CHAPTER V. SECTORAL DEVELOPMENT PLAN

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5.1. Proposed Land Use Plan and Soil Conservation Measures

5.1.1. Land Use Plan

1) Suitability for Land Use

It is essential that the land should be used depending on its suitability for sustained production of agricultural crops and grazing or forestry. In Swat District, altitude, slope and soil characteristics are major factors for determining suitability of land.

Altitude

The cultivated land in Swat District is classified into three Zones from altitude in topography. The land lying below about 1,200 m is good for cultivation from climatic and physiographic view points. The land lying between about 1,200 m and 2,400 m is less productive, because of steep slopes and harsh climatic conditions. At the altitude more than about 2,400 m, cultivation land is found little at present.

The range land lying below about 1,200 m is potentially suited for year-round grazing, while the land lying between about 1,200 m and 3,000 m is limited in grazing only for snow-free month. The areas higher than about 3,000 m are used for grazing during summer season only. The mountainous areas below about 2,400 m except rock land have a potential for timber production.

In this study, an accompanying contour map covering the areas between about 600 m and 2,400 m in altitude was prepared with the contour interval of 600 m.

Slope

On the basis of topographic slope, the cultivated land is classified into two classes; land with slope less than 50 percent and land with more than 50 percent. The estimation of cultivated land classified by altitude and slope was made based on the obtained data. The cultivated land in Swat District is mostly located in the mountainous area, and hence, 23 percent of the cultivated land has steep more than 50 percent as shown in

Table 5-1. Under the conditions, cultivation land has been in the severe limitation for crop production.

Soil Characteristic

The parent materials of soils, effective soil depth and proper past and present erosion results are the main limitation factors for proper land use in the District. The fertile soils derived from good parent materials are found in the alluvial plains along the Swat river and on the dissected loess plains at piedmonts. On the other hand, soil erosion and shallow soil layer are a serious problems in the mountainous areas.

Land Capability Classification

Land capability classification is a method to group the soils of areas showing their suitability for sustained production of crops or grazing and forestry. The classification method applied in Pakistan is similar to that used in the United States Department of Agriculture (USDA), but some modification of the method has been made, so as to suit the local conditions in Pakistan.

According to this classification, eight classes of land capability are recognized. Namely, the soils placed in the highest class (I) have the least limitations for agricultural use and potentiality of very good cultivated land. In the lower classes (II to IV), there is a increasingly severe limitation for cultivated land. The soils in the next lower three classes (V to VII) are unfit for economic arable farming. They have been utilized for range land or forestry. The soils in class VIII are agriculturally unproductive.

A land capability map with 1/250,000 in scale was prepared on the bases of collected reconnaissance soil survey report as shown in Figure 5-1. In this map, land capability association, in which two or more classes are presented together with the geographic region, was used as mapping unit.

2) Land Use Plan

Proposed land use plan, which was formulated based on the crop production and land use suitability plans in the Project Area is shown in Table 5-1, and the main features are summarized as follows;

TABLE 5-1 PROPOSED LAND USE

(uint: '000 ha)

Land Category	Cultivated Land (Food Crops) 4/						Range Land 4/				Forest Land	Cultivable Waste	Others	Total
	<1,200m		1,200-2,400m		>2,400m	Sub-total	<1,200m	1,200-3,000m	>3,000m	Sub-total				
	Slope <50%	>50%	<50%	>50%										
Proposed Land Use														
Cultivated Land (Total)	104.1	6.2	48.1	36.9	0.5	195.8						5.0		200.8
- For Fruits	3.0		2.8	2.2		8.0								8.0
- For Vegetables	4.0		3.0			7.0								7.0
- For Food Crops	97.1	6.2	42.3	34.7	0.5	180.8						5.0		185.8 1/
Range Land							78.9	38.2 (20.0) 2/	105.3 (10.0)	222.4 (30.0)				222.4
Forest Land								15.0 3/		15.0	213.4	3.0		231.4
Cultivable Waste												7.3		7.3
Others													216.9	216.9
Total	104.1	6.2	48.1	36.9	0.5	195.8	78.9	53.2	105.3	237.4	213.4	15.3	216.9	878.8

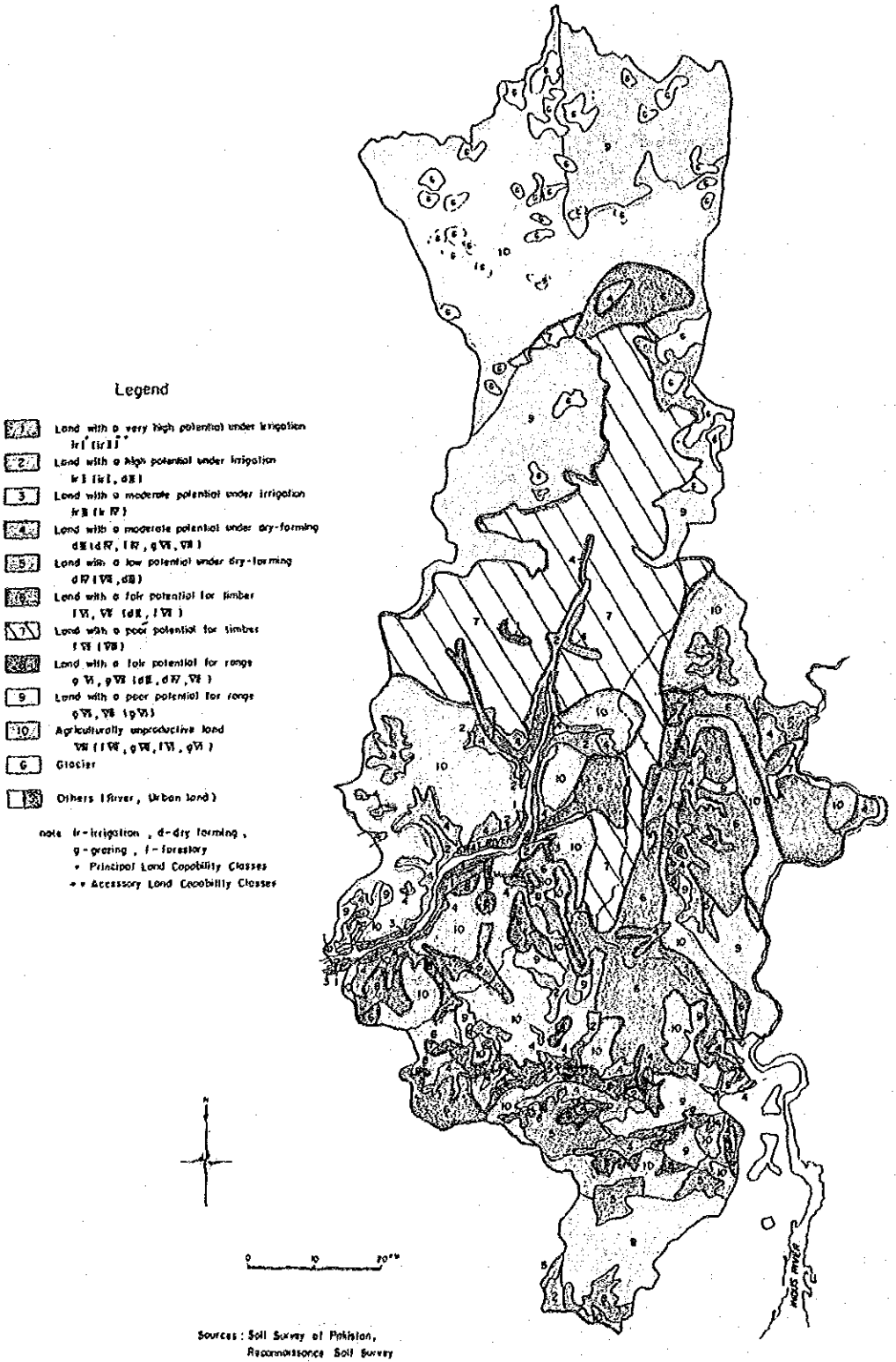
Note: 1/ About 20,000 ha of cropped area will be increased by expansion of irrigation.

2/ About 20,000 ha and 10,000 ha of respective lands in parenthesis will be improved as pasture land or grazing land.

3/ About 15,000 ha of range land will be afforested.

4/ Area by elevation and slope are estimated on the basis of the reports of "Integrated Resource Survey, Aerial Forest Inventory Project (1970, 1976)"

FIGURE 5-1 LAND CAPABILITY MAP IN SWAT DISTRICT



- Increase in irrigable area of 23,000 ha,
- Increase in cropped areas for fruit and vegetable of 15,000 ha,
- Conversion to cultivated land of 5,000 ha from cultivable waste lands with the improvement works,
- Grass land improvement of 30,000 ha, and
- Conversion to forest land of 15,000 ha from range and waste lands.

Cultivation Land

The cultivated land of about 110,000 ha, equivalent to 56 percent of the total cultivated land of about 196,000 ha, are located in the area with altitude below about 1,200 m, and almost all of the rest are observed between about 1,200 m and 2,400 m. Cultivated land higher than about 2,400 m is scarce. The cultivated areas having a slope less than 50 percent amount for 75 percent of the total cultivated lands.

The irrigable areas will be increased by the project from about 49,000 ha at present to about 72,000 ha. And, the advanced techniques of agricultural management will be introduced under the project, and the crop yields are expected to be increased considerably. Swat District has high potential for fruits and vegetable growing if irrigation water is supplemented. It is recommended that fruit orchards and vegetable fields are to be extended by about 8,000 ha and 7,000 ha, respectively. Expansion of orchards in acreage will serve not only for substantial income increase for the local farmers, but also for erosion control of the developed land.

The areas grown with grain crops and some others will remain unchanged in acreage by improving their cropping intensity with irrigation water supply to shift cultivable waste land to cultivated land.

Range Land

The total range lands of about 237,000 ha can be classified into the following three groups;

- Hill-foot range land below about 1,200 m in altitude (34 percent total range land),

- Temperate range land lying between about 1,200 m and 3,000 m (23 percent), and

- Alpine pasture located on the area higher than about 3,000 m (43 percent).

The elevated land shall remain with vegetation coverage with a variety of plant species with grasses, shrubs, and scare trees as a result of cutting. Out of about 53,000 ha of temperate range land, about 15,000 ha of range land is to be afforested for the production of fire-wood and timber. On the other hand, in order to expect more effective utilization of range land and ensure steady supply of forages with the livestock, control of overgrazing and adequate cutting of grasses are essentially required. These preventive works will be very useful for bringing good results of soils and water conservation on the mountainous slope areas.

Forest Lands

In Swat District, the areas lying below about 2,400 m in altitude are climatically suitable for tree growing. It is clear that the tree of vastly extended forest in the area have been cut down since long time. Forest is a valuable resources playing an important role in soils and water conservation in sloping land. Consequently, forest conservation should be conducted carefully, and about 15,000 ha of range land will be shifted into forest land by afforestation in selected area for these purposes. It is recommended to plant fast growing trees around villages and fields for supply fire-wood and timber.

5.1.2. Soils Conservation Measures

1) Method of Soil Erosion Control

Most of land utilized for cultivation and grazing land in the Barani conditions in Swat District is located in the mountainous area, and presently vulnerable to erosion. The soil conservation is the most essential works for efficient land use in the areas. And the following countermeasures shall be taken as i) an adequate application of cropping pattern and contour tillage, ii) provision of terraced field and waterway to drain excess rainwater, and iii) construction of small dams and sedimentation ponds as effective control of soil erosion in the District.

Cropping Pattern

The sloping areas, especially those without vegetation coverage, are easily eroded, so that suitable cropping pattern and systems to cover the fields during rainy season should be introduced in the project.

Contour Tillage

Countour tillage in the sloping areas is an effective method for not only controlling soil erosion, but also utilizing rainwater effectively.

Terracing

When the above-mentioned methods are not applicable due to steep slope in topography, it is recommended to resort to the construction of terraced land across the slope. Terracing is common in the mountainous area in the District. The terraces should be kept in proper condition by cultivating the land along contour line, by controlling gradient and by growing vegetation cover on ridges.

Waterways

The provision of adequate waterways plays an important role for the control of runoff discharges from the cultivated land. They serve as outlets for the terraces in eliminating the water into the fields at higher elevation.

Vegetation

The vegetation is the best way to protect soils from erosion. In the mountainous areas, the slopes near the residential areas are frequently cleared for cultivation and subject to over-grazing in resulting in greatly encouraging of the soil erosion. For these areas, strict control must be imposed urgently for grazing and cutting trees and grasses for vegetation cover. Furthermore, if needed, natural vegetations are supplemented by seeding or planting.

Gully Erosion Control

When guiles are not significant in the initial stage of erosion, the provision of small scale dams by rotten manure or straw at suitable intervals is very effective. On the other hands, in case of large gullies, construction of dams by earth, concrete and stones is often successful for erosion control. The construction of sedimentation ponds is also effective

for control of runoff and sedimentation which is important for the gullied land to prevent soils from further deterioration to adjacent farmland.

Control of Stream Bank Erosion

During the flooding period, the land along the rivers and streams is frequently washed away. The construction of wire netting structure is effective for control of erosion in these lands.

Land Slide Control

The steep slopes in the mountainous area are often affected by land slides, which are caused from breaking of soils along the steep slopes in cultivation or road construction. The damage is very heavy, especially in Shangla Par Sub-Division. The proper land use programmes are essential for preventing the land from such damages.

2) Implementation of Soil Conservation Measures

The following programmes for the soils conversion are proposed in the project.

- Strengthening and Promotion of Soil Conservation Works

  The soil conservation works implemented by Soil Conservation Office since 1986 are needed to be strengthened and promoted in the project. The conservation works so far made have included the provision of Pacca cemented structures, wire netting structures and sedimentation ponds. However, in the project plan, an additional works such as terracing and leveling works for the slope lands are expected to be included.

  The proposed implementation programes for soil conservation in the period of project target are planned as follows;

1989 - 1993	:	1,500 ha
1994 - 1998	:	3,000 ha
1999 - 2005	:	5,000 ha
Total		9,500 ha

- Strengthening of Vegetation Conservation for Forest and Grazing Land

  Conservation of vegetation is the most important works to minimize the soil erosion in slope land. Cutting of forests and over-grazing of range land should be completely checked to control the deterioration of land.

- Extension of Techniques and Subsidy for Local People

  In order to promote above-mentioned countermeasures, extension of techniques and subsidy of necessary materials to the local people are essential to implement successfully the prevention of soil erosion in these areas.

5.2. Water Resources Development Plan

5.2.1. Development Plan of Surface Water Resources

The huge amount of river water flows down uselessly in the rainy seasons a year because of i) low water holding capacity of the watersheds, and ii) absence of storage facilities such as dams and ponds.

It is essential to grasp the usable volume of the discharges in the respective rivers in order to materialize the effective utilization of the resources.

The estimation of the discharge was made in the main rivers and their tributaries in the Project Area based on the collected data during the field works.

1) Hydrological Probability and Design Value

The rainfall pattern corresponding to the drought year (1/5 year probability) was adopted for the design year based on the 22 years records (1963 - 1984) available at Charbagh, Karora and Daggar as the representatives of Swat, Shangla Par and Buner Sub-Divisions, respectively. The monthly values in design year are as shown in Annex A.

2) Run-off Depth and Unit Discharge

The following is a list of the monthly mean values of run-off depth at the three Sub-Divisions which were estimated based on the collected data. For the estimation, the discharge and rainfall data both recorded at Daggar Station in the Barandu river in Buner are used as the hydrological pattern in the Project Area for the reason that the remarkable time lag caused by snowfall and the thaw is negligible in the objective area of the regional development plan in this Study.

- The monthly run-off coefficient is the percentage of monthly mean discharge to the monthly mean rainfall in 1970 to 1972 at Daggar Station.

- The rainfall patterns in Swat, Shangla Par and Buner Sub-Divisions are decided based on the records at Charbagh, Karora and Daggar, respectively.
- The discharge is not the same in the three Sub-Divisions, but the run-off percentage can be estimated at about 13 to 17 percent in dry season, 23 to 45 percent in rainy season and about 22 percent a year.

The estimated run-off depth is as follows;

Monthly Run-off Depth in Design Year

(unit: mm)

Sub-Division	J	F	M	A	M	J	J	A	S	O	N	D	Total
Swat	9	0	17	21	15	7	20	19	3	12	4	0	127
Shangla Par	13	17	24	7	9	11	15	16	28	35	0	11	186
Buner	9	10	13	9	8	11	19	22	21	12	10	9	153

3) Discharge at Proposed Sites

The monthly discharge at the intake point of the proposed scheme in each river was estimated in multiplying the catchment area by monthly run-off depth. The catchment area is measured on the 1/50,000 and 1/250,000 scaled topographical maps.

The specific discharge in each Sub-Division was determined as follows;

		Average Year	Design Year
Swat Sub-Division	(MCM/100 sq.km/year)	: 19.8	: 12.7
Shangla Par Sub-Division	(MCM/100 sq.km/year)	: 25.8	: 18.6
Buner Sub-Division	(MCM/100 sq.km/year)	: 20.4	: 15.3

The discharges and catchment areas at the respective proposed schemes were estimated and shown in Table 5-2.

The detailed hydrological analysis was conducted by means of computering simulation for the priority plans selected in the Mater Plan Study. The probability analysis and the estimation of unit discharge in the Project Area are tabulated in Annex A.

