so they can work in the Progeny Garden and Demonstration Centers well as help establish demonstration plots on private farms. This would provide extension services to more remote areas of the Agency, where they would be accessible to farmers.

7. Provide travel allowances for FATA/Agriculture field staff so that they may travel more widely within the Agency in order to educate and train the rural farmers. [Current lack of TA funds has limited the field visits of extension workers to a 10-mile radius of the headquarters.]
8. Distribute free fertilizer to small orchard owners having an area of less than 1.1 acre.
9. Encourage farmers to do more deep (mechanical) plowing (10-12") to facilitate root penetration of desired crops and to eliminate unwanted weeds.
10. Encourage farmers to grow all early, mid-, and late varieties of vegetables in order to have marketable produce year-round.
11. Increase the production of peanuts in the following areas: Dabkot, Azam Warsak, Sholam, and Bermal where the loam/sandy loam soil is conducive to the production of this crop.
12. Increase the production of rapeseed and garma melon in loam/clay loam soil areas (Spin plain and Hilly areas of Sarwaki and Ladda Subdivisions).
13. Increase potato production in high elevation rainfed areas, e.g. Ladda, Baddar, Kanigurram, Ginimela, and Shakki.
14. Increase apple, pear, almond, pistachio, and walnut production in high elevation rainfed areas.
15. The suggested crop rotation schedule for the rainfed areas is:
  - corn--wheat
  - peanut--wheat
  - corn--rapeseed
  - potato--wheat
16. Encourage intercropping of vegetables and cash crops among fruit groves, stressing the need to provide adequate space between the rows of fruit trees.

## 10.0 Cost Requirements of Specific Suggestions

### 10.1 Aerial Spray Operation

<u>Year</u>	<u>Coverage</u>	<u>Area Sprayed</u>	<u>Cost of Pesticide</u>
1982-83	2	1200 hac	Rs. 1,45,000
1983-84	2	1688 hac	Rs.30,00,00
1984-85	.....	Dropped	.....

Since the area under fruit orchards is now almost double than that of 1983-84, the cost involved will be roughly Rs.16,00000 per year including 20% inflation in prices from 1983-84 rates.

For 3 years: 6,00000 x 3 = Rs.18,00,000

### 0.2 Establishment of 20 Acres Progeny Garden in Training and Demonstration Center

#### Field Staff Required

i)	Field Asstt.	- 2 x 1200 x 12	= Rs. 28,800
	Budders	- 4 x 1100 x 12	= Rs. 52,800
	Field Workers	- 10 x 1000 x 12	= Rs.1,20,000

Total: = Rs.2,01,720

ii)	Cost of Seed/Stones/Plants	= Rs. 93,000
	Fertilizer/F.Y.M	= Rs. 38,000
	Plant protection	= Rs. 10,000
	Land preparation	= Rs. 50,000
	Tools/Implements	= Rs. 30,000
	Misc./Casual Laborers	= Rs. 60,000

Total: = Rs.2,81,000

iii)	Land lease	= Rs.1,12,000
	Service charges for Resource Person at Rs.300/-P/Lec.	= Rs. 9,000
	Entertainment charges	= Rs. 10,000
	Materials rent	= Rs. 10,000

Total: = Rs. 29,000

Total cost per year = Rs. 6,23,720

Total cost for 3 years = Rs.18,71,160

10.3 Layout of 15 Model Fruit Farm (one acre each)  
on Farmer's Fields

Land preparation	=	Rs. 10,000
Cost of Plants	=	Rs. 12,000
Fertilizer/F.Y.M.	=	Rs. 20,000
Plant Protection	=	Rs. 5,000
Tools/Casual Laborers	=	Rs. 20,000
		-----
Cost Per Year	=	Rs. 67,000
Cost for 3 years	=	Rs.67,000 x 3 = 201,000

10.4 Layout of 16 Demonstration plots (1 Kanal each of Potatoes and  
Tomatoes on Farmers' fields.

Land preparation	=	Rs. 5,000
Seed	=	Rs. 5,000
Fertilizer/F.Y.M.	=	Rs. 8,000
Plant Protection	=	Rs. 2,000
Casual Lab and other miscellaneous	=	Rs.10,000
		-----
Total cost per year	=	Rs.30,000
Total cost for 3 years	=	Rs.30,000 x 3 = Rs.90,000

10.5 Provision of Incentive to Field Staff

Field Assistant	10	600x10x12=	Rs. 72,000
Agr. Officer	2	1200x2x12 =	Rs. 28,800
E.A.D.A.	1	2000x1x12 =	Rs. 24,000
			-----
		Cost Per Year	= Rs.124,800
Cost for 3 Years	=	124,800 x 3	= Rs.374,400
			=====