TABLE 5-2 MONTHLY RUN-OFF DISCHARGE FOR PROPOSED SCHEMES

Location	Proposed Scheme			Monthly River Discharge (MCM)												
Sub-Division	River (Khwar)	Intake Point	Catchment Area (sq.km)	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Swat	Barwai	Landai	87	0.8	0	1.5	1.8	1.3	0.6	1.7	1.7	0.3	1.0	0.3	0	11.0
	Harnoi	Aghai	220	2.0	0	3.7	4.6	3.3	1.5	4.1	4.1	0.7	2.6	0.9	0	27.8
	Harnoi	Chuprial	305	2.7	0	5.2	6.4	4.5	2.1	6.1	5.8	0.9	3.7	1.2	0	38.6
	Deolai	Kab	207	1.9	0	3.5	4.3	3.1	1.4	4.1	3.9	0.6	2.5	0.8	0	26.1
Shangla Par	Katkai	Bazarkot	18	0.2	0.3	0.4	0.1	0.2	0.2	0.3	0.3	0.5	0.6	0	0.2	3.3
	Shain	Alpurai	161	2.1	2.7	3.9	1.1	1.4	1.8	2.4	2.6	4.5	5.6	0	1.8	29.9
	Kana	Damorai	220	2.6	3.4	4.8	1.4	1.8	2.2	3.0	3.2	5.6	7.0	0	2.2	37.2
	Khan	Karora	345	4.5	5.9	8.3	2.4	3.1	3.8	5.2	5.5	9.7	12.1	0	3.8	64.3
	Itai	Sandai	45	0.6	0.8	1.1	0.3	0.4	0.5	0.7	0.7	1.3	1.6	0	0.5	8.5
	Choga	Upper Choga	56	0.7	1.0	1.3	0.4	0.5	0.6	0.8	0.9	1.6	2.0	0	0.6	10.4
	Itai	Jambal Derai	227	3.0	3.9	5.4	1.6	2.0	2.5	3.4	3.6	6.4	7.9	0	2.5	42.2
	Chakesar	Surbanai Banda	37	0.5	0.6	0.9	0.3	0.3	0.4	0.6	0.6	1.0	1.3	0	0.4	6.9
	Itai	Kuz Kobulgram	337	4.4	5.7	8.1	2.4	3.0	3.7	5.1	5.4	9.4	11.8	0	3.7	62.7
Buner	Budar	Batarai	146	1.3	1.5	1.9	1.3	1.2	1.6	2.8	3.2	3.1	1.8	1.5	1.3	22.5
	Chamla	Kotakot	102	0.9	1.0	1.3	0.9	0.8	1.1	1.9	2.2	2.1	1.2	1.0	0.9	15.3
	Chamla	Khana Derai	150	1.4	1.5	2.0	1.4	1.2	1.7	2.9	3.3	3.2	1.8	1.5	1.4	23.3
	Badri	Ghurghust	124	1,1	1.2	1.6	1.1	1.0	1.4	2.4	2.7	2.6	1.5	1.2	1.1	18.9

5.2.2. Development Plan of Groundwater Resources

The surface water resources are not abundant except the Swat river, but the groundwater resources are easily available in the Chamla and Badri basins in Buner Sub-Division.

The groundwater development is more advantageous than that of surface water in this area as shown below;

- Available in drought since seasonal and annual fluctuation is small,
- Easily obtained with simple facilities and easily lifted to the high land by pump,
- Possible to install wells and pumps near the irrigation area, and
- Generally high in water quality and no conflict on water right.

The solid development plan was studied and determined taking into account the following items for the utilization of groundwater for irrigation purpose since the lift volume is quite large.

- To review the available quantity obtained as the result of investigation carried out in the Irrigation Department of NWFP,
- To proceed with the proper development in considering the balance of lift and recharge by percolation of rainwater, river water and irrigation water etc.,
- To proceed with the gradual development to increase the small and middle scale facilities in confirming the influence and groundwater balance in wide area caused by concurrent lifting at many places, and
- To continue the development to establish the management system to control and check the lift volume or limit of draw-down of water table in order to make the proper groundwater utilization in future in the area.

5.3. Agricultural Development Plan

5.3.1. Target and Strategy of Agricultural Development

1) Target

The increase in land productivity is one of the important points in the agricultural development taking into consideration i) the small farm size by about one fourth of the national average or about 60 percent of the NWFP average, and ii) a limited development potential of land reclamation. The food self-sufficiency should be targeted in the short-term development plan. In placing an emphasis on development of fruit and vegetables farming and animal husbandry, the intensification of farm management should be pursued in the long-term development plan. For this purpose a great effort will be required to undertake the study and trial on the following items of activities;

- Crop and variety selection for the different agro-climatic zones,
- Seed production for vegetables and other upland crops under the favorable condition to avoid crossing with foreign plants in the mountainous areas,
- Scientific culture for edible mashrooms by utilizing locally available wood, and
- Scientific regeneration of medical plants like Acacia Catechu.

2) Strategy

In considering the varying agro-climatic conditions by area, and the poor infrastructure and the limited coordination among agricultural supporting agencies, it is necessary to take an approach of the integrated agricultural development. The approach should be made so as to generate multiplied effects among various development components. Namely, the right combination of development components for each specific area should be selected among irrigation and drainage, soils conservation, road system, agricultural extension adaptive researches strengthening of farmers' organizations, etc.

5.3.2. Crop Production Plan

1) Objectives

The average yields of two major crops, wheat and rice, in the Project Area are as low as about 57 percent and 98 percent of the national averages, whereas the yields of other crops are almost in the same level as the national averages. However, since an average farm size is as small as about one fourth of the national average, it is basically required to raise the crop yields as much as possible with increase in the cropping intensity for the improvement of the farm management. The major components for raising the crop yields and cropping intensity are as follows;

- To develop irrigated crop production,
- To improve Barani upland farming,
- To expand the use of quality seed,
- To improve fertilization method, and
- To improve farming practices.

The detailed countermeasures to improve the crop production in the irrigated and rainfed agriculture are shown below;

2) Development of Irrigated Crop Production

As for the existing irrigated areas, the improvement of on-farm water management by providing the on-farm facilities and precise land leveling should be accelerated. In the new irrigation areas, the improvement works involved in these components should be considered in their planning stage. Since the water temperature of Swat river is as low as 13 to 14°C, an appropriate procedure to raise the temperature in the irrigation systems has to be taken for irrigation of rice fields. The proposed crops by agro-climatic zone under irrigation are shown below;

Proposed Crops under Irrigation

Agro-Climatic Zone	Condition	Crops
1. Area lower than El. 1,200 m		
- Swat	The cropping area of fruits and vegetables may be increased, taking into account the most easy access to the markets.	Fruits, vegetables, maize, rice,
- Shangla Par	It is expected to improve the access to the markets through improving roads, which will make possible the introduction of fruits and vegetables.	Maize, rice, wheat, fodders, fruits and vegetables
- Buner	Rice will be excluded because of the limited water resources. However sugarcane will be cropped for the increase of local demand.	Maize, sugarcane, wheat, fruits vegetables and fodders
2. Area higher than El. 1,200 m		
- Swat and Shangla Par	Potato and temperate vegetable crops are able to be grown during Kharif season.	Potato, tomato, cabbage, pea, etc.

The cropping intensity and cropping calendar for the areas lower than El.1,200 m are shown in Table 5-3 and Figure 5-2, respectively. The cropping pattern A will be applicable for the area of reservoir type irrigation system, while the pattern B for the area of improved traditional irrigation system.

It is important to strengthen the adaptive research and the related extension activities to introduce new crops inclusive of fruits and vegetables into different agro-climatic areas. Then, it needs to render the intensive supporting services for the effective supply of farm input/production credit, especially to the small farmers who have less experiences of fruits and vegetable cultivation.

The adaptive research for vegetables cultivation should include the following;

- Application of modern irrigation method like furrow irrigation, drip irrigation, sprinkler irrigation etc.
- Use of plastic films for mulching/insects control and shading materials, and
- Introduction of greenhouse horticulture.

3) Improvement of Barani Cultivation

It is expected that a large area of Barani cultivation land will remain even in the target year of the Master Plan. Most of such lands are located in the mountainous areas, where the soil layers are shallow with poor fertility and steep slope is in general. Moreover, the soils are suffering from landsliding and soil erosion, and the local farm labors farming is quite inefficient due to heavy labor requirement. Consequently, both the land productivity and production efficiency are low in these areas.

Despite the above conditions in the Barani area, it will be possible to improve the cultivation with drought tolerant crops in applying the following methods;

Enrichment of Soil Moisture Retention Capacity

The increase of soil moisture retention capacity will make to raise crop yields through land leveling, application of organic matters, deep plowing and installment of plot dikes for water retention.

Control of Soil Erosion

The soil erosion control mentioned in 5.1.2 and improvement of terraces (see Figure C-3, Annex C) should be practiced to protect the soils from erosion.

Improvement of Cropping Pattern

The present mono cropping of wheat and maize must be changed to multi-cropping with legumes, root crops (potato) and green manure crops.

Improvement of Farming Practices

The improvement of farming practices will be made through timely planting, use of quality seeds and early maturing varieties, application of pretreatment/disinfection of seeds, application of adequate fertilizers, stripe seeding and weeding, etc.

To improve farming practices, it requires to establish effective and modern demonstration farms at on-farm level as well as to render powerful extension services.

5.3.3. Farm Mechanization Plan

Recently, a number of tractors has been introduced in the Project Area in the governmental program of tractor loan. The farm mechanization will contribute to raise the crop yields and cropping intensity and also to improve the quality of farm products through ensuring timely planting, deep plowing, efficient pest control and reduction of post-harvest losses. For the promotion of the farm mechanization, the farmers need to receive the following governmental services.

- Establishment of workshop
- Introduction of small size farm machinery
- Training of farmers on operation and maintenance of farm machinery

5.3.4. Animal Husbandry and Other Farming Plan

1) Animal Husbandry

Judging from the demand and supply balance of animal feed, the primary need is to increase the productivity of livestock in a number. To increase the production of livestock and poultry, the following measures should be taken in the project.

a) Quantitative and Qualitative Improvement of Feed Supply

The amount of crop residue and fodder will be increased with the increase of total crop production as mentioned in 5.3.2 "Crop Production Plan". The other quantitative and qualitative improvement of feed supply have to be made adequately by taking the following measures..

- Improvement of pasture/grazing land with planting of forage crops and trees,
- Development of grazing land from wasted land,
- Promotion of the straw treatment with urea or ammonia, and molasses,

- Utilization of untapped feed resources through raising of waterfowls like ducks, and
- Provision of extension services on the breeding and nourishing to farmers.

b) Strengthening of Animal Health Services

It is required to establish additional veterinary hospitals and dispensaries in the area where no such facilities are existing at present. The shortage of veterinary drugs and medicines should be remedied.

c) Strengthening of the Artificial Insemination Services

Establishment of additional Artificial Insemination Centers or Sub-Centers is needed to extend their services in the remote areas.

d) Promotion of Cross-Breeding for Improving of Livestock

It is required to distribute the studs of cattle and buffaloes, rams and he-goats for improving the genetic characteristics and to establish the natural breeding centers for the studs of cattle and buffaloes in the remote area.

e) Establishment of Livestock and Poultry Production Cooperatives

A special stress should be given to establishment of the livestock and poultry cooperatives so as to improve dietary life and farm economy of the small scale farmers in the area. For this purpose, the stock of chicken and ram, etc. will be rented together with raising facilities on the installment basis.

2) Other Farming Activities

It is proposed to establish bee-keeping centers at the strategic

locations for the education of the bee-keepers, especially the landless farmers on modern keeping technologies.

In addition to the above, the introduction of mashroom culture and scientific regeneration of medical plants should be on trial through adaptive research in the Project Area.

5.3.5. Farmers' Organization Plan and Institutional Development of Agricultural Supporting Services

1) Farmers' Organization

Reorganization and strengthening of the existing cooperative societies have to be promoted with paying a special attention to the small farmers for the supply of credit and farm inputs. In the areas where cooperative associations have not been established, the organization of new cooperative societies has to be promoted by the small farmers.

Reorganization and strengthening of the existing cooperatives as well as establishment of new cooperatives should be made effectively in close coordination between the Cooperative Department and UC organizations.

2) Institutional Development of Agricultural Supporting Services

It is expected that the local farmers themselves will play an important role to implement the proposed integrated rural development project which has multiple components. Special measures should be taken in the proper coordination among farmers' organizations and governmental agencies since the planning stage. For this purpose, the following institutional development is required;

a) Establishment of Coordination Body of the Integrated Rural Development Project

For the planning and implementation of the integrated rural development project, the coordination body between governmental organization and Union Councils have to be organized.

b) Establishment of Village Development Councils

The communication channels among villages and governmental organizations concerned should be established to play the key role for the following objectives;

- To provide the local people with the opportunity to learn development process and to develop the sense of identification with local problems,
- To give them full knowledge of their own potential resources for the development and confidence, and
- To enhance mutual affection and respect between the government and the local people.

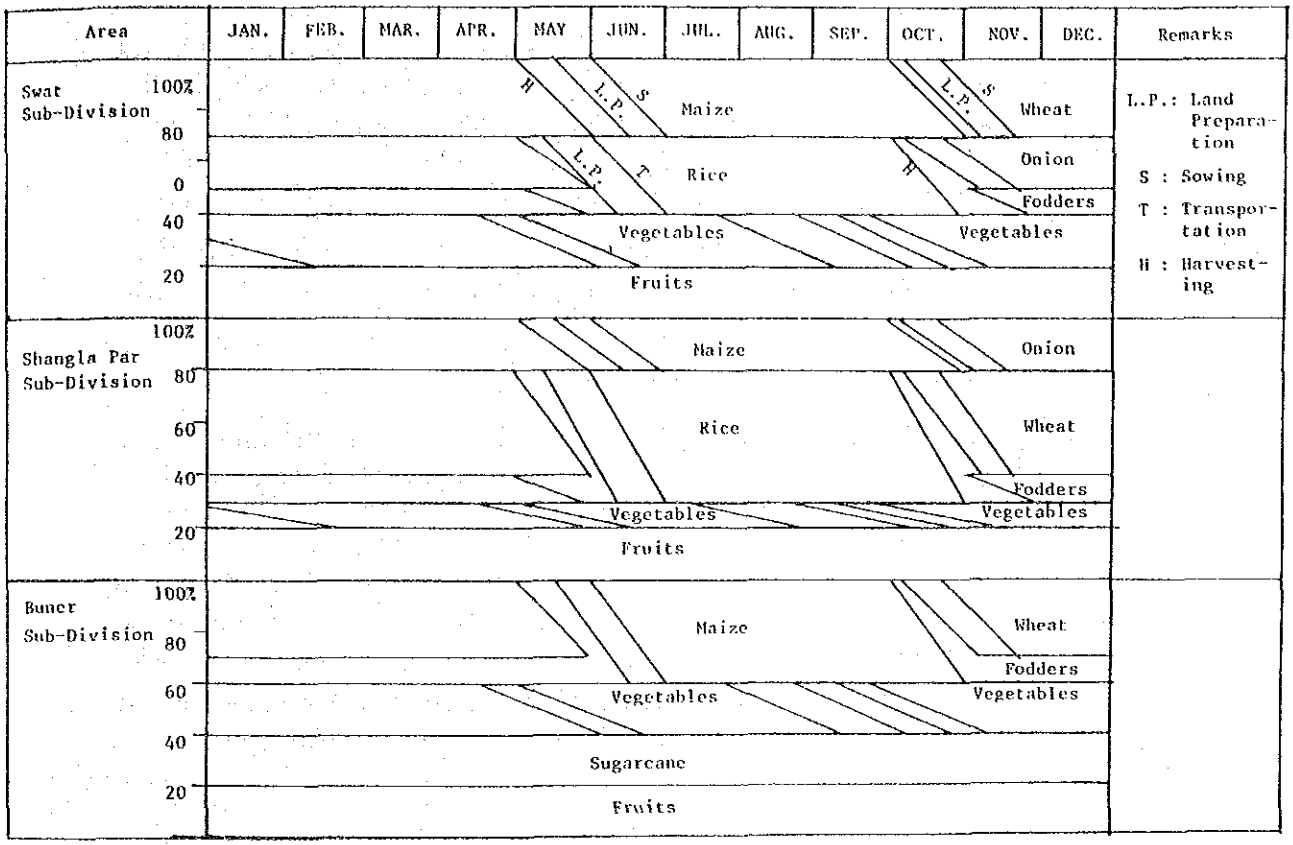
TABLE 5-3 PROPOSED CROPPING PATTERN AND INTENSITY

(Unit: %)

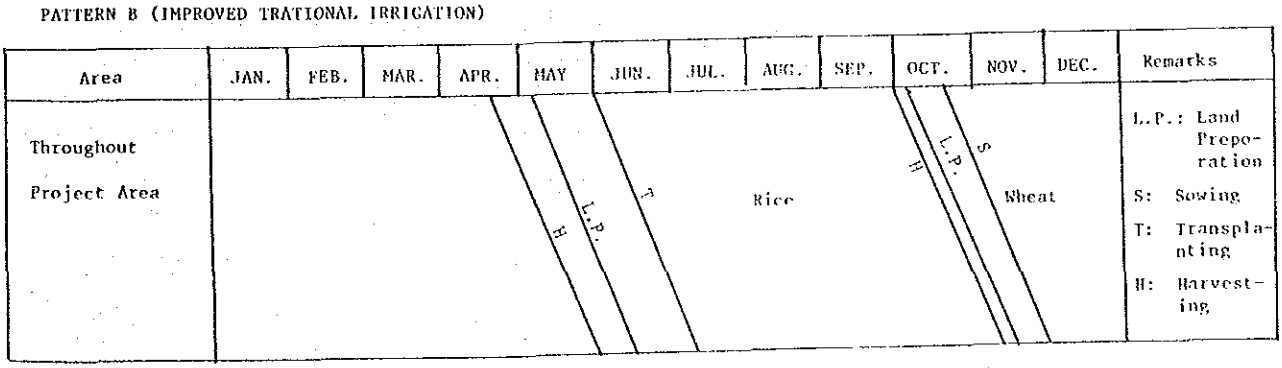
Crop	Swat Sub-Division	Shangla Par Sub-Division	Buner Sub-Division
1. Pattern A (Reservoir Irrigation)			
Kharif			
(1) Maize	30	20	40
(2) Rice	30	50	-
(3) Potato	-	-	-
(4) Sugarcane	-	-	20
(5) Fodders			
(6) Vegetables	20	10	20
(7) Fruits	20	20	20
Sub-Total	100.0	100.0	100.0
Rabi			
(1) Wheat	30	40	30
(2) Onion	20	20	-
(3) Sugarcane	-	-	20
(4) Fodders	10	10	10
(6) Vegetables	20	10	20
(6) Fruits	20	20	20
Sub-Total	100.0	100.0	100.0
Total	200.0	200.0	200.0
2. Pattern B (Improved Traditional Irrigation)			
Kharif			
Rice	100	100	100
Rabi			
Wheat	100	100	100
Total	200	200	200

FIGURE 5-2 PROPOSED CROPPING PATTERN

PATTERN A (RESERVOIR IRRIGATION)



PATTERN B (IMPROVED TRATIONAL IRRIGATION)



5.4. Rural Industry Development Plan

The development of rural infrastructure like road networks and electrification will make it possible to develop the rural industry in the Project Area. The promising rural industries are as follows;

- Fruit processing for squash, juice, jam, marmalade, etc.