10.6 Provision of transport to field staff

Motor Cycles	=	10 x 35000	=	Rs.350,000
P.O.L.	=	10 x 5000	=	Rs. 50,000
				-----
		Cost Per Year	=	Rs.400,000
Cost for 3 Years	=		=	Rs.500,000
				=====

**APPENDICES**

List of Acronyms

ADA	Agriculture Development Authority.
A.D.B.P.	Agricultural Development Bank of Pakistan.
AGRI.	Agriculture.
A.H.O.	Assistant Horticulture Officer.
A.O.	Agriculture Officer.
APPO.	Assistant Plant Protection Officer.
Apr.	April.
A.S.	Amomonium Sulphate
Asstt.	Assistant.
A.T.I.	Agriculture Training Institute
Aug.	August.
CDA.	Capital Development Authority.
D.A.	Director of Agriculture.
D.A.	Daily Allowance.
D.A.P.	Diamonium Phosphate.
DDA.	Deputy Director Agriculture.
Dec.	December.
Deptt.	Department.
Dev.	Development.
D.G.	Director General.
E.A.D.A.	<del>Extra</del> Assistant Director of Agriculture.
etc.	Etcetera.
F.A.	Field Assistant.
FATA.	Federally Administrated Tribal Area.
FATA.D.C.	Federally Administrated Tribal Area Development Corporation.
Feb.	February
FR.	Frontier Region.
FT.	Feet.
F.V.D.B.	Fruit and Vegetable Development Board.
F.Y.M.	Farm Yard Manure.
govt.	Government.
H.a.	Hectare.
H.Q.	Head Quarter.
Jan.	January.
Kg.or Kilo	Kilogram.
K.M.	Kilometer.
M.	Metric.
Max.	Maximum.
M.D.	Managing Director.
M.Ds	Maunds (A weight for 37.5 kilogram).
min.	Minimum.
ml.	Milli Litre.
mm.	Milli Meter.
NLC.	National Logistic cell.
No.	Number.
Nov.	November.
N.W.F.P.	North West Frontier Province.
Oct.	October.
P.A.	Political Agent.
P & D.	Planing and Development.

P.A.R.D. Pakistan Academy for Rural Development.  
Prof. Professor.  
P.P. Plant Protection.  
P.P.O. Plant Protection Officer.  
Sept. September.  
S.P. Super Phosphate.  
T.A. Travelling Allowance.  
Temp. Temperature

**Planting/Flowering/Harvesting Schedule for Fruits Grown By  
Subdistrict in North and South Waziristan Agencies**

<u>Name of Fruit</u>	<u>Where Grown</u>	<u>Plantation Months</u>	<u>Flowering Months</u>	<u>Harvesting Months</u>
Apple	Wana, Birmal, Tinai, Tatai, Shakki, Sholam, Azam Warsak, Shin Warsak, Ladda and Sarwaki	Jan. up to 15th of Feb.	Feb/March	Aug/Sept
Pear	"	"	"	"
Apricot	Wana, Ladda and Sarwaki Sub-Division	Jan/Feb	"	June/July
Peaches	"	"	"	"
Plums	"	"	"	"
Grapes	Wana Sub-Division	"	Feb/March	"
Walnuts	"	Feb/March	"	Sep/Oct
Loquat	Spin Plain, S/W, MiranShah Sub-Division, N.W. Agency	Feb/March Aug/Sept	Nov/Dec	April/May
Dates	Mirali Teh. N.W. Agency	"	Feb/March	July/Aug
Guava	Spin plain area, S.W.A	Feb/Aug/Sept	Feb/March/ Aug/Sept	July/Aug/ Dec/Jan

Recommended Schedule of Pesticide Use for Specific Crops

<u>Crop</u>	<u>Name of pests recommended</u>	<u>Name of pesticide P/Acre</u>	<u>Doses</u>	<u>Time of spray</u>
Wheat	Grasshopper	B.H.C.10% dust	7-10kg.	as and when noticed.
	Aphids/jassids	Thiodon 25%ec	600-800ml	
Corn	Cutworms	Sundaphos 50%ec	300-450ml	15-20 days after sowing
	Borer	Dasudin granules	5kg.	as and when noticed.
	Aphids	Thiodon 25%ec	600-800ml	
Rice	Leaf hopper Bugs Borer	Sundaphos 50%ec	450-600ml	20 days after transplansting.
Sugar	Pyrilla	Methyle Parathion	16-24oz	15th April to 15th Aug.
	White flies	50%ec		
	Mites	Norocide 40%	216ml	When the crop is 1 foot high. again after three weeks.
	Top borer Stem borer	Ekalux	9kg 11kg	
Apricot	Flat headed borer	Thiodon 35%ec	216ml	1st spray in 1st week of Feb. 2nd spray in 3rd week of April. 3rd spray in 2nd week of May. 4th spray in 1st week of June.
	Aphids	Supracide 40ec	108ml	1st spray in 1st week of Feb. 2nd spray after fruit set. 3rd spray in 2nd week of April. 4th spray in 1st week of May.
	Fruit fly	Dipterex 80%sp	216 gm	1st spray 20 days after fruit set. 3 sprays after, @ intervals of 15 days.
	Mites Scales	Norocide 40%ec Supracide 40%ec	216ml. 108ml.	1st spray before flower formation. 3 spray after fruit set at 15 days interval.
Apple	Codling moth	Zolon DT. or	216ml.	1st spray before flowering & then 3 sprays
	San Jose scale	Supracide 40%	162ml	after fruit set at 15 days interval.
		Dimocron or Meta systox	54ml. 216ml.	1st spray before flowering, 2 sprays after fruit seting at 20 days intervals.
	Trunk borer or	Gusathion	216ml.	fruit setting at 20 days intervals. 1st spray in last week of May
		Thiodon	& 3 spray after 20days interval. 216ml.	"
Hairy cater-		Follidol H 50%	108ml.	As & when observed.

	pillar			
	Aphids	Metasystox 25%ec	216ml.	1st spray after calyx formation & 2 sprays after fruit setting.
Apple	Fruit fly	Dipterex 80%sp	216gm	1st week of June & then two spary after Cont'd) 15 days interval.
	Mites	Moracide 40%ec	216ml.	1st spray last week of May, 2 spray at 15 days intervals.
Pear	Twig borer	Thiodon 35%	216ml.	1st spray in 3rd week of April. 2nd spray in 2nd week of May. 3rd spray in 1st week of July.
	Mites	Kelthan 42%ec or Gusathion 20%ec	162ml. 216ml	
	Trunk borer	Bedrin 24%ec or Thiodon 25%ec	54ml 216ml	1st spray last week of April. 3 sprays after 15 days interval.
	Pear Psylla	Dimecron 100%ec or Metasystox 250%ec	54ml 216ml	1st spray in last week of March. 2 or 3 sprays at 15 days interval.
	Aphids	Anthio 25%ec or Dimocron 100%ec	216ml 54ml	
	Scale	Gusathion 20%ec or Supracide 40%ec	216ml 108ml	
Dates	Scale	Gusathion 20%ec or Supracide 40%ec	216ml 162ml	
	Fruit-fly	Dipterex 80%sp	216gm	1st spray in July & then 3 sprays at 15 days or Carbicron 100%ec 54ml interval.
	Borer	Detia Tablets Larson 40%ec	1-2 tab 81ml	Plugging the hole in May. Spray in June.
Loquat	Fruit fly	Dipterex 80%sp	216 gm	1st spray in 1st week of March & 3 sprays at 15 days interval.
	Aphids	Dimecron 100%ec	54 ml	1st spray after fruit set & then when appear.
	Mites	Kelthan 42%ec	108ml	1st spray in 3rd week of June if neccessary 2 spray at 15 days interval.

**BEST AVAILABLE DOCUMENT**

Fertilizer Schedule for Crops Commonly Grown in Tribal Areas

<u>Crop</u>	<u>Fertilizer and dose lb/acre</u>		<u>Time of Application</u>
	<u>Nitrogen</u>	<u>Phosphorous</u>	
<u>Wheat</u>			
Rainfed land			
-good rains	70	50	All fertilizer applied at sowing time
-poor rains	50	50	
Irrigated lands			
-average land	90	60	All phosphorous and half nitrogen at sowing and half nitrogen at 1st and 2nd irrigation.
-poor land	130	75	
<u>Corn</u>			
-fertile land	75	50	All phosphorous at planting, half nitrogen when crop is knee high and half when crop is waist high.
-average land	90	75	
<u>Rice</u>			
-fertile land	75	50	All phosphorus at planting and nitrogen at the time of earing
-average land	90	75	
<u>Potato</u>	80	40	Apart from farm yard manure applied before planting, full phosphorus and half nitrogeon at sowing, and half nitrogen before earthing up.
<u>Tomato</u>	80	40	Apart from application of farm yard manure before planting, full phosphorus and half nitrogen at planting time.  Half nitrogen at earthing up . If required, more nitrogen can be applied after considerable picking of fruit is done and crop show signs.

fertilizer Requirement for Selected Crops

<u>Crop</u>	<u>Urea</u>	<u>DAP</u>	<u>A/S</u>	<u>Sup/Phosph.</u>	<u>Time of Application</u>
Wheat	1-1/2	1-1/2	-	-	1-1/2 bags DAP and half bag of urea with sowing. Another half urea with 2nd irrigation
Corr	2	1-1/2			1-1/2 bags DAP along with sowing. 1 bag urea when the crop is 1-1/2 feet high. 1 bag urea when the crop is 2-1/2 feet high.
Paddy	1-1/2	1	-	-	1-1/2 bags DAP with transplantation. 1 bag urea 2 weeks before earing.
S. Cane	2-1/2	1-1/2	-	-	1-1/2 bags DAP and half of urea with sowing. Another half before earthing up.
Potato	-	-	7	5	5 bags of sup/phosph. and half of A/S with sowing. Another half of A/S before earthing up.
Tomato	1	1	-	-	1 bag of DAP and half of urea with sowing. Another half of urea before earthing up.
Rape	1	1	-	-	-do-