  The development scheme of fruit processing is conceived as one of the promising schemes to be executed by the Cooperative Department.

- Processing of Marble Plate, etc.

  The marble processing development scheme is included as one of the components in the Buner Development Project.

- Processing of Construction Materials

  The increase in demand of gabions (GI wire and stones) is expected for the flood protection and soils conservation schemes in the Project Area. Also the use of concrete blocks and tiles will be increased in building works. The factories for these construction materials are suitable for rural areas.

- Processing of Leather and Wood

  As the Project Area is blessed with sufficient supply of animal hides and wood, the processing of them should be promoted.

- Handicraft

  The movement of Women Handicraft Cooperative Societies should be promoted to create job opportunities in sewing, embroidering and knitting for the local women.

5.5. Marketing and Agricultural Credit Plan

5.5.1. Marketing Plan of Agricultural Products

The main agricultural products in the Project Area are maize, wheat, rice as cereals, and vegetables and fruits. Most of the cereal products except maize are consumed in Swat District. Wheat and rice produced insufficiently are imported. Such vegetables are produced in cash-crops, as tomato, onion, potato, cauliflower and fruits as apple, persimmon, apricot, plum, walnuts, etc. are exported.

In the present marketing system, either facilities of marketing or transportation are incompletely provided, and yet, the local farmers are not so powerful in the marketing transaction as middlemans or wholeselers. Under the circumstances, the farmers have been beaten down with the farm gate prices of their products.

In considering these conditions, however, the free marketing facilities for farm products are proposed to be constructed in the project plan. This construction plan is contemplated by District Council in Swat.

And the proposed plan covers the scheme to provide these comprehensive facilities for collecting and supplying the marketing information. The information will be collected from not only the regional sources but the national level sources and supply the local farmers and people concerned, so as to keep them watching the changing market conditions for timely and profitable supply of the products as well as for holding the balance of the demand and supply in the market.

The following marketing facilities will be considered in the Project:

- Public auction facilities
- Public vendor
- Office space
- Car park
- Computer information system

The location of the proposed marketing facilities in Swat District are as follows :

Swat Sub-Division	Shangla Par Sub-Division	Buner Sub-Division
1. Mingora	1. Alupuri	1. Sawari
2. Matta	2. Aloch	2. Pir Baba
3. Khawazakhela	3. Chakesar	
4. Bahrain	4. Martung	
5. Kalam		
6. Kabal		

5.5.2. Agricultural Credit System Plan

The agricultural credit plan shall be worked out to stabilize the farm management fund for the small-scale and landless farmers to increase the agricultural productivity. However, there are some problems with small and tenant-farmer. The pure tenant-farmers have no land and other stable sources of income or mortgage fund as a security because of the strong influence of landlords. Many tenants do not have the fund to acquire all the required inputs and control their time for farm management. The tenant-farmers can get their share only by less than a half of the harvested yield.

An institution for crediting system serves generally favourable for the large-scale farmers and progressive farmers, because of minimizing their risks, following the simple formalities and promoting easily bank's loan by yearly disbursement target.

The agricultural credit system should be established with a special project fund for middle term for the small-scale farmers and tenant-farmers in the Integrated Rural Development Project in Swat District. This credit system plan will be extended by the Agricultural Development Bank of Pakistan (ADBP), and the Federal Bank for Cooperatives (Coop Bank) of Swat Regional Office will open a special account in the project office, in order to improve the small farmer's management fund.

Alternatively, the central ADBP will secure a loan from foreign funding institution for the Swat Integrated Rural Development Project.

5.6. Agricultural Infrastructure Plan

5.6.1. Irrigation Plan

The continuous endeavors are being made by the farmers as well as the government officers in charge to extend the irrigation area in order to steal out of the Barani dry farming.

However, the diffusing rate of the irrigation practices has reached only 40 percent even in the most developed Swat Sub-Division, 8 percent in Shangla Par Sub-Division and 11 percent in Buner Sub-Division.

The extension of irrigated area and completeness of the irrigation facilities are earnestly desired. It is quite essential to increase the implementation of schemes and to reinforce the present executing organization.

1) Delineation of Irrigable Area

To prepare the irrigation schemes in which the rivers with tributaries or streams can be the water resources, the possibility has been examined in the respective sites from the viewpoint of the availability of water and land as described below.

a) River Discharge at Proposed Intake Point

The monthly discharge at the intake point for each river has been estimated multiplying the catchment area by monthly run-off depth as explained in 5.2.1. "Development Plan of Surface Water Resources".

b) Crop Water Requirement

The crop evapotranspiration (ETc) is estimated in multiplying the crop coefficient of each crop by the reference crop evapotranspiration (ETo) adopted in NWFP based on the proposed cropping pattern as shown in Figure 5-2.

Reference Crop Evapotranspiration (ETo)

(unit: mm)

Month	ETo	Month	ETo
Jan.	1.8	Jul.	6.7
Feb.	2.5	Aug.	5.7
Mar.	3.7	Sep.	5.0
Apr.	5.5	Oct.	3.8
May.	7.4	Nov.	2.4
Jun.	8.4	Dec.	1.6
		Ave.	4.5

Data Source
1/ On-Farm Water Management Field Manual, prepared by Ministry of Food, Agriculture and Cooperative, Government of Pakistan
2/ Irrigation Requirement of Crop, prepared by Irrigation and Power Department, Government of Pakistan.
3/ FAO Technical Paper No.24.

c) Effective Rainfall and Maximum Water Requirement

The monthly water requirement was estimated in subtracting the monthly effective rainfall in the design year. The monthly effective rainfall was decided as the monthly sum of 80 percent of daily rainfall more than 5 mm, but daily rainfall less than 5 mm was neglected as ineffectual, for the values in Swat, Shangla Par and Buner Sub-Divisions by using the rainfall records at Charbarg, Karora and Daggar, respectively.

Maximum Irrigation Water Requirement (RI)
(Net value in month)

	Sub-Disivion	Winter Crop (Rabi) Month	mm	cu.m/ha	Summer Crop (Kharif) Month	mm	cu.m/ha
A,.	Proposed Cropping Pattern for New Develop. Scheme						
	Swat	Feb.	52	520	Sep.	130	1,300
	Shangla Par	Apr.	89	890	Jul.	146	1,460
	Buner	Apr.	48	480	Jun.	138	1,380
B.	Proposed Cropping Pattern for Improvement of Traditional Irrigation System						
	Swat	Feb.	107	1,070	Sep.	284	2,840
	Shangla Par	Apr.	154	1,540	Jul.	279	2,790
	Buner	Apr.	129	1,290	Jul.	243	2,430

The consumptive use and crop water requirement were computed and tabulated in Annex D.

d) Irrigation Area

The irrigable area in the month of maximum irrigation water requirement was estimated as follows;

$$IA = \frac{C \times RW}{RI}$$

where;

IA : Irrigable area (ha)
RW : River discharge (cu.m)
RI : Net irri. requirement (cu.m/ha)
C : Rate of water utilization
by weir : $0.6 \times 0.4 = 0.24$
by dam : $0.6 \times 0.9 = 0.54$
Irrigation efficiency: 0.60
(field losses + conveyance losses)
Intake efficiency
Weir : 0.40
Dam : 0.90

Hydrological Factor:

The river discharge required for the irrigation of one hectare of land is calculated and shown below as the hydrological factor to determine the irrigable areas in the respective schemes.

River Discharge Required for One Hectare of Irri. Area

(unit: cu.m/ha)

Sub-Division	In Case of Weir		In Case of Dam	
	Winter Crop	Summer Crop	Winter Crop	Summer Crop
A. Proposed Cropping Pattern for New Develop. Scheme				
Swat	2,170	5,420	960	2,410
Shangla Par	3,710	6,080	1,650	2,700
Buner	2,000	5,750	890	2,560
B. Proposed Cropping Pattern for Improvement of Traditional Irri. System				
Swat	4,460	11,830	1,980	5,260
Shangla Par	6,420	11,625	2,850	5,170
Buner	5,380	10,130	2,390	4,500

The following factors were also considered to determine the irrigable areas.

Topographical Factor:

The following items were studied based on the finding and information from site reconnaissance and 1/50,000 and 1/250,000 scaled topographical maps.

- Dam and reservoir construction,
- No dam but weir construction,
- Gravity conveyance of water, and
- Pump irrigation.

Land Use and Soil Factor:

The result of land and soil classification shown in Figure 5-1 was checked about the kind of soil, the elevation and the slope of land etc. for the determination of the irrigable area.

The irrigable areas in the respective proposed schemes are tabulated in Annex D after examination with three factors mentioned-above .

5.6.2. Farmland Improvement Plan

The farmland improvement programme is to be carried out considering the land classification shown in Table 3-1 and Figure 5-1.

Land Class irI Zone

: The small areas along the Swat river and the Barandu river.

The land improvement schemes are to be carried out at the farm land (the slope not more than six percent). The purpose is to establish the better operation and maintenance system of the irrigation facilities, and increase in irrigation efficiency by means of construction of new facilities as well as the improvement of the existing one.

Land Class dIIIe Zone

: The cultivated areas (the land slope not more than 15 percent) located on the vast alluvial fans around the Swat river and Barandu, Chamla and Badri rivers

The schemes are to be carried out in the extensive Barani fields for the purpose of effective use of rainfall and introduction of farming and hauling machinery to elevate both the labour and land productivities.

Land Class VIe - VIIe Zone

: The narrow cultivated fields in the mountainous area (the land slope between 15 and 65 percent) as commonly seen in Shangla Par Sub-Division.

The schemes are to be carried out in the terraced narrow Barani fields for the purpose of effective use of rain water and prevention of field erosion and soil losses.

Land Class VIIe - VIIIe Zone

: The mountainous areas (the land slope of 65 percent or more)

No effect can be expected in such steep mountainous areas and gravelly land even if improvement work are tried. Those areas should be provided for forests of fuel woods and grazing lands.

1) Consolidation of Irrigated Field (Land Class: irI Zone)

The development in the irrigated fields (land slope less than six percent) around the Swat river and Barandu river are planned in accordance with the following policy.

- Reorganization of the farm blocks by each owner-ship and provision of farm roads by improvement and unification of conventional small intakes and canals.
- Enlargement of the size of one farm block by land leveling for each ownership for effective irrigation and farming.
- Promotion of effective use of irrigation networks in expediting the completion of terminal structures following the existing irrigation facilities.
- Effective reuse of irrigation water by proper arrangement of the drainage canals.

2) Consolidation of Barani Field

dIIIe Zone

The improvement of Barani fields (land slope not more than 15 percent) on the vast alluvial fans developed along the Swat river and Barandu, Chamla and Badri rivers is designed in view of the following measures;

- Land grading and leveling works,
- Ridging, terracing and basin works etc.,
- Plowing-in of crop residuals after harvesting,
- Increase in porosity of the soil by deep plowing and subsoil breaking,
- Mulching for protection of crumb structure from breaking, and
- Retention of excessive water caused by heavy rain.

In addition to the above, it is necessary to conduct the consistent experiment, examination, research, demonstration, display and training including introduction of suitable varieties, new agricultural technology from foreign countries in order to elevate the productivity in the Barani farming.

For the above, it is desirable to establish the "Agricultural Technology Transfer and Demonstration (ATTD) Farm" and the branch farms in Nipki Khel and the other suitable places in order to study and prove the effect of the research. It is also important to cooperate with existing BARD (Pakistan-Canada Cooperation Project).

VIe - VIIe Zone

The improvement of Barani field (the land slope is a range from 15 to 65 percent) mainly seen at the highland in Shangla Par is quite different from that in the above-mentioned dIIIe Zone, and it is required to be consolidated as the terrace farms.

For the development of such terrace farming area, it is important to pay attention to the soils and water conservation method for the total resources control in view of the overall watershed management.

- The measures should be taken for maximum utilization of the limited rainfall,
  - ° To decrease the surface outflow of rainwater by ridging and basin works, and to increase percolation of rainfall into the fields,
  - ° To prevent soils erosion by heavy rainfall and to retain the rainwater in the soils,
  - ° To lead the rainwater from fallow land to cultivated farms, and
  - ° To increase porosity in the soils by deep plowing and plowing-in of crop residuals,

- The measures should be taken for the watershed management and farmland improvement,
  - ° To store rainwater by contour ditches provided in the forests and grazing lands located higher than the terrace farms,
  - ° To plant tree for fire woods, fodders and fruit crops in the spaces between the ditches,
  - ° To construct drainage canals, erosion stoppers and protectors,
  - ° To introduce "agro-forestry development method" by replacing farmlands in steep slope with the fire wood forests or grazing land,
  - ° To make contour ditches and contour levees,
  - ° To reform the existing fields to the shape along the contour to increase the water holding capacity, and
  - ° To retain rainwater in the farm ponds for the use.

- The measures should be taken for farming management and activities,
  - ° To widen levee crests, farm boundary width, and ditch border crests for smooth access of bull carts and small-size equipment to the farm plots.

VIIe - VIIIe Zone

The following measures are to be taken to this zone as the minimum investment.

- To make erosion control for protection and conservation of the farmlands located lower, and
- To provide access roads in minimum scale to this area,

5.6.3. Flood Control and River Protection Plan

There are several major rivers and their tributaries flowing through the area, and a sudden increase in the river discharges has been observed immediately after heavy rainfall in the monsoon. Such heavy rainfall results in muddy flows and sometimes even debris flows, which do serious damages to the farmland and public facilities.

As a consequence, the following flood control and river protection schemes should be urgently realized with flood protection measures properly provided for land and social properties.

- The comprehensive site investigation for the present situation of damaged scale and values etc.,
- Layout of prevention plans adopted for the respective damages,
- Establishment of mass production system of standardized materials such as gabions (stone and wire), stone baskets etc.,
- Construction of soil saving dams and riverbed protective structures upstream from damaged sites, and
- Presentation of necessity and formulation of the project plans to accelerate the implementation of the schemes and to increase project fund.

1) Protection of Damages

At meandering parts and confluences of main streams and tributaries, the river banks and riverbeds should be protected with

gabions, stone baskets, concrete blocks, ground sills and stone mattresses. The spurs and flow diversion walls should be installed at the suitable places in order to reduce the flow energy and strong vortex motions to scour out the river banks and beds. Those are made of gabions, stone masonry and concrete. There are many places with the existing protective structures scoured and washed away. And standardized ground sills, foot protections or pile works will be required to fix the protective structures. It is effective to establish the mass production system of the standard materials for this sort of river protection works for the reduction of the construction cost and for the acceleration of the works.

2) Erosion Control and Stabilization of Sharp Flow Sources

For the captioned measures, it is very effective to construct soil saving dams, stepped chutes and sedimentation ponds in the suitable sites of the valleys, and steep streams keeping in the closed contract with the "Watershed Management Schemes" and the "Soil and Land Conservation Schemes" which have been executed by other governmental agencies.

5.7. Rural and Social Infrastructure Plan

5.7.1. Road and Transportation Plan

1) Road Development Plan

In Swat District road improvement and construction schemes are planned and carried out steadily by the Communication and Works Department. However, strengthening of the project implementation organization and of the implementation capacity are required in order to meet the increasing traffic volume and requests from local people who do not have proper access roads. The on-going road development schemes in the District are classified as follows;

a) Improvement Schemes of the Trunk Roads: to secure safe traffic

Currently, the traffic in the District has been concentrated to some existing trunk roads, which have neither provided capacity to cover the present traffic volume nor secured safety traffic. A considerably large-scale improvement and upgrading works have been carried out to meet an increasing traffic demand by gradual economic development and to ensure the safety traffic. The major works now in progress are widening, improvement of tight corners, heavy grade, sights, etc.

b) Construction Schemes of the New Link Roads: to link present roads

In the District some roads do not have link roads due to the mountainous topography. Construction of those link roads will directly contribute to the development of road networks in the entire District. Also it will mitigate an over crowded traffic in the present trunk roads.

c) Pavement Schemes of the Branch Roads: to secure traffic for rural villages

It is strongly requested to secure local traffic through providing paved all-weather roads. To ensure marketing roads is very important as a base of local economic activities. The schemes will effectively provide

various functions for social services such as health care, education, post as well.

d) Construction Schemes of the Branch Roads: to provide roads for remoted villages

Those schemes will improve connection of villages with higher road density secured in the District.