Fertilizer Schedule for Selected Fruits and Vegetables

<u>Crop</u>	<u>Name of Fertilizer with Dose</u>		<u>Time of Application</u>
	<u>Nitrogen lb/acre</u>	<u>Phosphorous lb/acre</u>	
(i) Wheat			
(a) Barani Lands (Rainfed lands)			All fertilizers be applied at sowing time.
(i) good rains	70	50	
(ii) Poor rains	50	50	
(b) Irrigated lands			All phosphorus and half nitrogen at sowing and half nitrogen at 1st and 2nd irrigation.
(i) Average land	90	60	
(ii) Poor land	130	75	
(ii) Corn			all phosphorus at planting, half nitrogen when crop is knee high and half when crop is waist high.
(i) Fertile land	75	50	
(ii) average land	90	75	
(iii) Rice			All phosphorus at planting and nitrogen at the time of earing
(i) fertile land	75	50	
(ii) average land	90	75	
(iv) Potato	80	40	Apart from farm yard manure applied before planting full phosphorus and half nitrogen at sowing and half nitrogen before earthing up.

(v) Tomato	80	40	Apart from application of farm yard manure before planting full phosphorus and half nitrogen at planting time. Half nitrogen at earthing up . If required more nitrogen can be _____ applied after considerable picking of fruit is done and crop show signs.
(vi) Pulses	40	60	All phosphorous and half nitrogen at sowing & half nitrogen at earthing up.
(vii) Peanut	20	80	Besides farm yard manure before planting and all phosphorus and half nitrogen at sowing and half nitrogen at earthing up.
(viii) Apple, Peach plum, and other fruit plants.			2-3 Kilogram nitrogen in Feb, March besides one donkey load farm yard manure per plant during winter.

N:B: Potash is not generally required for these lands.

Appendices

## Appendix I

Area and Population by Sexes Density in Kurram Agency  
Population Census 1981

Area in Square Kilometer	Both Sexes	Male	Female	Sex ratio Male Per Female
3380	294362	14822	146140	101.4

Source: Planning and Development  
Department Government of  
N.W.F. Province.

## Appendix 2

Area and Production of Wheat in Kurram Agency from 1984-85  
to 1987-88

Area in Hectares Year	Area		Production in Tons	
	Irri	Unirri	Irri	Unirri
1984-85	9,820	643	15,924	646
1985-86	10,000	700	16,200	780
1986-87	9,000	1,700	13,900	300
1987-88	7,000	3,700	12,510	3,776

Sources: Senior Statistician  
Imprve Crop Estimates Project  
Agriculture Department  
N.W.F.P. Peshawar.

## Appendix 3

Area and Production of Rice in Kurram Agency from 1984-85  
to 1987-88

Area in Hectare		Production in Tons.
Year	Area	Production
1984-85	5,496	7,147
1985-86	4,200	5,425
1986-87	4,500	5,822
1987-88	4,700	6,500

Sources: Senior Statistician  
Improve Crop Estimates Project  
Agroculture Department  
N.W.F.P. Peshawar.

## Appendix 4

Area and Production of Corn in Kurram Agency from 1984-85  
to 1987-88

Year	Area in Hectare		Production in Tons	
	Irri	Unirri	Irri	Unirri
1984-85	3354	673	6002	693
1985-86	3000	2500	6000	3235
1986-87	3000	1500	5000	1770
1987-88	4000	400	6050	550

Sources: Senior Statistician  
Improve Crop Estimates Project  
Agriculture Department  
N.W.F.P. Peshawar.

## Appendix 5

**Area and Production of Soybean in Kurram Agency  
from 1984-85 to 1987-88**

<u>Area in Hectares</u>		<u>Production in tons</u>	
<u>Year</u>	<u>Area</u>	<u>Area</u>	<u>Production</u>
1984-85	457		207
1985-86	450		200
1986-87	250		112
1987-88	131		144

Sources: Senior Statistician  
Improve Crop Estimates  
Project,  
Agriculture Department  
N.W.F.P. Peshawar

## Appendix 6

**Area Production of Kharif Pulses in Kurram Agency  
from 1984-85 to 1987-88**

<u>Year</u>	<u>Area in Hectares</u>				<u>Production in tons</u>			
	<u>Mong</u>	<u>Mash</u>	<u>Arhar</u>	<u>Others</u>	<u>Mong</u>	<u>Mash</u>	<u>Arhar</u>	<u>Others</u>
1984-85	2881	654	50	463	1586	315	19	220
1985-86	2860	-	-	-	1574	-	-	-
1986-87	3350	-	-	-	1927	-	-	-
1987-88	2550	200	-	-	1385	80	-	-