The above-mentioned road development has been carried out at present, but some other schemes will be required as future plans as follows:

- Strengthening of road maintenance system

  The length of roads in the District is increasing in total year by year. And, a proper maintenance system should be established through training the staffs, and providing construction machinery and others.

- Development of touring roads

  The development of the tourism resources especially in the Upper Swat area will inevitably require road construction and improvement works for existing ones.

- Filling up facilities for safe traffic

  Safe traffic should be secured by installing sign boards, side fences, road lines, corner mirrors, etc.

The highway Division, Communication and Works Department is responsible for planning and implementing the annual works of the road development and improvement. But at present, the yearly work volume is quiet limited by various reasons.

Consequently, it is difficult to accelerate the time-consuming works in the yet-undeveloped mountainous areas. Such being case, enhancement of the present executing organization for expediting the works is essentially required as a matter of urgency in view of indispensable role played by roads for development works.

2) Development of Public Transportation Services

The public transportation services should be developed through improvement and organical establishment of the road networks. The road networks arranged functionally will enable the local transportation available by large-size buses and tracks to result in regional economic vitalization. And the development of the area will ensure the increase in passengers and freights. The development of functional road systems, thus, plays a vitally important role as well as improvement of the road facilities. Relationship between roads and vehicles can be shown as follows;

- Trunk and Important Branch Roads : Large buses and trucks
- Branch Roads : Middle size buses and trucks
- Katcha Roads : Pick-ups

5.7.2. Small Hydel Power and Rural Electrification Plan

1) Electricity Supply Plan

There is a serious regional gap in rural electrification in the District. For Shangla Par Sub-Division, the family coverage of electricity supply shows the lowest rate by seven percent, which suggests the Sub-Division to be less developed in the area. Such regional depression should be improved for the well-balanced total development of Swat District. As future plan, WAPDA proposed to construct grid stations at Khawazakhela and Madyan in the Upper Swat and Chakesar or Martung in Shangla Par Sub-Division.

The main source of power supply for the District is Tarbela Dam which is operated by WAPDA with capacity of 2,000 MW at present (3,760 MW future plan). There are two transmission stations to supply with seven distribution blocks in the District. The Upper Swat area and Shangla Par Sub-Division are not included in this power supply system. WAPDA is extending the supply system through expanding transmission lines in addition to the present system.

Small hydel power stations requiring comparatively high cost of construction and operation/maintenance are planned in only remote mountainous areas by the Government of NWFP. GTZ (Deutsche

Gesellshaftfuer Technische Zusammenarbeit Gmbh, West Germany) are counterpart of SHYDO since 1986 to prepare a Master Plan of "Small Hydel Power Development for Remote Mountainous Areas in NWFP", which will cover Chitral, Dir, Swat, Kohistan and Mansehra Districts. The data regarding a Master Plan Study for Swat District was obtained on July 1989. According to the data, there is no potential sites in Shangla Par Sub-Division for small hydel power generation.

At present there are about 100 sites proposed by Public Engineering Cooperation for small hydel power plants in NWFP, of which 16 sites are in Upper Swat. Construction of micro-hydel power stations in Shangla Par Sub-Division, in which rural electrification is little developed, is urgently needed for the total development of the area. The hydel power development in Upper Swat area should also be carried out for the tourism development in future, too.

2) Rural Electrification

According to the electricity supply plan obtained from Irrigation Department, a supply unit for domestic use is estimated at 0.54 kilowatt (kw) per household, and this supply for domestic use is the main purpose of rural electrification. Also the rural electrification will contribute to the improvement of social services such as health care, education, vocational training, etc. Introduction of lift pumps for irrigation and drinking water supply will be encouraged in order to raise the agricultural production and to increase benefit by hygiene village water supply. Small industries will be encouraged, too, to create new job opportunities in the rural area.

Such a variety of electricity demand will be expected in future as domestic use, education facilities, health care, agriculture including pilot farm, veterinary center, etc., fish breeding, street-lightning, small factories, markets, tourist facilities and others. The rural electrification as a base of rural development should be promoted strongly.

5.7.3. Village Water Supply Plan

Village water supply can contribute to the improvement of living conditions in rural areas. Hygienic living condition will be ensured through safe drinking water supply, and guidance on sanitation will be

required together with water supply. The proposed plan can relieve women and girls from the hard work of fetching drinking water, so that they can join social activities. Girls will be able to attend to primary education, and the present very low participation rate of girls by six percent on average of the District will be raised. The women are expected to find job opportunities at handicraft shops, etc. for cash income. And improvement of the social status of the local women will indispensably require to provide a variety of social infrastructure such as water supply system, facilities for education and vocational training, social welfare service organization, etc.

The water supply facilities in Shangla Par Sub-Division are provided only at low level showing the smallest population coverage in Swat District. Shortage in electricity and roads in Shangla Par restricts the implementation of water supply schemes. For example, lift pumps cannot be introduced as steady electricity supply is not available.

The following considerations should be made for the implementation of the water supply schemes. They are;

Improvement of Intake Facilities

The intake facilities on the streams should be of groundsill type to protect the river bed from erosion. The water will be taken and stored in distribution tanks through pipes. Tanks should function to sterilize and filter the water.

Construction of Storage Facilities

There are seasonal fluctuations of stream discharges, but, water supply should always be stable. In order to meet the increasing water demand in future, construction of regulating and/or storage facilities should be constructed.

Coordination with Rural Electrification

Electricity supply is required to introduce tube-wells and lift pumps. When rural electrification is progress, the coverage of the safe water supply will be widely expanded.

Water Sharing

A certain amount of village water supply should be included in the irrigation systems. And the water released from the small hydel power plant will be used for domestic use.

5.7.4. Rural Infrastructure Plan

The development of rural infrastructure covers various sectors, and the following paragraphs discuss the sectoral development plans.

1) Education Facilities

The main purpose of the local education is to give an opportunity of the primary education to the local people as much as possible. And, recently, a number of school buildings have been constructed so that the local people can easily attend school in their living places. In the District, there are a very few middle and high schools for girls' education, although regional difference is observed in number.

While rapid increase in schooling facilities is required, there is a fact that well-trained teacher can not be secured in enough number to meet requirements. Consequently the development of education in the District through providing the new schools should be planned on the long-term development basis. On the other hand, it should be realized in short-term to improve the existing facilities such as classrooms, water/power supply, sanitation, etc. Establishment of residence for teachers is also required to secure the qualified teachers smoothly in sufficient number.

2) Health Care Facilities

The existing health care facilities should be improved as soon as possible together with improvement of other infrastructure such as roads, water/power supply and sanitation. Upgrading of dispensaries into BHUs is required to strengthen the health care system in the District. Although each BHU needs a resident for doctor, it is impossible to bring up a large number of qualified doctors in a short period. In order to secure many doctors in future, residences for health care staffs should be required at present. It should be prevented to construct any new BHU and/or RHC without concrete staffing ensured.

3) Sanitation Facilities

A few village sewage schemes and sanitation schemes are on-going with a population coverage of one percent or less. Considering population growth, the present unfavourable sanitary conditions should be improved as early as possible. The Government, however, has been implementing mainly village water supply schemes, and generally, the local people are not interested in sanitations facilities. Guidance on improvement of sanitary condition should be given to the local people, and their self-construction of sanitation facilities should be encouraged. On the other hand, the Government should strengthen the implementation body of the village sewage schemes and steadily raise the population coverage rate of sewage systems. Also, sufficient sanitation facilities are required for tourism development.

4) Social Welfare Facilities

Strengthening of vocational training for women is given the first place in this sector. At present, there are few social welfare activities except those in Swat Sub-Division. These activities should be extended to other areas of Shangla Par and Buner Sub-Divisions. Needleworks are one of the famous local works in Swat District, and will give a good job opportunity to the women for cash income and help to improve social status of the women. Training of the capable leaders for womens' activities are necessary in order to improve the handicraft technique and to keep quality of their products. Financial assistance of the Government is needed to improve the related facilities and to supply training materials.

5) Communication Facilities

Extension of telephone lines and improvement of dialing system are requested by local people. Completed telephone networks which will cover all the villages in the District will greatly help to develop the regional marketing. Also more post offices will be required in future as the local literacy rate are improved.

5.8. Social Forestry and Tourism Development Plans

5.8.1. Social and Farm Land Forest Development Plans

1) Long-Term Targets

Target : To secure fire wood and timber for village inhabitants

Plan : Establishment of village/public tree nurseries, afforestation in the village woodlots and Forestry Cooperative Society.

2) Social and Farm Land Forest Plan

In the rural areas like Swat District, the energy sources other than fire woods are rarely available. The local people depend their fuels mainly upon fire woods collected in the prevented forests and farm land.

According to the Household Incomes & Expenditure Survey, 1984-1985, Federal Bureau of Statistics, the monthly fuel cost per households in NWFP is averaged at about Rs.143, which is 60 to 120 percent higher than the average cost in other four provinces. Percentages of major fuel costs to the total household expenditures are 59.3 percent of fire wood, 9.9 of kerosion, 9.0 of dung cakes, 7.0 of weeds and 6.9 of electricity. The consumption structure of the fuel in Swat District shows the similar trend to NWFP as mentioned above.

Even in future, fire woods consumption in the rural areas will increase with population growth, unless kerosene and electric power become available more economically and easily. This will give an adverse effect to the soils and water conservation which is conceived for the total resources control in Barani of the whole watershed of the Project Area.

According to the forestry development policy taken in the Seventh Five-Year Plan, much emphasis is laid on the programmes of social and farm land forestry on marginal private land. At present, the following projects are in progress;

- Agriculture, Forestry and Cooperative Department, NWFP is executing the Social Forestry Pilot Project in Malakand (1985/1986 to 1989/1990, West Germany Aid) is to meet the above-mentioned national policy.

- In Buner Sub-Division, the social and farm land forestry project is executed to attain the purpose on the social forest. This is one of the components of the Buner Development Project (1988 to 1991, EC Aid).
- The Kalam Integrated Development Project, Phase III (1987 to 1992, Switzerland Aid) is under implementation on the following four sectors of forest, village development, human resources and agriculture. The social and farm land forestry works are making a good grogress under forest and village development sectors.
- The Watershed Management and Forest Extension Project in Dir-Swat District Phase II (1987 to 1990, Nederland, FAO Aid) has the main components of forest, soil and water conservation, and pasture and grassland improvement. The project area is the Swat Sub-Division excluding Kalam area. The subject on the social and forest sectors is not emphasized in this project.

The basic plan of forest development in this study is proposed as shown below, taking into account the development necessity and the contents of the on-going projects.

i) The social and farm land forest project is to be achieved in the village woodlots. The project lots will be found from the following land category except forest land.

Uncultivated Land

(unit; 1,000 ha)

District/ Sub-Division	Culti-vable Waste	Pasture Land	Grazing Land	Timber Forest	Non Available for Cultivation	Total
Swat	5.3	20.2	100.5	140.3	140.7	407.0
	(0.5)	(2.8)	(67.1)	(86.3)	(161.7)	
Shangla Par	4.1	31.4	14.5	39.8	6.2	96.0
Buner	5.8	18.1	52.7	31.8	8.8	117.2
Swat District	15.3	69.7	167.7	211.9	155.7	620.2

Note: Figures in the parenthesis of Swat Sub-Division are those in Kalam and Bahrain Sub-Tehsil. Non available land for cultivation are river sites, village land, grave, precipice and hill of Kalam etc.

It is considered that the marginal private land planned in the Seventh Five-Year Plan is found in the land other than timber forest land.

ii) Establishment of village nurseries and afforestation will be planned in each village. The unit area is planned as follows taking into account the contents of the Social Forestry Pilot Project in Malakand and the Buner Development Project.

Village Nursery : 1.2 ha (3 acre)/village
Afforestation: : 40 ha (100 acre)/village

iii) The areas of village nursery and afforestation in the Plan can be estimated as indicated below using above basic unit area;

Social and Farm Land Forestry Scheme

District/ Sub-Division	No. of Hamlet	Nursery (1.2 ha/village) (ha)	Afforestation (40 ha/village) (ha)
Swat	900	1,080	36,000
Shangla Par	184	220	7,360
Buner	540	650	21,600
Swat District	1,624	1,950	64,960

Note: 1/ Figures in Swat Sub-Division are exclusive of the figures of Kalam Integrated Project.
2/ Figures in Buner Sub-Division include the figures of Buner Development Project.

In the land use plan described in paragraph 5.1.1, the planning areas of forest land to be converted from pasture and grass lands is forecasted at 15,000 ha. This area will be included in the afforestation areas of 64,960 ha as shown in the above table. And hence, the remaining areas will be developed in cultivable waste land, grazing land and land unavailable for cultivation. In this Master Plan, an afforestation for social and farm land forest (15,000 ha) will be given priority.

iv) This plan will be promoted through a village-based social forestry programme prepared by related village people, and in order to execute this plan, Forest Cooperative Society will be established. This Societies will have the responsibilities for

raising of nurseries, management of plantation and marketing of the yields.

5.8.2. Tourism Development Plan

1) Long-Term Target

Target : To strengthen the strategy for attracting tourists.

Plan : Investment to public facilities for tourism so as to increase the regional income and generate employment opportunity.

2) Tourism Plan

a) Development of Resort Sites for Tourism in the Sakhrah Valley

Site and Tourism Resource

The Sakhrah valley is located in just opposite site of Fatephur town across the Swat river. The main gate of the valley is placed at Baghaderi village, about 46 km away from Saidu Sharif. The Nallah and Khwar flow in the heart of the valley to run into the Swat river. A Katcha road starting from Baghaderi village runs about 19 km along the Nallah. The altitude of this valley, where the road ends, is about 1,650 m. The tourists can enjoy the uphill along the valley with luscious green and apple trees.

The snow-capped high mountain ranges are at the back of the valley. These mountains are easily accessible and can be crossed easily by the tourists, who like to go hiking, trekking towards Darral Darrah lake.

Those tourists who are interested in fishing can do angling in the Swat river and the Nallah. The important lakes of Darral, Saidgai, Kungal and several other ponds are dotted in the high mountain area. The local inhabitants of the area have keen interest in developing the area as a tourisms resort.

Plan of Tourism Facilities

One motel is proposed to be built at the Sakhrah valley in order to establish a new tourism resort, and shall be managed under the jurisdiction of Ministry of Tourism and the Pakistan Tourism Development Corporation (PTDC).

It is reported that the road leading upto Sakhrah from Baghderi will be metaled in near future.

b) Construction of Motels in Mingora and Madyan

Site of Building

- Site of new motels is proposed at the outskirt of Mingora in front of the Emerald Mines near the bank of Swat river. The place is about 2.5 km away from Mingora, and

- Another site of motel is proposed at Madyan where is the center of all off-shoots in the valley.

Social Ground of Establishments

- Mingora;

  The Municipal Park is located near the bank of Swat river. During the summer season, all the tourists staying in the hotels in Mingora and the local inhabitants go to the Municipal Park seeking for refreshing.

  The building of the new motel is expected to attract tourists. The said site of the new motels is only along the main road leading to Madyan, Behrain and Kalam. And from there, the terminal building of the airport across the Swat river can be seen.

- Madyan;

  The private sector playing the important role in tourism in Madyan build a few high class and ordinary class hotel and restaurants. It is reportedly that many tourists visiting Swat and other visitors with limited purse look for an average accommodation fulfilling their requirement, but they ultimately depend on substandard hotels and leave a bad

impression on their mind. Establishment of a reasonable motel accommodation at Madyan shall be met the requirements of tourist mentioned above.

5.9. Long-Term Target and Stage Development Plan

The proposed long-term targets for each sectoral development plan and their staged development plan upto the target year of 2005 are shown in Table 5-4, 5-5 and 5-6.

TABLE 5-4 LONG-TERM TARGET AND STAGE DEVELOPMENT PLAN (AGRICULTURAL SUPPORTING SERVICES) (1/2)

Section / Program	Long-Term Aim		Development Scheme in Different Terms					
			Short-Term Scheme		Middle-Term Scheme		Long-Term Scheme	
	Item	Object of Program	Schemes	Description	Schemes	Description	Schemes	Description
1. Agricultural Development Plan								
1. Research	1. Implementation of Semi-Detailed Soil Survey	To implement the semi-detailed soil survey with preparation of soil maps (Scale, 1 : 5,000) in 215,000 ha.	– Soil Survey Scheme	– To make soil survey and prepare soil maps in 43,000ha	– do –	– do –	– do –	– do –
	2. Strengthening of Agricultural Research Sub-Station for High-Altitude Agriculture	To make a research on high-altitude agriculture	– Establishment of the Kalam Research Sub-Station.	– To construct building with provision of facilities and equipment				
	3. Upgradation of Agricultural Research Activities	To strengthen agricultural research activities			Establishment of Agricultural Research Institute	– To construct building with provision of facilities and equipment		
2. Extension and Seed Multiplication	1. Agricultural Technology Transfer and Demonstration	To train the farmers in Swat District for the development of agricultural production	– Agricultural Technology Transfer and Demonstration (ATTD) Farm	– To establish a main farms and five branch farms				
	2. Strengthening of Agricultural Extension Activities (Except Buner Sub-Division)	To strengthen the agricultural extension activities through increasing the staff for the areas inclusive of remote areas with provision of facilities and equipment.	– Agricultural Extension Center Establishment Scheme	– To construct Agricultural Extension Centers and Sub-Centers. – To Provide audio-visual aids and transportation facilities, etc.	– do –	– do –	– do –	– do –
	3. Crop Maximization of Basic Crops (Cereals and Others)	To multiply the seeds of creals and other crops and to demonstrate the package of technology	– Seed Farm Establishment Scheme	– To establish seeds production and processing farms				
	4. Strengthening of Agricultural Extention for Fruits and Vegetables	To improve the production of fruits and vegetables	– Fruits and Vegetables Extension Establishment Scheme – Nursery Station Establishment Scheme	– To construct Fruits and Vegetables Extension – To provide gardening tools and equipments – To establish nursery station	– do –	– do –	– do –	– do –
	5. Strengthening of Extension Services on Bee-Keeping	To develop modern bee-keeping	– Bee-Keeping Center Establishment Scheme	– To establish Bee-Keeping Centers	– do –	– do –	– do –	– do –
3. Soil Conservation	1. Expansion of soil Conservation Project	To implement soil conservation works for the protection of soil erosion with maximization of soil moisture in the expanded area	– Implementation of Soil Conservation Works	– To establish offices and workshop – To provide soil conservation equipments – To implement soil conservation works	– do –	– do –	– do –	– do –
4. Farm Machanization	1. Introduction of Small Farm Machinery	To introduce small farm machinery for the group use of small farmers on the installment basis.	– Distribution of Small Farm Machinery	– To rent small farm machinery to small farmers				

TABLE 5-4 LONG-TERM TARGET AND STAGE DEVELOPMENT PLAN (AGRICULTURAL SUPPORTING SERVICES) (2/2)

Section / Program	Long-Term Aim		Development Scheme in Different Terms					
			Short-Term Scheme		Middle-Term Scheme		Long-Term Scheme	
	Item	Object of Schemes	Schemes	Description	Schemes	Description	Schemes	Description
5. Animal Husbandry	1. Improvement of Animal Nourishment	To provide farmers with extension services on animal husbandry and pasture improvement	– Animal Nutrition Center Establishment Scheme	– To establish Animal Nutrition Centers	– do –	– do –		
	2. Strengthening of Veterinary Health Services	To upgrade the existing veterinary dispensaries into fullfledged Veterinary Hospitals or to establish new Veterinary Dispensaries	– Upgrading of Veterinary Dispensaries into Veterinary Hospitals	– To upgrade the existing veterinary dispensaries into Veterinary Hospitals or to establish new Veterinary Hospitals	– do –	– do –	– do –	– do –
	3. Expansion of Natural Breeding Services	To expand the natural breeding services for improvement	– Natural Breeding Center Establishment Scheme	– To establish Natural Breeding Center	– do –	– do –	– do –	– do –
	4. Strengthening of Artificial Insemination Services	To establish new A.I center or sub-center for extension of services in the remote area	– Establishment of New A.I Centers / Sub-Centers	– To construct building with provision of facilities, equipment and materials	– do –	– do –	– do –	– do –
	5. Promotion of Cross-Breeding	To raise the productivity of livestock and poultry through cross-breeding	– Studs Livestock Distribution Scheme	– To distribute livestock	– do –	– do –	– do –	– do –
			– Poultry Hatchery Establishment Scheme	– To construck poultry hatchery				
6. Farmers' Organization and Farm Inputs Supply	1. Expansion and Strengthening Cooperative Activities (Cooperative Office)	To increase the members in the existing multipurpose cooperative societies and to organize new cooperative societies	– Cooperative Offece Establishment Scheme	– To establish cooperative Offices	– do –	– do –		
			– Cooperative Bank Establishment Scheme	– To establish cooperative Bank Offices				
	2. Installment of ADA Sale Points and Warehouse	To supply farm inputs at reasonable prices in the remote areas	– ADA Sale Point / Warehouse Establishment Scheme	– To establish ADA Sale Points and warehouse				
7. Small Industry	1. Expansion and Strengthening of Women Handicraft Cooperative Societies	To organize new Women Handicraft Cooperative Societies and to provide training services with lending materials	– Establishment of Women Handicraft Sub-Center	– To construct women Handicraft Inspectoress and Women Handicraft Center				
			– Provision of Training Services with Lending Machinery / Equipment and Materials	– To lend sewing, embroidering and knitting machinery with materials				
	2. Fruit Processing	To develop fruits processing on the cooperative basis			– Pilot Scheme of Fruit Processing (squash, juce jum, marmalade, various dry fruits, etc.)	– To establish cooperatives of fruit processing – To construct building and plant		
	3. Training of Woodcraft Processing	To train people for woodcraft			– Establishment of Wood Work Training	– To establish Woodcraft Training Center – Construction of building with provision of equipment		
	4. Gabion Making	To develop gabion making	– Pilot Scheme of Gabion Factory	– To establish gabion factory				
8. Marketing of Agricultural Products	1. Improvement of Marketing System and Facilities	To improve the marketing facilities in the Project Area in favor of farmers	– Constraction / Rehabilitation of Marketing Facilities	– To construct / rehabilitate Marketing Facilities	– Establishment of Marketing Assistance for Marketing Information			
9. Agricultural Credit	1. Expansion of Agricultural Credit Service	To finance farm credit for the small-scale and tenant farmers			– Financiry of production credit to small farmers			

TABLE 5-5 LONG-TERM TARGET AND STAGE DEVELOPMENT PLAN (AGRICULTURAL INFRASTRUCTURE)

Section / Program	Long Term Target		Stage Development Plan					
			Short-Term Schemes		Middle-Term Schemes		Long-Term Schemes	
	Item	Object of Program	Scheme	Description	Scheme	Description	Scheme	Description
II. Agricultural Infrastructure Plan								
1. Irrigation and Farmland Improvement Works	1. Implementation of On-going Irrigation Schemes	To improve and newly establish the irrigation facilities in conformity with 7th Five Year Plan to elevate irrigated agriculture by means of improvement and new establishment of Irrigation facilities	– Usheron Irrigation Scheme – Budal Irrigation Scheme – Kar Shalezara Irrigation Scheme – Nawagai Lift Irrigation Scheme – Chur Ghshto Lift Irrigation Scheme	– To harvest and diffuse highland vegetables, cash crops and seeds – To materialize effective utilization of surface water resources to steal out of Barani farming				
	2. Implementation of New Schemes	To steal out of Barani farming and improve farming circumstances by means of new irrigation scheme including construction of head regulator.	– Nipki Khel Irri. Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. System	– Expansion of irrigable area by extension of Nipki Khel canal.	the same as left Stage 2 : D/D and Fund Arrangement of Development Project, Improvement of Existing Irri. system			
			– Deolai Khwar Irri. Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. System	– Improvement of existing irrigation system, construction of permanent off-takes, reinforcement and lining of canals and protection of riverbanks and farmlands from floods	the same as left Stage 2 : D/D and Fund Arrangement of Development Project, Improvement of Existing Irri. system			
			– Barwai Khwar Irri. Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. System	– Improvement of existing irrigation system, construction of permanent off-takes, reinforcement and lining of canals and protection of riverbanks and farmlands from floods	the same as left Stage 2 : D/D and Fund Arrangement of Development Project, Improvement of Existing Irri. system			
			– Harnoi Khwar Irri. Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. System	– Improvement of existing irrigation system, construction of permanent off-takes, reinforcement and lining of canals and protection of riverbanks and farmlands from floods	the same as left Stage 2 : D/D and Fund Arrangement of Development Project, Improvement of Existing Irri. system			
		Effective Utilization of Water Resources by Discharge Control of Swat River	– Swat River Basin Irrigated Agriculture Development Project Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system		Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system		Stage 3 : Construction stage of Development Project	
							– Kuz Kabulgram Irri. Scheme	– Irrigation, electric and domestic water supply by dam construction
			– Jambal Derai Water Utilization Scheme	– Hydel power, irrigation and domestic water supply				
			– Kana Khwar Water Utilization Scheme. Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– To supply electricity, domestic and irrigation water by construction of Dam	Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left	Stage 3 : Construction stage of Development Project	the same as left
			– Chagarzai Irri. Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– F/S, D/D and Fund Arrangement	Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	– Implementation of irri. scheme by construction of Dam		
		To steal out of Barani farming with Small Scale Irrigated Agriculture Scheme by means of intermittent flow of streams.	– Small Scale Irrigation Schemes Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– Implementation of irri. scheme by construction of farm pond	the same as left Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left	Stage 3 : Construction stage of Development Project	the same as left
		To use effectively spring outflow by means of reservoir tank	– Tank Program Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– To secure irrigation and domestic water by mountainous springs	the same as left Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left		
		To improve irri. system, generation of hydel power, flood protection etc.	– Irrigation and Hydel power Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– To secure irrigation, electricity and domestic water use (puran)	Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left (Choga, Chakesar)		
		To supply irrigation and domestic water by groundwater development	– Chamla Basin Groundwater Development Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– To secure irrigation and domestic water supply drawing up the groundwater by tube-wells	the same as left Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left		
			– Badri Basin Groundwater Development Scheme Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	– To secure irrigation and domestic water supply drawing up the groundwater by tube-wells	the same as left Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left		
2. Barani Farmland Improvement Plan	Elevation of Labour and Land Productivities in Barani Farming	To establish Research Center to conduct experiments, studies, exhibitions, training and diffusion.	– Establishment Scheme of ATTD for Barani Farming Foundamental Research		– Barni field consolidation scheme	– Provision of land levelling and terrace works, land plot arrangement, farm roads and drainage canals	the same as left	the same as left
3. Flood Control & River Protection Plan	Land Conservation by means of Riverbank and farmland Protection against Flood.	Protection and Conservation of Farmlands, Irrigation and Public Facilities against Flood in Swat River and the Tributaries	– Flood Control and River Protection Scheme in Swat River	Stage 1 : Investigation of present situation F/S of Development Project Improvement of Existing Irri. system	the same as left Stage 2 : D/D and Fund arrangement of Development Project, Improvement of Existing Irri. system	the same as left Protection along Swat main river	the same as left Stage 3 : Construction stage of Development Project	the same as left Protection along tributaries

TABLE 5-6 LONG-TERM TARGET AND STAGE DEVELOPMENT PLAN (RURAL INFRASTRUCTURE, SOCIAL AND FARM LAND FOREST AND TOURISM)

Section	Long Term Aim		Development Scheme in Different Terms					
			Short-Term Scheme		Middle-Term Scheme		Long-Term Scheme	
	Aim	Object of Scheme	Scheme	Description	Scheme	Description	Scheme	Description
III. Rural Insfrastructure Plan								
1. Road and Transportation	1. Improvement of Road Networks	To improve/construct roads, to strengthen roads and to level up maintenance system To raise the road density 30% (0.16km/km²)	– Implementation Body Strengthening Scheme	– To increase staff and machinery			– Schemes to Install the Facilities for Safe Traffic	– To install guard rail, sign boards and others
			– Truck roads Improvement Scheme	– To secure safe traffic				
			– Branch Roads Improvement and Construction Scheme	– To improve the roads in Shangla Par and to develop touring roads in Upper Swat	– Roads Maintenance System Strengthening Scheme	– To increase staff and machinery	– O & M Strengthening Scheme	– To strengthen O & M system
					– Branch roads Improvement and Construction	– To raise road density	– Branch road Construction	– To raise road density
	2. Development of Public Transportation Services	To improve public transportation services			– Large-Scale Vechicles Provision Scheme	– To provide large scale buses and trucks	– Public Transportation Facilities Improvement Scheme	– To improve and strengthen public bus O & M system
							– Freight Transportation Improvement Scheme	– To improve and strengthen public trucks
2. Small Hydel Power Development and Rural Electrification Plan	1. Expansion of Rural Electrification	To increase population coverage of elecrification up to 75%	– Existing Facilities Improvement Scheme	– To improve WAPDA transmission system and Hydel Power station	– Transmission Line Extension Scheme	– To expand population coverage of electrification	– Transmission Line Extension Scheme	– To extend WAPDA transmission lines
			– Small Hydel Power Stations Construction Scheme	– To establish small Hydel Power station in Shangla Par	– Small Hydel Power Construction Scheme	– To establish small Hydel Power station in Upper Swat		
3. Water Supply	1. Expansion of Water Supply System	To increase pupulation coverage of water supply up to 75%	– Water Supply System Improvement Scheme	– To develop water supply system in remote mountainous villages	– Water Supply System Improvement Scheme	– To supply water to public facilities and to raise population coverage	– Water Supply System Improvement Scheme	– To increase the population coverage by water supply
							– O & M Strengthening Scheme	– To establish proper maintenance system
4. Education	1. Improvement of Education Facilities	To improve existing school facilities and to establish new schools in order to raise participation rate especially for girls	– Existing School Improvement Scheme	– To improve existing facilities	– Primary Schools Establishment Scheme	– To increase the number of primary schools especially for girls	– Middle and High Schools Improvement Scheme	– To upgrade primary schools into middle and/or high schools
		Participation rates for boys and girls will be 90 and 70% respectively.	– Primary Schools Establishment Scheme	– To establish primary schools with proper staffing	– Teachers Residence Construction Scheme	– To construct residential facilities for teachers		
			– Girls Schools Establishment Scheme	– To establish middle and high schools for girls in Shangla Par				
5. Health	1. Improvement of Health Care Facilities	To establish BHUs for all villages through strengthening BHU and RHC system and increasing doctors	– Existing Facilities Improvement Scheme	– To improve present facilities (water supply, electricity, etc.)	– Dispensaries Upgrading Scheme	– To upgrade dispensaries into BHUs	– RHCs establishment scheme	– To establish RHCs and hospitals
			– Doctors Residence Improvement Scheme	– To construct doctors residence for BHUs and RHC	– Doctors Residence Improvement Scheme			
6. Sanitation	1. Installation of Sanitation Facilities	To install sanitation facilities and village sewage system through guidance and extension service	– Implementation Body Establishment Scheme	– To establish Implementation Office	– Sanitation Facilities Introduction Scheme	– To encourage the construction of sanitation facilities by themselves	– Village Sewage Scheme	– To encourage construction of village sewage system
			– Guidance and Extension Scheme	– To introduce guidance and extension for sanitation	– Village Sewage Scheme	– To construct village sewage system		
7. Social Welfare	1. Strengthening of Social Welfare Activities	To improve position of women and to give job opportunity to women through strengthening of vocational training for women	– Facilities Improvement Scheme	– To improve and establish facilities for vocational training	– Vocational Training Encouragement Scheme	– To encourage vocational training in rural area	– Social Welfare Strengthening Scheme	– To encourage various social activities
			– Leaders Training Scheme	– To train leaders for women's vocational training	– Organization Establishment Scheme	– To establish voluntary organizations in each UC		
			– Government Office Strengthening Scheme	– To strengthen social welfare offices				
8. Telecommunication	1. Telecommunication Facilities	To improve telephone and post system covering all villages	– Telephone Extension Scheme	– To expand telephone networks to all villages	– Telephone Extension Scheme	– To increase number of public telephones	– Telephone Extension Scheme	– To encourage extension of personal telephones and direct dialing
			– Wireless Telephone Scheme	– To establish Wireless telephone system for remote area			– Postal Service Improvement Scheme	– To improve the regional post service

CHAPTER VI. FORMULATION OF BASIC PROJECT PLAN (MASTER PLAN)

CHAPTER VI. FORMULATION OF BASIC PROJECT PLAN (MASTER PLAN)

6.1. Basic Concept and Selection of Integrated Rural Development Plan

The objectives of Basic Project Plan (Master Plan) for the Swat District Integrated Rural Development Project are to increase the base of agricultural production, employment and income generating base and to improve the living conditions of the rural people in Swat District, thus reducing socio-economic imbalance among urban and rural areas. For these purposes, direct participation of the rural people in development activities is one of the most important factors for the best understanding of a rural development plan.

Almost all of the present cultivated fields, except those areas developed along the both banks of the middle and lower Swat river and in a part of the Buner Sub-Division in Swat District are located on mountainous slope areas under the terraced conditions. In these prevailing particular conditions in the District, the Basic Project Plan (Master Plan) of the Integrated Rural Development Project should be formulated in emphasizing i) improvement of agricultural infrastructure, which is generally the major component of the project, ii) improvement of necessary facilities to contribute directly and indirectly to the raise of living standard of the local peoples, iii) transfer of technology in various fields, iv) creation of employment opportunities, and v) foundation of harmonized living environment with natural conditions in the area.

The development period of the project is set up by 15 years upto the end of year in 2005, and the project plan should be formulated to meet these project target period in taking into account the subjects, scale and economy of the projects.

For the formulation of the Basic Project Plan, the following criteria are considered for the selection of main development schemes;

- To keep consistency in government policy,
- To meet local people's demands,
- To make efforts to income increase and employment creation,
- To satisfy local people with basic needs in minimum, and
- To look into adequate investment scale.

6.1.1. Criteria for Selection of Development Plan

1) Consistency in Government Policy

According to the Seventh Five-Year Plan, the Federal and Provincial Governments have priority for developing the rural area in such aspects as i) education including staff's training, ii) health services, iii) roads, iv) rural electrification, v) village water supply, and vi) housing. The project plan on these aspects was likewise given high priority in the formulation of Master Plan, accordingly.

2) Satisfaction of Local People's Demands

It is very difficult to satisfy all the needs of the local people in the Project Area. However, efforts were made to meet their demands as much as possible in the proposed development plans so as to realize the Master Plan as early as possible.

For the purpose of identifying the development need of the area, the inquiry survey of 69 Union Councils (UC) in the Project Area was conducted, and people's needs in the area were identified in each sector. As the results of the survey, irrigation water supply is found to be the strongest need, followed by roads, rural electrification, village water supply, health services, and education, all of which are vitally important in rural life. The development plans reflecting these local needs are the basis for formulation of the Master Plan.