Sources: Senior Statistician  
Improve Crop Estimatiss Project  
Agriculture Department  
N.W.F.P. Peshawar

## Appendix 7

Area and Production of Peanut in Kurram Agency  
from 1984-85 to 1987-88

Year	Area in Hectares Production in Tons	
	Area	Production
1984-85	335	584
1985-86	300	540
1986-87	310	540
1987-88	471	820

Sources: Senior Statistician  
Improve Crop Estimation project  
Agriculture Department  
N.W.F.P. Peshawar

## Appendix 8

## Area and Production of Kharif Fruits in Kurram Agency from 1984-85 to 1987-88

Year	Area in Hectares.												Production in Tons.							
	Apricot		Apples		Persimon		Plum		Pomegranite		Pears		Peaches		Guava		Walnut		Fig	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P
1984-85	66	582	220	3922	6	200	70	606	45	660	20	364	10	10	-	-	120	2251	3	51
1985-86	66	589	220	3922	6	200	70	606	46	660	20	364	10	10	-	-	120	2251	3	51
1986-87	66	589	210	3762	6	200	70	606	45	660	20	364	10	10	-	-	120	2251	-	-
1987-88	65	700	200	3750	10	150	20	250	25	220	50	350	30	300	-	-	100	2000	-	-

## Appendix 9

Area and Production of Kharif Vegetable in Kurram Agency  
From 1984-86 to 1987-88

Year	Area in Hectares.						Production in Tons.							
	Musk Melon		Okra		Egg plant		Pumpkin		Bitter Gourd		Bottle Gourd		Tomato	
	A	P	A	P	A	P	A	P	A	P	A	P	A	P
1984-85	-	-	40	300	16	40	10	75	20	70	15	61	405	2835
1985-86	-	-	40	260	10	30	10	70	15	60	15	60	400	2800
1986-87	-	-	45	260	20	30	20	70	15	60	15	60	335	2598
1987-88	-	-	2	9	4	6	-	65	-	-	-	-	370	2600

Source: Planning and Development  
Department Government of  
N.W.F.P. Peshawar

**BEST AVAILABLE DOCUMENT**

## Appendix 10

Area and production of Rabi Vegetables in Kurram Agency from  
1984-85 to 1986-87

Year	Turnip		Spinach		Tomato		Raddish		Others	
	Area	Produc tion	Area	Produc tion	Area	Produc tion	Area	Produc tion	Area	Produc tion
1984-85	-	-	2	2	-	-	-	-	25	53
1985-86	-	-	2	2	-	-	-	-	-	-
1986-87	-	-	2	4	-	-	-	-	-	-
1987-88	-	-	5	30	5	35	-	-	10	85

Source : Senior Statistician  
Improve Crop Estimates Project  
Agriculture Department  
N.W.F.P. Peshawar

## Appendix 11

Set up of Agriculture extension service in Kurram Agency

Sl. No.	Name of the post	Nature of sanctioned post	Number of vacant post	Place of postings & responsibilities	Headquarter
1.	EADA	1	4	Incharge of Agri. extension service Kurram Agency.	Parachinar.
2.	Agri. Officer	8	4	i. A.O. & F.H. Parachinar circle upper Kurran. ii. A.O. Ahmadzai circle upper Kurran. iii. A.O. Sadda & F.R Kurram circles. iv. A.O Alizai circle.	Parachinar. Parachinar. Sadda Alizai.
3.	Field Assistant	26	5	i. Eight field Asstt under A.O. Ahmadzai circle in upper Kurran. ii. Five field Asstt under A.O. Ahmadzai circle in upper Kurran. iii. five Asstt under A.O. of R Kurram in lower Kurran. iv. Three Field Asstt under A.O. Alizai in lower Kurran.	Parachinar Parachinar Sadda. Sadda

BEST AVAILABLE DOCUMENT

Area Irrigated by different sources in  
North Waziristan for the year 1984-85 to 1986-87  
(Area in Hectare)

Year	Total	Canal					Others
		Govt	Private	Tanks	Tube wells	Wells	
1984-85	8000	—	6000	—	200	1000	800
1985-86	10000	—	8000	—	1000	200	800
1986-87	10000	—	8000	—	1250	200	550

Source: Senior Statistician  
Improved Corp  
Estimate Project  
Agri Deptt. Peshawar.