3) Income Increase and Employment Generating Effects

One of the major objectives of the Master Plan is to correct regional imbalance in socio-economic conditions. Income increase and employment creation, therefore, will play an important role in correction of socio-economic imbalance in the rural area. And hence, the priority for selection of the development plans is given to those plans, which will raise the income level and increase employment opportunities of the rural people.

4) Satisfaction of Minimum Basic Needs

Most development plans in the past aimed to achieve the higher economic growth solely through providing directly productive components such as irrigation facilities, agricultural facilities, and livestock production facilities. Such approach, however, has not always been successful for developing countries.

The recently accepted philosophy underlying rural development is that more emphasis should be placed on the promotion of social infrastructure and welfare services as a basis for development in the rural area. The Seventh Five-Year Plan of Pakistan has also focused on the importance of proving infrastructure and services for satisfying the local people with the minimum basic living conditions. The proposed rural infrastructure and services include the village water supply, health, education, and sanitation, etc. The plans related to these fields are also given high priority and should be included in the Master Plan.

5) Investment Scale

From an idealistic viewpoint, a huge amount of investment would be needed to carry out all the plans considered for the development of the Project. Although some parts of the investment cost would be financed in foreign loans considering its project scale, it is difficult to provide all of the facilities involved in the plan.

In considering the improbability of investing such a huge amount in the Project Area, those plans with lower priority in light of the selection criteria discussed above are not included in the Master Plan. Consequently, the said criteria in view of investment scale will be decided based on the coordination of the on-going development plans, effect through the plans and urgency in project implementation.

6.1.2. Selection of Development Plan

All of the development plans in each sector, aiming at betterment of rural life in the Project Area, are carefully reviewed on the above mentioned criteria, development potential, and natural and physical

conditions. As the results, the following development plans are selected in the Master Plan.

- Agricultural Infrastructure
- Road and Communication Networks
- Rural Electrification
- Village Water Supply
- Agricultural Promotion Facilities
- Rural Infrastructure
- Village Community Development

"Social and Farm Land Forest Development Plans" mentioned in the paragraph of 5.8.1 is not included in the main development plans, because these plans would be implemented successively by the on-going forestry development project. And furthermore, "Tourism Development Plan " is also not included in the plan taking into account the following reasons. Namely, "the Integrated Rural Development Plan " should be formulated through the integration of sectoral development plan in combination with close coordination of rural community in the related areas. Form this point of view, such criteria as the immediate effect through the plans and urgency of project implementation mentioned previously should meet the demands of local people.

6.1.3 Basic Concept of Development Plan

Since the economic structure of employment in Swat District has been concentrated to the agriculture sector, the increase in population is accompanied by such vitally important problems as unemployment, low self-sufficiency of food and poor situation of social infrastructure.

The socio-economic development in Swat District shall be entrusted with the Seventh Five-Year Plan (1988-1993). The Plan was formulated to resolve the national dilemma which was always represented by co-existence of poverty and economic prosperity. On the other hand, the future socio-economic growth in Swat District shall aim to attain the targets of the national economic growth projected in the Second Project Plan (1988-2003), that is, 3.1 to 2.6 percent of population and 6.2 percent of GNP per annum, respectively.

The District-wise Development Plan in the various sectors has been formulated and implemented by line-Department Development Plan and the Foreign Aids Plans with nine projects. Especially, Kalam Integrated Development Project, Watershed Management and Forest Extension Project in Dir-Swat Districts and Buner Development Project have been implemented through the integrated development methods.

However, the implementation periods of these Foreign Aids Projects are within a term of the Seventh Five-Year Plan mentioned above. Annual budgets required for the local programmes have not been enough to meet the local needs. Under the circumstances, an attainment to the national economic growth target projected in the Second Project Plan will be difficult, unless the special development strategy is taken by the Government. It will be rational strategy that the development budgets to be allocated to each line-Department concerned in Swat District is integrated, and the proposed plans will be implemented according to the Master Plan of the Swat District Integrated Rural Development Project.

An execution of strategy to integrate the development budgets by sector mentioned above should be accompanied by administrative, financial and regulative procedures.

As an administrative step, each agency has to make the long term (15 years) development plan based on the Master Plan by themselves. It is an indispensable conditions that each agency finds the most effective methods to executive line-budget under schedule of the Master Plan. For example, it is said that an implementation of such infrastructure as road, electricity, village water supply and irrigation are followed by expansion of budget on agricultural production, education, health and communication. As regards the financial phase, the Master Plan on Swat District Integrated Rural Development Project has to be authorized by the NWFP Government. Planning and Development Department is active authority as the sponsor for implementation of the Master Plan.

An implementation organization recommended in Paragraph 6.6 plays an important institutional role. Development priority of 20 Sub-projects explained in Paragraph 6.3 is decided through this organization.

The most important items which are required to function the activity of the organization are functional structure, controllability of budget and sense of responsibility of staffs.

6.1.4 Approach for Integrated Rural Area Development (IRAD)

1) Definition of IRAD Study

The integrated rural area development study is to determine the appropriate location of social and economic activities / functional facilities. These activities are functionally confined over the physical space for balanced development in the certain area and region.

2) Local Peoples' Participation

This Master Plan study was initiated by the development need survey conducted with the participation of all Union Councils, although the community participation programme is under progress through the establishment of Non-Governmental Organization.

3) Line-Departments Planning

On-going IRAD projects and future plans to be executed by all line-Departments concerned were confirmed and projected in the Master Plan.

4) Water Resources Development Study

Water resource development studies were conducted on the preliminary level by JICA Study Team, and their results should be functionally and spatially arranged in accordance with the line-Departments planning policy.

5) Decentralization of Planning

At the first step of the planning, administrative structures as spatial hierarchy was identified, that is, Sub-Division, Sub-Tehsil, Union Council, Wards and Village. And at the second step Sub-Division was classified into nine Zones based on the topographical, agro-climatological and socio-economical environments. Each Zone is bounded by Sub-Tehsil.

One Sub-Tehsil has about 9,800 ha1/ of cultivation area on an average and 77,000 of population in 1988 and 131,000 in the target year of 2005 respectively. The average acreage per one Sub-Tehsil would be considered to be suitable from view point of integration of the line-Departments development plans and projects to be requested by Union Council and also the project area to meet an available water resources in the areas. Therefore, one Sub-Tehsil area is defined to be one Sub-Project Area. As a result, the Project Area is divided into 20 Sub-Project Areas.

Note: 1/ Total cultivation area 195,700 ha/20 Sub-project Areas = 9,800 ha

6.2. Selected Main Development Plan

6.2.1. Agricultural Infrastructure Plan

The agriculture infrastructure plan consists of following three main components in this Master Plan Study ;

- Water resource development and irrigation schemes,
- Flood protection schemes of riverbanks and farmlands, and
- Barani farmland improvement schemes.

1) Aim of Scheme

The schemes have been concertized in accordance with the below-mentioned aim and set forth as the subject of the Master Plan. (See Annex D)

a) Water Resources Development and Irrigation Schemes

- Promotion of agriculture with the construction and improvement of irrigation facilities,
- Effective use of seasonal flow in the intermittent rivers,
- Effective use of springs (small perennial flow),
- Effective use of Swat river flow by discharge control, and
- Effective use of groundwater for irrigation.

b) Flood Protection Schemes of Riverbanks and Farmlands

- Protection of riverbank, farmland and public facilities against flood, and
- Stabilization of sharp flow and mud flow sources and prevention of erosion.

c) Barani Farmland Improvement Schemes

- Elevation of land and labour productivities at the flat Barani fields,

- Land conservation and elevation of land productivity in the terraced Barani fields at the mountainous area, and
- Fundamental research and diffusion of new technology of Barani farming.

2) Water resources Development and Irrigation Schemes

The respective schemes included in the Master Plan and Priority Sub-Projects in Shangla Par Sub-Division (SIRDP) should be formulated considering the following factors :

- Identification of project benefit generated from both of the irrigated double crop farming and micro-hydel power based on dam construction to store large amount of river discharges in the rainy seasons, and
- Socio-economic balance between investment in dam construction plus compensation for losses of existing social capitals to be sunk under water in the reservoir and benefit to be born by the project.

The conveyance and distribution systems of the irrigation water are planned with the gravity method in the whole irrigation schemes in order to keep operation and maintenance (O&M) cost low, except for the lift irrigation schemes planned in Buner Sub-Division.

The construction of new main canal is not planned in the existing irrigated areas, where reservoir dam scheme is proposed. Then the irrigation water is released from dam to the river controlling its amount to meet the requirement of the irrigated farms through the year so that the perennial irrigation is possible for double crop farming. New main canal is to be constructed in newly developed irrigation areas.

The reasons of no construction of irrigation canal in the existing irrigated areas are as follows;

- Situation of well maintained existing irrigation canals at present,
- Observance of existing water right, intake and distribution custom and system, and

- Avoidance of social confusion caused by new water allocation system.

The Swat river has the greatest potential of water resources development to improve the Barani farming and level up the living standard of rural people. However, the integrated water resources development is essential for the effective use of the ample water taking the whole Swat river system into account.

It is no doubt that the immediate commencement of promotion of this large scale water resources development programme is necessary. The materialization of successful completion of integrated water resources development prospects and promises the prosperity in the Swat valley.

It is also important and urgently required to repair and improve the old civil and private irrigation canal networks which are timeworn naturally and damaged by flood in many places. The people manage to repair and use them with much endeavor and labor at present.

3) Flood Protection Schemes of Riverbanks and Farmlands

The big Khwars such as Barwai, Harnoi and Deorai, etc. are the important water resources of areal irrigation as well as the Swat river. However, the farmlands along such Khwars are eroded and washed away every year in the thaw and monsoon rainy seasons. The full-scale protection works should be planned and carried out in those Khwars like in the Swat river.

The main works are installation of the spurs and gabions (stones in wire basket) on the riverbanks. Those are installed first in the damaged places for restoration and then next along the whole river for the bank protection and improvement of weirs and head regulators of the irrigation off-take.

4) Barani Farmland Improvement Schemes

The irrigated farmland should be increased in area as wide as possible. However, most of the farmlands will be left as the Barani field from the technical and economical points of view. The following schemes are planned in order to increase the labour and land productivities;

- Establishment of Agricultural Technology Transfer and Demonstration (ATTD) Farm in Swat and its vicinity area to conduct research, extension and training related to adapted research to introduce suitable crops, upland crops and Barani cultivation trial, etc. including paddy cultivation and extension and technical transfer.
- Implementation of such large scale schemes as land leveling, terrace works, farm road, land protection from soil losses and drainage works.

5) Term of Implementation of the Schemes

The implementation period of the respective schemes included in the above-mentioned three main components are categorized into short (S), middle (M) and long (L) -terms. Some schemes will be implemented crossing over these terms.

a) Water Resources Development and Irrigation Schemes

- On-going schemes in the Seventh Five-Year Plan (S)
- Improvement of existing irrigation facilities (S)
- Lift irrigation schemes (S) & (M)
- Small scale irrigation schemes (S), (M) & (L)
- Spring water-tank programme (S) & (M)
- Irrigation schemes including dam construction (M) & (L),
- Swat river basin irrigated agricultural development scheme (Stage development) (S), (M) & (L)

b) Flood Protection Schemes of Riverbanks and Farmlands

- Protection schemes at damaged place (S),
- Protection schemes along whole banks (S), (M) & (L)

c) Barani Farmland Improvement Schemes

- Establishment of ATTD Farm and Experiment to prove the effect (S),
- Implementation of large scale schemes to carry out practical Barani farming (M) & (L)

6.2.2. Agricultural Supporting Facilities Development Plan

1) Agricultural Development Supporting Plan

The agricultural development supporting plan includes following main components in this Master Plan Study;

- Strengthening of agricultural research activities,
- Strengthening of agricultural extension and seed multiplication,
- Development of animal husbandry
- Intensification of agricultural mechanization supporting services,
- Expansion of soil conservation project, and
- Expansion of cooperative organizations and farm inputs supply facilities.

The proposed agricultural development supporting plan aims that the effective soil conservation will be incorporated in the proper land use among various sectors of crop production, animal husbandry, tree planting, etc.

2) Aims of Agricultural Supporting Facilities Development

The aims of agricultural supporting facilities development are formulated in accordance with the sectoral development plan in Chapter V, as shown below;

a) Strengthening of Agricultural Research Activities

- Promotion of agricultural research on the mountainous agriculture and high altitude agriculture,
- Upgradation of the Mingora Agricultural Research Station.

b) Strengthening of Agricultural Extension and Seed Multiplication

- Efficient transfer of technology covering mountainous area,
- Strengthening of agricultural extension activities especially in the mountainous areas,
- Seeds and fruit trees multiplication,
- Promotion of agricultural extension for fruits and vegetables production,
- Improvement of bee-keeping technology.

c) Development of Animal Husbandry

- Strengthening of veterinary services,
- Improvement of livestock and poultry through artificial insemination and crossing,
- Extension of production technology especially in the improvement of animal nutrition,
- Mulplication of quality chicken like Fuyumi for distribution to farmers.

d) Expansion of Soil Conservation Project in Swat District

- Strengthening of soil conservation project office,
- Implementation of soil conservation works to cover whole District.

e) Intensification of Agricultural Mechanization Supporting Services

- Quick implementation of the existing workshop construction scheme,
- Implementation of trials on the introduction of small farm machinery especially in the mountainous areas,

f) Expansion of Cooperative Activities and Farm Inputs Supply

- Expansion of cooperative organizations,
- Increase of Agricultural Development Authority (ADA) sale point.

3) Strengthening of Agricultural Research Activities

A substation of the Mingora Agricultural Research Station should be established in Kalam to develop the high altitude agriculture because it is impossible to conduct the concerned research at the existing station which has the elevation of above 1,000 m from sea level. Moreover, it is proposed to upgrade the Mingora Agricultural Research Station to the Mingrora Agricultural Institute which should have such new section responsible for breading of fruits and vegetables, and conducting research on the mountainous agriculture.

4) Strengthening of Agricultural Extension and Seed Multiplication

There is a large gap of the technology levels between research stations and farmers' fields. The following improvement is required to solve the problem;

- To make the trials on the selection of suitable crops and varieties in the different agro-ecological zones and to standardize related agricultural technology,
- To demonstrate the agricultural technology at the representative farms of farmers in the different agro-ecological zones,

- To train extension staff and farmers' leaders for the agricultural development in the specific areas regularly.

To meet the above requirement, a institution to have the function of agricultural technology transfer should be created in the District. The agricultural extension activities should be strengthened through posting adequate extension staff according to the national standard, and providing extension building inclusive of warehouses, bicycles, motorcycles, adio-visual aids etc. especially for the extension services in the mountainous areas. The establishment of seed farms and nursery stations should be established to multiply the seeds of maize, wheat, rice, pulses, vegetables, etc. and the saplings of fruits trees and forage trees for the dispersal. Moreover, some extension stations of fruits and vegetables should be established in the new development areas of these crops.

5) Promotion of Animal Husbandry Development

The distribution of the veterinary hospitals and artificial insemination facilities concentrates in the plain areas. Therefore, these facilities should be established even in the non-plain areas to strengthen the services on vaccination, preventive and curative disease control, and artificial insemination. Instead of the artificial insemination facilities, the natural breeding stations of cattle and buffalo should be established for the more effective improvement of their genetic characters in the remote areas. For the improvement of other livestock and poultry, it is required to disperse stud rams, he-goats and cockerels/pullets. The multiplication of cockerels/pullets is needed for dispersal purpose. Animal Nutrition Centers will be needed to improve the production technology especially in the improvement of animal nutrition.

The development of grazing land from waste land as well as improvement of pastures will be made with collaboration of the concerned agencies with range development and soil conservation in the demonstration activities by Livestock and Daily Development Department. The demonstration and extension services on the improvement of animal nutrition will be extended through establishment of livestock and poultry production cooperatives.

6) Expansion of Soil Conservation Project

To expand the activities of the soil conservation project in Swat-District, which has implemented soil conservation works in the District since 1978, the project facilities like office buildings and workshop should be installed with the provision of the related equipments and materials.

7) Intensification of Agricultural Mechanization Supporting Services

The workshop which is under construction by Agricultural Mechanization Department should start their activities as quickly as possible by installing the workshop machinery. The tractor stations should be established to introduce small farm machinery like small tractors and two-wheels tractors.

8) Expansion of Cooperative Organizations and Farm Inputs Supply Facilities

For the expansion of the multipurpose village farmers cooperative societies in Shangla Par Sub-Division where their activities are under developed, it is proposed to establish the offices of Cooperative Department and the Agricultural Cooperative Banks in the Sub-Division. Also, since there is no Agricultural Development Authority (ADA) sale point in the Sub-Division, it is planned to establish a ADA sale point facilities with warehouse.

9) Terms of Implementation of the Scheme

The identified schemes in the above-mentioned plan and the terms of implementing the schemes are shown in the below. In the short(S)-term development, an emphasis should be placed in the production of basic food crops for the self-sufficiency. On the other hand, the development of the intensive farming of fruits and vegetables, livestock and poultry and even other new crops should be promoted in the Project Area. The middle (M)-term development will play a role to lead to the realization of long (L)-term development plan. Eventually, the

proposed schemes of industry and marketing facilities which are mentioned in Chapter V are included in the following;

a) Agricultural Research Strengthening Schemes

- Kalam Substation of the Mingora Agricultural Research Station (S)
- Upgradation of the Mingora Agricultural Research Station to the Agricultural Research Institute (M)

b) Agricultural Extension and Seed Multiplication Strengthening Scheme

- Agricultural Technology Transfer and Demonstration Farm (S)
- Agricultural Training Center (S), (M) & (L)
- Seed Farm (S)
- Nursery Station (S), (M) & (L)
- Fruit and Vegetables Training Centers (S), (M) & (L)
- Bee-Keeping Station (S), (M) & (L)

c) Animal Husbandry Development Promotion Scheme

- Veterinary Hospitals (S), (M) & (L)
- Artificial Insemination Center and Subcenter (S), (M) & (L)
- Natural Breeding Center (S) & (M)
- Animal Nutrition Center (S) & (M)
- Poultry Hatchery Farm (S) & (M)

d) Soil Conservation Scheme

- Expansion of Soil Conservation in Swat District (S), (M) & (L)

e) Farm Mechanization Promotion Scheme

- Tractor Station (S)

f) Cooperative Development Scheme

- Cooperative Office (S) & (M)

- Agricultural Cooperative Bank (S)
- ADA Sale Point (S)

g) Rural Industry

- Women Handicraft Inspectoress Office and Women Handicraft Center (S)
- Fruit Processing Factory (M)
- Woodcraft Training Center (M)
- Gabion Making Factory (S)

h) Agricultural Marketing Facilities

- Vegetable and Fruit Market (S) & (M)
- Computer System Facilities (S)

6.2.3. Road and Communication Plan

1) Road Development Plan

Road development is one of the most important rural development components in Swat District. The establishment of a proper road system in the District is strongly requested by many social sectors and local people and will contribute to the agricultural development, the extension of various social services, and others.

The road development plan in the Master Plan Project considers following subjects;

- Road development is given priority in the integrated rural development plan,
- C & W Department, Highway Division should be a main implementation body of road development,
- Improvement and construction of trunk roads (provincial roads),
- Improvement and construction of farm to market roads which will encourage local agricultural activities, and
- Improvement and construction on inter-village link roads which will extend various social services such as health care, education, post and others.

Improvement and construction of trunk and link roads should be carried out mainly in the short-term development. And in the middle and long-term developments, improvement and construction of branch roads should be executed. Road improvement of 316.5 km, nine routes including existing trunk roads and roads construction of 16 km, one route are planned in the Seventh Five-Year Development Plan. Out of them roads improvement of 323 km and roads construction of 312 km would be planned in the Master Plan Project. Road density of the District will be increased in about 30 percent by 2005, viz. from 0.125 km/sq.km to 0.163 km/sq.km.

Especially short and/or middle-term road development plans should include following schemes;

- Strengthening of implementation body of road development:

  Staff and construction machinery should be increased.

- Easing of local gaps in road condition:

  Road development schemes in less developed areas should be given priority especially in Shangla Par Sub-Division.

Long-term plan should involve following projects.

- Strengthening of maintenance system:

  Proper maintenance system should be established through adding staff and machinery.

- Completing of facilities for safe traffic:

  Sign boards, lines and others should be completed.

2) Telecommunication Development

The condition of telecommunication in mountainous area in Swat District is generally poor. However, construction and/or extension of telephone system will be costly in rural area, due to the scattered villages and low demand. Therefore, establishment of limited numbers of wireless telephone systems for rural public facilities in remote areas would be proposed for first aid of health care, disaster relief and others in the short and middle-term development because of its low cost.

Improvement and extension of existing telephone systems in the District should be carried out in company with rural electrification in the long-term development. Also, postal communication should be improved through increase in number of branch offices and/or agents based on the future road development in the Project Area.

6.2.4. Rural Electrification Plan

Extension of WAPDA transmission and distribution line is probably the most efficient way to raise population coverage of electrification during the short-term development as well as long-term development. WAPDA proposed a plan to construct grid stations at Khawazahkela and Madyan in upper Swat and Chakesar or Martung in Shangla Par Sub-Division under The Fourth Secondary Transmission and Grid Station Project of WAPDA. The tentative schedule of completion is 1992/1993.

Summary of "The Fourth Secondary Transmission and Grid Station Project by WAPDA"

Name of Grid Station	Voltage	Existing Voltage & Capacity		Proposed Capacity	Tentative Schedule
	(KV)	(KV)	No. x (MVA)	No. x (MVA)	(year)
Saidu Sharif	132	132/33	1 x 6.3	1 x 26	1998/90
	132	132/33	2 x 13		
Khawazakhela	132	132/33		1 x 6.3	1990/91
Madyan	132	132/33		1 x 6.3	1991/92
Martung/Chakesar	66	66/11		1 x 6.3	1992/93

These project sites are almost all mountainous and the villages to be electrified are scattered. Therefore, it will be anticipated that the completion of the project will be considerably delayed. Thus, it will cause a bigger gap on electric development between close areas to the transmission lines and remote areas located in mountainous area. In order to prevent or mitigate such local gap in electrification, hydel power development schemes should be promoted in remote areas.

According to the data of Master Plan of Integrated Rural Development Project in Swat by SHYDO and GTZ, it is reported that there are potentials for small-hydel power from 250 KW to 2,500 KW in Upper Swat area. On the other hand, Shangla Par Sub-Division has low potential for small-hydel power generation, according to the topographical and hydrogical situation in those areas, except for a micro-hydel power generation having the capacity less than 200 KW, which will be basically supplied to the public facilities such as schools, hospitals, post and communication offices, etc.

Rural electrification is very helpful to raise total living conditions, and is required for improvement of various social services such as health care, education and others. Therefore, Upper Swat areas should be electrified by small-hydel power generation and the public facilities should be electrified by the micro-hydel power in Shangla Par Sub-Division in the stage of the short and middle-term development.

The rural electrification programmed in the Master Plan was formulated as follows in terms of development stage;

Short-Term Development;

- Development of existing WAPDA transmission system,
- Improvement of existing small-hydel power station, and
- Construction of micro-hydel power (less than 200 KW) stations for public facilities in the Shangla Par Sub-Division, coordinating future WAPDA development plan.

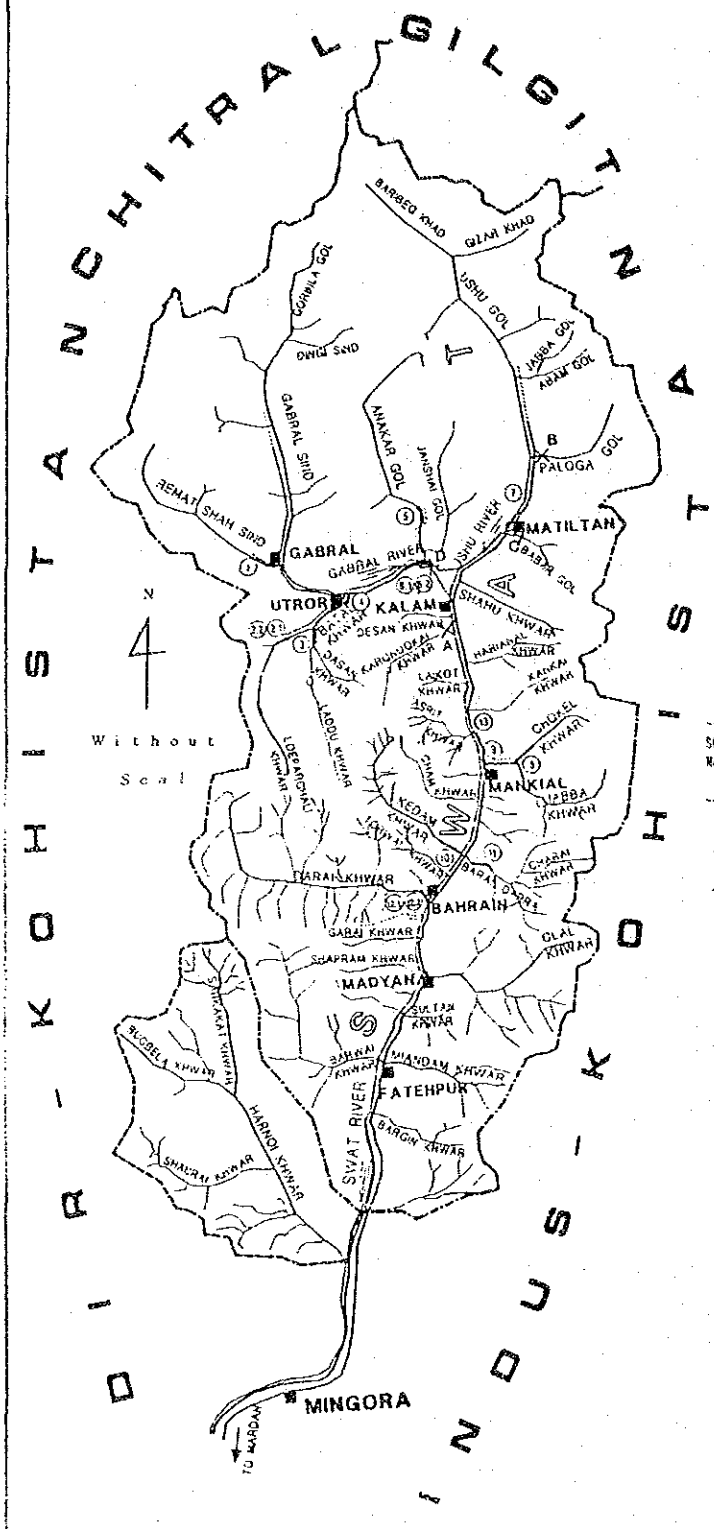
Middle-Term Development;

- Extension of WAPDA transmission and distribution lines,
- Construction of small-hydel power station (200 KW to 2,500 KW) in Upper Swat (see Figure 6-1), and
- Construction of micro-hydel power station in the selected Shangla Par Sub-Division.

Long-Term Development;

- Extension of WAPDA transmission and distribution lines, and
- Integration of grid lines and all hydel-power supply lines.

FIGURE 6-1 PROPOSED POTENTIAL SITES FOR SMALL-HYDEL POWER DEVELOPMENT IN UPPER SWAT



SCHEME No.	R I V E R	LOCATION	TYPE	DESIGN DISCHARGE m³/s	HEAD m	DESIGN CAPACITY kW	TOTAL COST US $	COST PER kW US $/kW
4	BAIAL KHWAR	UTROR	PEAK	1.60	140	1500	2032177	1213
12/2	BARAL KHWAR	ARIN-BAHR.	PEAK	2.15	310	5250	7185733	1369
2/2	LOE FASCHALI KHW.	UTROR	PEAK	0.50	315	1100	1457885	1408
1	REHMAT SHAH SIND	GABRAL	ROR	0.85	135	900	1230833	1481
7	USHU RIVER	MATILTAN	ROR	3.20	70	1700	2519240	1498
11	BARAL BARRA	BARNI	ROR	0.33	435	1060	1601991	1510
10	KEDAM KHWAR	KEDAM	ROR	0.25	500	1000	1555552	1533
8	CHOKEL KHWAR	SHUIDEHRAI	ROR	0.45	265	990	1515925	1530
9	CHOKEL KHWAR	MANKIAL	ROR	0.70	245	1650	2660502	1612
2/1	LOE FASCHALI KHW.	UTROR	ROR	0.30	315	700	1129550	1614
3	LABOU KHWAR	UTROR	ROR	0.50	210	900	1423301	1655
12/1	BARAL KHWAR	BARR.-LANG.	ROR	1.30	120	1220	1997488	1665
6/2	GABRAL RIVER	KALAM	ROR	4.87	130	4750	7972706	1685
5	AMAKAR GOL	AMAKER	ROR	0.70	145	760	1355928	1783
13	SWAT RIVER	ASRIT	ROR	12.00	25	2400	4672500	1947
6/1	BARAL RIVER	BANAM	ROR	4.87	55	2000	4755121	2378

Data source; "Master Plan of Integrated Rural Development Project Swat" prepared by SHYDO, GTZ, June 1989.

6.2.5. Village Water Supply Plan

1) Extension of Water Supply Facilities

Population coverage of water supply facilities in Swat District, which has been estimated at 33 percent by the Study Team, 1988, is behind with that of the average in NWFP, 50 percent and shows a local gap in the District. Considering future population increase, construction of water supply facilities should be encouraged further more by PHE Department. In the short-term development, in order to ease the local gap of water supply services in remote areas, especially in Shangla Par Sub-Division, a concentrated investment for those areas would be required. In company with improvement and construction of schools, BHUs, RHCs, and others, water supply facilities should be completed for them in the long-term development. About 202,000 families will be benefited with a coverage of 75 percent by the end of the Master Plan period, 2005.

Following considerations should be given for better village water supply facilities;

- Introduction of water quality test for all schemes, which can ensure safety water supply,
- Coordination with rural electrification which can introduce lift pumps and tube wells, and
- Establishment of proper maintenance system.

2) Operation and Maintenance of Water Supply Facilities

At present water supply is distributed through the government constructed water supply systems in actually free of charge in rural area. Consequently the government is spending a large amount of operation and maintenance costs every year for local people. Operation and maintenance costs will be increased year by year together with extension of services, and it will affect on the water supply development in future due to the heavy burden on the government.

During the long-term development, operation and maintenance works of water supply systems should be handed over to the beneficiaries, and the beneficiaries themselves should maintain the systems through their organizations such as Village Community (see Paragraph 6.2.7). Direct participation of the local people to water supply schemes and

strengthening of their organizations would be essential to the future water supply development.

6.2.6. Rural Infrastructure Plan

The existing local gap of the social services should be eased through the rural infrastructure development. Therefore, a higher investment for Shangla Par Sub-Division, especially Chakesar, Puran and Martung Sub-Project Areas showing backward situation in the District should be assigned to the short-term development. In order to obtain an adequate population coverage of social services with population increase in future, the rural infrastructure development should be carried out consistently during all the Master Plan period.

1) Education Facilities

It is the most important aim in the education sector to raise participation rate at primary education. Participation rates of 90 and 70 percent for boys and girls would be proposed as a target of the Master Plan by 2005. The target rates, however, are still behind with the national target.

Improvement scheme of existing about 1,200 schools should be carried out in the first place. Considering a population increase construction of schools and increase in proper staffs should be taken into account in a long-term development. About 2,500 schools (1,000 schools for girls) will be constructed, and 13,000 teachers (5,500 teachers for girls) will be posted until the end of the Master Plan, 2005. In order to fulfill a large number of teachers required, a system of assistant and/or temporary teachers from local people would be introduced. The improvement schemes include the implementation of residence and dormitory for teachers and students.

2) Health Care Facilities

Existing health care facilities (17 hospitals, 3 RHCs, 64 BHUs and 34 Dispensaries) should be improved and upgraded in the short and middle-term development. In order to strengthen the health care systems

in the District, it is proposed that ambulances would be stationed one each at 12 deficient hospitals as the short-term development. Construction of 137 BHUs and RHCs, and posting of 400 doctors (including LHVs) would be targeted by the end of the Master Plan project.

3) Sanitation Facilities

Hygiene education and guidance on improvement of sanitary condition should be given to the rural people, and construction of latrines in public facilities should be carried out in the short-term development. Self-construction of private latrines by the local people should be encouraged consistently to raise a population coverage of sanitation facilities. Therefore, establishment of an implementation office for rural sanitation schemes in PHE Department, Swat will be in the first place.

4) Social Welfare Facilities

In order to give a good job opportunity to women for cash income and help to improve their position, strengthening of vocation training for women is very important in this sector. This is planned in the agricultural supporting development in company with the small industry development.

6.2.7. Village Community Development Plan

An important factor of success for implementing the project and executing the operation and maintenance of projected facilities would be the coordinated efforts by the local people acting through their local representative bodies like villages (Mauza) and Union Councils in connection with the Project Management Unit to be newly established in the project (see Figure 6-3).

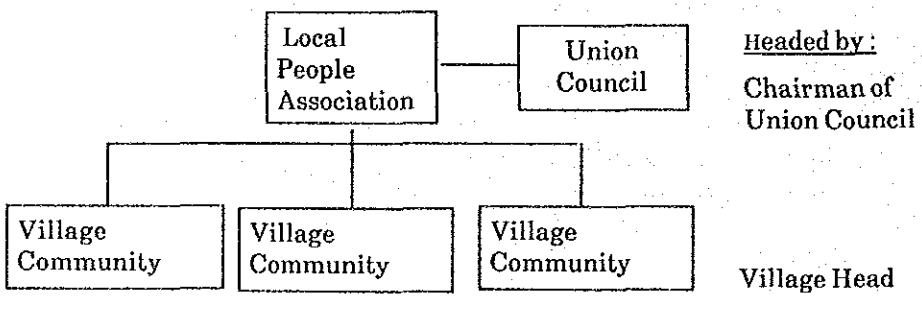
Local people' representatives would be the members of District Project Coordination Committee, as shown in Figure 6-3, and thus participate in the overall planning and orientation of the rural development plan. However, most important would be local people's participation at the village level, where through terminal administrative bodies such as villages and Union Councils, all villagers have to arrive at an agreement on consensus of the project to carry out in their areas.

From this point of view, prevailing Local Councils would be responsible for ensuring local people participation in planning and determination of priorities, implementation of proposals and operation and maintenance of structures provided. However, in order to expect more enthusiastical participation of the local people to the project, these Local Councils should be functionally strengthened in connection with the project, that is, Village Community, which will be Non-Governmental Organization should be newly organized on the basis of village (Mauza), and their activities would be guided and supported by the Local Government and Rural Development (LG & RD) Department in the District. Proposed organization and function of the Village Community are envisaged as follows;

Organization of Village Community

- The Village Communities to be organized at village (Mauza) level headed by every Village Head, of which total number is estimated at 499, will be based on a bottom-up planning process by the assistance of the LG & RD Department.
- The programme will run through active participation of volunteer organizations at the village level, and register themselves as Non-Government Organizations to the LG & RD Department.
- The Village Communities will be a non-political organization with maximum membership from village households. Those Communities having larger membership will be entitled to government grants.
- The Village Communities will be integrated as Local People Associations at District Counselor level, of which total number is 32 in Swat District as shown below;

Proposed System of Village Community



Function of Village Community

- Engagement of small scale development activities such as the project finding and construction of public facilities with the provision of self-help and self-contribution, of which necessary budgets will be founded by the LG & RD Department and other line-Departments,
- Execution of operation and maintenance of the constructed facilities,
- Organization of farmers associations to receive extension services,
- Participation in crop marketing systems proposed in Mingora, Chakesar, Aloch and Martung as a model (see paragraph 7.2),
- Mediation of credit and farm inputs supply to the multi-purpose village farmers' cooperative societies, voluntary groups and working women in handicraft etc.