Area & Production of Major Kharif Crops  
from 1984-85 to 1988-89 in N/Waziristan

(Area in Hectare)  
(Production in Tons)

Year	Maiz		Rice		Sugar Cane	
	Area	Production	Area	Production	Area	Production
1984-85	4650	7290	392	384	925	20905
1985-86	3370	5283	53	52	725	16385
1986-87	4500	7050	55	65	700	15820
1987-88	5000	7830	250	300	700	15800
1988-89	5330	8250	369	460	--	--

Source: Senior Statistician  
Agriculture Dept.  
Govt of NWFP.

APPENDIX-14

Area & Production of Major Rabi Crops  
during 1984-85 to 1987-88 in N/Waziristan

Year	<u>Wheat</u>						<u>Barley</u>						<u>Gram</u> (Area in Hectare) (Production in Ton)					
	Area			Production			Area			Production			Area			Production		
	Irr- gatl	Unir gatl	Tot	Irr- gatl	Unir gatl	Total	Irr- gatl	Unir gatl	Tot	Irr- gatl	Unir gatl	Total	Irr- gatl	Unir gatl	Total	Irr- gatl	Unir gatl	Total
1984-85	6200	550	6750	6410	521	6931	240	--	240	300	--	300	--	160	160	--	64	64
1985-86	6000	700	6700	6500	391	6891	250	--	250	312	--	312	--	190	190	--	76	76
1986-87	6500	600	7100	7000	300	7300	260	--	260	300	--	300	--	2300	2300	--	920	920
1987-88	6150	950	7100	6650	555	7205	150	--	150	166	--	166	--	2300	2300	--	650	650
1988-89	6550	450	7000	6732	500	7232	110	--	110	122	--	122	--	--	--	--	--	--

Source:- Senior Statistician  
Improved Crop estimates  
Agriculture Department

**BEST AVAILABLE DOCUMENT**

APPENDIX-15

Area & Production of Kharif Fruits  
in W/Waziristan Agency

A: Area in Hectare.  
P: Production in Tons.

Year	Apricots		Apples		Persimon		Plum		Pomegr- nate		Pear		Grape		Peach		Almond		Dates		Figs		Wall- nuts		Others			
	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P		
1984-85	---	---	---	---	142	4757	---	---	---	---	---	---	---	---	---	---	---	210	2628	10	170	---	---	30	91	---	---	
1985-86	---	---	---	---	145	4832	---	---	---	---	---	---	---	---	---	---	---	210	2628	15	250	---	---	30	90	---	---	
1986-87	10	130	10	150	145	4000	---	---	---	---	---	---	---	---	---	---	---	200	2000	15	150	---	---	20	70	---	---	
1987-88	10	220	100	2000	10	270	5	10	---	---	10	200	---	---	10	200	---	---	150	1800	5	80	---	---	---	---	---	---
1988-89	40	400	100	1700	---	---	20	300	---	---	10	200	---	---	20	250	---	---	50	850	---	---	10	200	25	---	---	

Source: Senior Statistician  
Improved Crop Estimate  
Agriculture Department

BEST AVAILABLE DOCUMENT

APPENDIX-16

Area & Production of Kharif Vegetable in  
North Waziristan Agency for the year 1984-85 to 1988-89

Year	<u>Musk Melon</u>		<u>Okra</u>		<u>Tinda</u>		<u>Egg Plant</u>		<u>Pumpkin</u>		<u>Bitter gourd</u>		<u>Bottle gourd</u>		<u>Tomato</u>		<u>Total</u>	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1984-85	--	--	5	37	2	6	3	22	--	--	2	12	4	14	172	1204	--	--
1985-86	--	--	5	37	2	6	3	22	--	--	2	12	4	14	69	494	--	--
1986-87	10	82	30	200	50	279	20	150	--	--	30	120	30	60	80	484	250	1375
1987-88	--	--	30	190	10	60	20	80	3	40	4	35	6	45	112	620	185	1070
1988-89	--	--	50	500	10	20	20	100	--	--	10	20	10	20	350	1940	450	2600

Source:- Senior Statistician improved Crop  
Estimates Agri. Deptt Peshawar.

**BEST AVAILABLE DOCUMENT**

APPENDIX-17

Area & Production of Rabi Vegetable in N/Waziristan Agency

Area in Hectare.  
Production in Ton.

Year	Turnips		Spinach		Tomatos		Radish		Peas		Other	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1984-85	40	150	--	--	50	500	10	10	--	--	--	--
1985-86	40	150	--	--	50	500	--	--	--	--	--	--
1986-87	40	350	--	--	50	200	10	30	--	--	60	385
1987-88	60	580	15	165	70	420	--	--	20	70	10	20

Source:-

FATA Development Statistics  
P & D Deptt.  
Govt of N.W.F.P

BEST AVAILABLE DOCUMENT

Area & Production of Potato in N/Waziristan Agency

Year	Area	Production
1984-85	200	1149
1985-86	48	278
1986-87	60	600
1987-88	100	1000
1988-89	120	1190

Source:- P & D Deptt.  
Govt of NWFP.  
Peshawar.

## Annexure NW

Area & Production of Tomato in  
N/Waziristan Agency for the Years (1984-85 to 1988-89)

Year	Area in Hectare	Production in Tons
1984-85	172	1204
1985-86	69	494
1986-87	80	484
1987-88	70	420
1988-89	100	750

Source:- Fata Development Statistics  
P & D Department  
Govt of NWFP.

## Annexure

## Fruit Plants Distribution in North Waziristan

Name of Fruit Nursery farm	Area	Fruit Plants Distributed			
		1986-87	1987-88	1988-89	
1. F.Nursery farm Hiran Shah	4 acres	Plum	4075	3500	6000
		Apple	1100	3000	1300
		Peach	305	350	500
		Persmon	---	---	300
		Apricot	---	300	700
		Walnuts	---	3500	2500
		Pomegranate:	7000	2000	1000
		Almond	620	2000	2000
		Grape	2000	1000	500
		Total:	15100	15650	15000
		2.F.Nursery farm Paikhel:	4 acres	Plum	1000
Apple	---			---	1000
Peach	1000			1000	1000
Apricot	---			---	1000
Walnuts	2000			1000	3500
Pears	2000			2000	2000
Pomegranate:	4000			4000	1000
Almond	2000			1000	2000
Grape	4000			4000	500
Total	16000			15500	15000
3. F.Nursery farm Dusalli	4			Plum	1140
		Apple	3300	2000	1000
		Peach	600	500	1500
		Apricot	1133	500	4500
		Walnuts	1000	4000	2500
		Pear	---	---	1000
		Pomegranate:	6000	4000	2000
		Almond	2000	3000	500
		Total:	15173	15000	15000

Source:- Deputy Director Agri.  
FATA, D.I.Khan.

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Appendix 20  
 FRUIT NURSERY FARM ESTABLISHED BY THE PATA-AGRICULTURE  
 IN SOUTH WAZIRISTAN AGENCY

<u>S.No</u>	<u>Name of Nursery Farm</u>	<u>Location</u>	<u>Area of the Farm Acres/Kanals</u>	<u>Annual Target</u>
1.	Fruit nursery farm, Wana	Dabkot	3 - 0	15000 F. Plants
2.	" " " "	Karezai	1 - 6	8000 " "
3.	" " " Sarwaki	Shahoo	4 - 0	20000 " "
4.	" " " Birnaal	Sholan	2 - 0	10000 " "
5.	Pistachio nursery farm	Wana	3 - 0	5000 " "

Source: EADA  
 South Waziristan Agency  
 Wana

AREA AND PRODUCTION OF FRUITS GROWN IN SOUTH WAZIRISTAN (WANA)  
FOR THE YEAR 1984-85 TO 1988-89

A - Area in Hectare  
P - Production in M/Ton

Year	Apple		Pear		Apricot		Plum		Peach		Grape		Walnut		Almond		Pomegranate		Fig		Other		Total	
	Area	Prod	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P
84-85	1390	15247	25	86	160	1039	30	37	50	75	-	-	30	102	150	565	50	128	5	85	112	1261	-	-
85-86	2800	27900	25	85	160	1500	25	30	50	70	-	-	30	100	150	520	50	120	-	-	120	1251	-	-
86-87	2800	50000	25	400	160	2500	25	30	50	70	-	-	30	100	150	520	50	600	-	-	120	1280	3410	55000
87-88	2800	50000	25	400	160	2500	25	30	50	70	20	80	30	100	150	520	50	600	-	-	100	1200	3410	55500
88-89	3000	49945	30	350	180	3000	30	30	60	-	30	150	40	-	160	350	60	700	-	-	100	1200	3590	55500

Source: Bureau of Statistics  
P&D Department  
Government of NWFP

Appendix 22

AREA AND PRODUCTION OF WHEAT CROP IN SOUTH WAZIRISTAN AGENCY (WANA)  
FOR THE YEAR 1984-85 TO 1988-89

Area in Hectare  
Production in H/Ton

Agency	1984-85			1985-86			1986-87			1987-88		
	Area			Area			Area			Area		
	Irrig.	Un-Irri.	Total	Irrig.	Un-Irri.	Total	Irrig.	Un-Irri.	Total	Irrig.	Un-Irri.	Total
South Waziristan Agency	5190	3040	8230	5200	3040	8240	5200	3030	8230	5120	2110	8230
	<u>Production in H/Tons</u>											
	5748	2592	8340	5760	2601	8361	5760	2590	8350	7360	1000	8300

AREA AND PRODUCTION OF CORN CROP IN SOUTH WAZIRISTAN AGENCY (WANA)

4200	-	4200	4200	-	4200	4200	-	4200	4250	-	4250
<u>Production in H/Tons</u>											
7360	-	7360	7360	-	7360	7360	-	7360	7440	-	7440

AREA AND PRODUCTION OF RICE IN SOUTH WAZIRISTAN AGENCY (WANA)

142	-	142	142	-	142	145	-	145	145	-	145
<u>Production in H/Tons</u>											
215	-	215	215	-	215	220	-	220	220	-	220

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Source: Bureau of Statistics  
P&D Department  
Govt. of NWFP

## Appendix-23

AREA AND PRODUCTION OF KHARIF VEGETABLE IN SOUTH WAZIRISTAN AGENCY (WANA)  
FOR THE YEAR 1984-85 TO 1988-89

Production in Tons  
Area in Hectare

Year	Musk Melon		Okra		Tinda		Egg Plant		Pumpkin		Bitter Gourd		Bottle Gourd		Tomato	
	Area	Pro	Area	Pro	A	P	A	P	A	P	A	P	A	P	A	P
1984-85	12	112	7	37	21	41	4	29	25	129	10	61	10	30	51	229
1985-86	35	330	30	200	50	65	20	141	50	250	30	170	30	90	80	350
1986-87	40	330	30	200	50	250	20	140	20	80	30	170	30	90	80	350
1987-88	50	300	170	900	50	300	160	850	50	280	50	280	50	290	200	1000
1988-89	-	-	15	30	10	20	20	40	10	20	10	20	15	30	750	4350

Source: Bureau of Statistics  
P& Department, Govt.  
of NWFP

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## Appendix-24

AREA AND PRODUCTION OF TOMATO CROP  
FOR THE YEAR 1984-85 TO 1988-89

(Area in Hectare)  
(Production in Tons)

Agency	Y E A R									
	1984-85		1985-86		1986-87		1987-88		1988-89	
	Area	Prod.								
North Punjab	51	229	80	350	80	350	200	1000	750	4350

Source: Senior Statistician  
Improved Crop Estimates  
Agriculture Department,  
Peshawar

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APPENDIX-25

AREA AND PRODUCTION OF POTATO CROP  
FOR THE YEAR 1984-85 TO 1988-89

Area in Hectare  
Production in Ton

ncy	Y E A R									
	1984-85		1985-86		1986-87		1987-88		1988-89	
	Area	Prod.								
th iristan	375	3765	357	3765	370	3765	375	3800	375	3770

Source: Senior Statistician  
Bureau of Statistics

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Appendix -26

AREA AND PRODUCTION OF POTATO CROP  
FOR THE YEAR 1984-85 TO 1988-89

Area in Hectare  
Production in Ton

y istan	Y E A R									
	1984-85		1985-86		1986-87		1987-88		1988-89	
	Area	Prod.								
	375	3765	357	3765	370	3765	375	3800	375	3770

Source: Senior Statistician  
Bureau of Statistics

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## Appendix -27

AREA IRRIGATED BY DIFFERENT SOURCES DURING  
THE YEAR 1985-86 AND 1986-87 IN SOUTH WAZIRISTAN

(Area in Hectare)

Agency	Year	Total	Canals		Tanks	Tubewells	Wells	Lift Pumps	Others	
			Govt.	Private						
South Waziristan Agency, Wana	1985-86	8800	-		4910	190	325	120	-	3255
"	1986-87	8800	-		"	"	"	"	-	"

Source: Senior Statistician  
Agriculture Department  
Peshawar

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TRIBAL AREAS DEVELOPMENT PROJECT  
SCOPE OF WORK FOR  
AGRICULTURE CONSULTANTS

1. Hameed Farooqi
  2. S. Fazal Rabbi
- 

1. In depth study with respect to the present status of horticultural crops (fruit orchards and assorted vegetables) in the South Waziristan Agency, North Waziristan Agency, Kurram Agency and Orakzai Agency.
2. Find out and investigate major problems in the production and marketing of horticultural crops and commodities i.e.
  - What is actually happening?
  - Where is it happening?
  - At what level?
  - What is the role of Govt. and private sector in this field?
  - Production problems:
    - a) Technical
    - b) Managerial
    - c) Marketing etc.
  - Farmers training, extension agents training etc.
3. Study the existing cropping pattern in barani (rainfed area) and irrigated areas of these agencies. The findings should also suggest for a more rational approach in introducing new crops or improvement in the existing crop husbandry. The objective is to increase farm profitability in more than one way.
4. TADP has completed construction of some irrigation schemes in the tribal areas and would continue to construct more schemes in the future. The study should focus concern on the development of an appropriate package of crop rotation in the command area of these schemes.
5. FATA-Agriculture is the GOP implementing Agency for the USAID funded programs in agriculture sector. The study should also address into the weaknesses of FATA Agriculture e.g. insufficient staffing and other resources. The matter needs a close tie-up with FATA-Agric Deptt. So that they are willing and capable of fielding an expanded program.