6.3. Formulation of Integrated Rural Development Plan

Integrated Rural Development Plan in Swat District is formulated in accordance with the selected main development plan mentioned in paragraph of 6.2, and the followings are proposed as development plan in the project.

- 20 Sub-Project Areas of development plan on the basis of administrative boundaries of Tehsil or Sub-Tehsil are proposed in Swat District. An average area covering one development plan is approximately 9,800 ha, and the total population in the year of 1988 and 2005 are estimated at about 77,000 and 131,000 on an average, respectively.

- Several major project facilities listed below will be included in one development plan. These facilities will be newly provided by the project.

  ° Irrigation Facilities:

    Irrigation facilities consisting of head works, storage dams, multipurpose dam, pumps, small scale irrigation systems and small tanks to store spring water,

  ° Micro- Hydel Power:

    Potential sites selected on the basis of the collected data during the Phase I and Phase II field work,

  ° Roads:

    Improvement and newly construction roads proposed depending upon the information obtained from Communication and Works (C & W) Department,

  ° Rural Infrastructures:

    Ten priority facilities such as village water supply, public welfare, education, postal services, telephone communication, etc., which were selected through the inquiry survey on Union Council (UC) level,

  ° Agricultural Promotion Facilities:

    Agricultural supporting systems and facilities mentioned in 6.2.2,

° Agricultural Marketing Facilities:

Agricultural marketing facilities mentioned in 5.5.1.

Tehsil-wise 20 Sub-Project Areas involving above-mentioned major project facilities are tabulated in Table 6-1.

TABLE 6-1 20 DEVELOPMENT SUB-PROJECTS AND THEIR MAIN PROJECT FACILITIES

No. of Zone	Name of Sub-Project Scheme	No. of UC	Population in 1986 ('000)	Culti. Area ('000 ha)	Head works	Dams	Multi-Purpose Dams	Pumps	Small Scale Irrigation System	Small Tank	Small Hydel-Power	Road		Village Water Supply	Public Welfere	School	Post Office	Tele-phone	Marketing Facility	Agri. Promotion Facility	Vete-rinary	Artifical Insemination Office
												On-Going	Proposed									
I	Kalam	2	31	2.2			○				○		○	○						○		
	Bahrain	4	85	6.5							○	○		○	○		○			○		
II	Matta	8	211	26.6		○						○		○	○	○	○	○	○	○		
	Khawazakhela	4	100	18.7 1/						○		○		○	○	○				○		
	Charbagh	3	54						○						○	○	○	○		○		
III	Kanju	3	50	11.7 2/	○									○	○	○	○	○				
	Ka'bal	3	136	21.0	○									○	○	○	○	○		○		
	Barikot	3	64	12.4					○				○		○	○	○	○		○		
	Mingora	5	96						○	○		○		○	○	○	○	○		○		
IV	Alpuri	7	121	16.5		○	○			○		○		○	○	○	○	○	○	○	○	○
V	Chakesar	2	51	6.7			○				○		○	○	○	○				○	○	○
	Puran	2	51	8.7			○	○	○		○	○			○	○	○	○	○	○	○	○
	Martung	2	31	4.5			○					○		○	○	○	○	○		○	○	○
VI	Besham	2	47	5.3				○			○				○				○	○	○	
VII	Daggar	4	65	10.2					○	○		○		○	○	○			○	○		○
	Gadezai	3	65	10.5					○	○		○			○	○	○	○	○	○		○
	Gagra	3	52	6.3	○							○		○	○							
	Chaghrzai	4	47	8.9	○	○					○	○	○	○	○	○	○	○				
VIII	Chamala/Amazai	3	61	9.4				○			○	○	○	○	○	○				○		○
IX	Khudukhel	2	47	9.9				○					○		○	○						
	Total	69	1,465	195.8																		

Note: 1/; Include Charbagh population
2/; Include Mingora Population

6.4. Proposed Facilities

The proposed project facilities in the Master Plan can be categorized into seven components mentioned below. For planning of the project facilities, following conditions were taken into considerations, that is, a) line-Department development programmes listed in the Seventh Five-Year Development, b) local peoples' demand, c) available resource for development potential identified through the field works, d) countermeasures to raise local peoples' living standard by means of the increase in farm income and creation of employment opportunities, and e) countermeasures to keep living environments with the provision of rural infrastructures.

- Agricultural Infrastructure Facilities,
- Agricultural Supporting Facilities,
- Road and Communication Facilities,
- Rural Electrification Facilities,
- Village Water Supply Facilities,
- Rural Infrastructure Facilities, and
- Village Community Facilities.

Total project facilities for Master Plan and those in Sub-Project Areas are given in Table 6-2 and Figure G-1 to Figure G-20 in Annex G.

TABLE 6-2 PROPOSED DEVELOPMENT WORKS FOR MASTER PLAN

Project Facilities	Short-Term		Middle-Term		Long-Term	
	Works	Qty	Works	Qty	Works	Qty
1. Agri. Infrastructure Development						
-New Irrigation Schemes	.Ushoran Irrg. Scheme	120 HA	.Choga Irrig. & Hydel	170 HA	. Kabalgram Irri. Scheme	320 HA
	. Budar Irrg. Scheme	1,520 HA	. Chakesar Irrig. & Hydel	110 HA		
	. Kar Schalizara Scheme	42 HA				
	. Ghur Ghushot Lift Irrig.	49 HA				
	. Kotkai SSIP	150 HA				
	. Sandai-Aloch Irrig.	352 HA				
	. SSIS	40	. SSIS	40	. SSIS	40
	. Spring Water Tank Irri.	75	. Spring Water Tank Irri.	75		
	. Ground Water Tank Irri.	15	. Ground Water Develop.	15		
- Improvement / Extension of Irrigation Facilities	. Improvement in Mingora	500 HA	. Improvement in Mingora	500 HA	Improvement in Mingora	500 HA
	. Nipki Khel Canal Exten.	1,315 HA	. Nipki Khel Canal Exten.	1,315 HA		
	. Impro. / Flood Project		. Imp / Flood Protect		. Imp / Flood Protect	
	Barwai Khwar	170 HA	Barwai Khwar	180 HA	Barwai Khwar	180 HA
	Harnoi Khwar	500 HA	Harnoi Khwar	500 HA	Harnoi Khwar	500 HA
	Deolai Khwar	500 HA	Deolai Khwar	500 HA	Deolai Khwar	500 HA
	Kana Khwar	110 HA	Kana Khwar	120 HA	Kana Khwar	120 HA
- Barani Field Consolidation			. Swat Sub-Div.	2,100 HA	. Swat Sub-Div.	2,100 HA
			. Buner Sub-Div.	3,300 KM	. Buner Sub-Div.	3,300 KM
- Flood Control & Land Protection	. Swat River Area	7.8 KM	. Swat River Area	10.0 KM	. Swat River Area	10.0 KM
2. Agricultural Supporting Service Development						
- Soil Research	. Soil Survey	215,000 HA	. Soil Survey	215,000 HA	. Soil Survey	215,000 HA
	. Sub-Station / Upgrading	2				
- Extension & Seed Multiplication	.ATTD Farm(Mingora)	1				
	. Agr. Training Centers	5	. Agr. Training Centers	5	. Agr. Training Centers	5
	. Extension Facilities	17	. Extension Facilities	17	. Extension Facilities	18
	. Transportation for Exten.	21	. Transportation for Exten.	20	. Transportation for Exten.	20
	. Seed Farms	4				
	. Fruit. & Vegetable Training Offices	6	. Fruit. & Vegetable	2	. Fruit & Vegetable	2
	. Fruit Nursery Station	1	. Fruit Nursery Station	1	. Fruit Nursery Station	1
	. Bee Keeping Center	1	. Bee Keeping Center	1	. Bee Keeping Center	1
- Livestock & Poultry	. Veterinary Hospital	4	. Veterinary Hospital	1	. Veterinary Hospital	1
	. Nutural Breeding Center	3	. Nutural Breeding Center	3	. Nutural Breeding Center	3
	. Animal Insemination Center / Sub-Center	3	. Animal Insemination Sub-Center	1	. Animal Insemination Sub-Center	1
	. Animal Nutrition Improvement Center	2	. Animal Nutrition Improvement Center	1		
	. Poultry Hatchery	1	. Poultry Hatchery	1		
	. Animal Distribution	LS	. Animal Distribution	LS	. Animal Distribution	LS

Note : Figures without specified unit show the proposed places

TABLE 6-2 PROPOSED DEVELOPMENT WORKS FOR MASTER PLAN STUDY

Project Facilities	Short-Term		Middle-Term		Long-Term	
	Works	Qty	Works	Qty	Works	Qty
- Agri. Engineering & soil Conservation	.Soil Conservation	LS	.Soil Conservation	LS	.Soil Conservation	LS
	. Tractor Station	3				
- Cooperative & Input Supply	. Inspecter Office	1	. Inspecter Office	1		
	. Cooperative Bank	1				
	. Agr. Inputs Warehouse	1				
- Small Industry	. Woman Handicraft Center	1	. Wood Craft Training	1		
	. Gabion Factory	1	. Fruit Processing	1		
- Marketing Facilities	. Main Station(Mingora)	1				
	. Center & Sub-Center	3	. Center & Sub-Center	5	. Center & Sub-Center	3
3. Road and Communication Development						
- Road Improvement/Const.	. Road Improvement	387.5 KM	. Road Improvement	123 KM	. Road Improvement	23 KM
	. Road Construction	77 KM	. Road Construction	88 KM	. Road Construction	157 KM
- Telecommunication Development	. Wireless Telephone System	LS				
4. Rural Electrification Development						
- Rural Electrification	. Extension of WAPDA Transmission Line	29,000 H	. Extension of WAPDA Transmission Line	68,700 H	. Extension of WAPDA Transmission Line	116,200 H
	. Micro-Hydel Power		. Micro-Hydel Power			
	Kalam	400 KW	Kalam	200 KW		
	Martung	200 KW				
5. Village Water Supply Development						
- Water Supply System	. New Water Supply System	58,800 H	. New Water Supply System	70,600 H	. New Water Supply	72,600 H
6. Rural Infrastructure Development						
- Education Facilities	. Improve./Upgrading Schools	815	. Improve./Upgrading Schools	406		
	. Const. of Schools	286	. Const. of Schools	646	. Const. of Schools	1,613
- Health Facilities	. Improv./Upgrading Facilities	78	. Improv./Upgranding Facilities	65		
	. Construction of BHUs	24	. Construction of BHUs	34	. Construction of BHUs	52
	. Residence for Doctor	51	. Upgranding to RHCs	7	. Upgranding to RHCs	19
	. Ambulances	12	. Residence for Doctor	133	. Residence for Doctor	221
- Sanitation Facilities	. Office Establishment	LS				
	. Self-Const. of Latrin	13,400 H	. Self-Const. of Latrin	18,200 H	. Self-Const. of Latrin	42,800 H
7. Village Communitiy Development	. Minor Works Programme	LS	. Minor Works Programme	LS	. Minor Works Programme	LS

Note : Figures without specified unit show the of proposed places
H:HOUSES

6.5. Cost Estimation

6.5.1. Estimation Conditions

The cost estimation of the project was made subjecting to the following conditions;

- Basic costs such as wages, construction material, etc. are estimated on the basis of July, 1989 local market prices in the Project Area.
- Unit costs for respective construction work items are prepared referring to the unit costs of recent similar projects in and around Project Area.
- Indirect costs for construction works which are land acquisition cost, administration cost and engineering service cost are estimated at 30 percent of the direct construction cost and are included in the project costs.
- Physical contingency is considered as 20 percent of the construction cost and is included in the project cost.
- Price escalation included in the project cost is set as 3.6 and 7.1 percent per annum for foreign and local currency, respectively.
- Exchange rate of US$1.00 = Rs.21.00 as of July 1989 is applied in the estimation.

6.5.2. Project Cost

The project cost was estimated at 15,653 million Rupee. The summary of the project cost is shown below;

Summary of Project Cost for Master Plan Study

(unit: million Rs, %)

Description	Short-Terms		Middle-Term		Long-Term		Total	
1. Agricultural Infrastructure Development	636	(18)	670	(21)	636	(16)	1,942	(18%)
2. Agricultural Supporting Service Development	255	(7)	123	(4)	76	(2)	454	(5%)
3. Road and Communication Development	950	(28)	322	(10)	193	(5)	1,465	(14%)
4. Rural Electrification Development	309	(9)	558	(18)	907	(23)	1,774	(17%)
5. Village Water Supply Development	376	(11)	452	(14)	464	(12)	1,292	(12%)
6. Rural Infrastructure Development	856	(25)	933	(30)	1,548	(40)	3,337	(32%)
7. Village Community Development	76	(2)	92	(3)	91	(2)	259	(2%)
Sub-total	3,458	(100)	3,150	(100)	3,915	(100)	10,523	(100%)
8. Price Escalation	449		1,392		3,289		5,130	
9. Total Project Cost	3,907		4,542		7,204		15,653	

Note: Details are shown in Annex G.

6.6. Implementation Programme

6.6.1. Implementation Organization

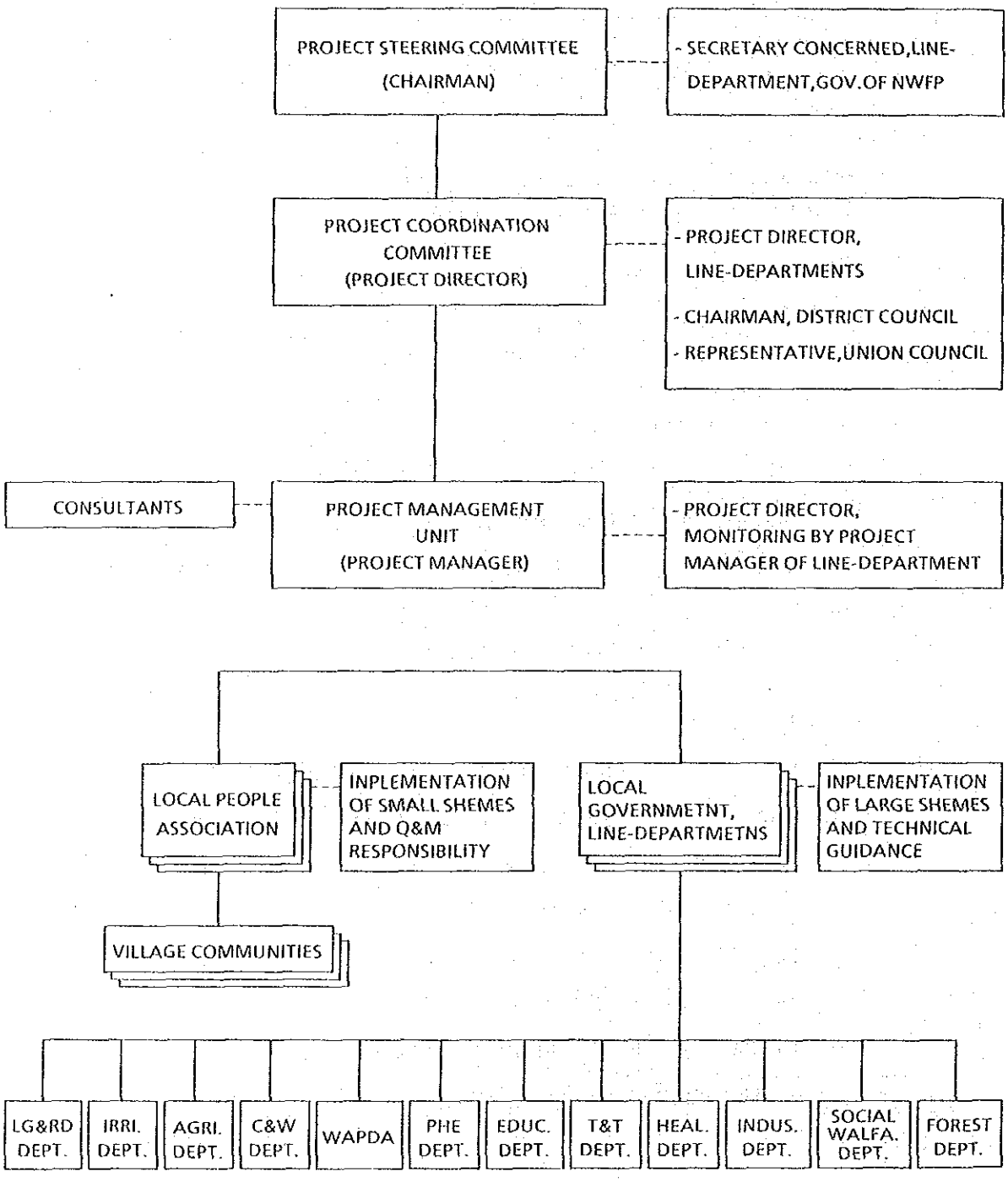
The project would have three level organization and management structures as shown in Figure 6-2. Responsibility for policy making matter would be a Project Steering Committee (PSC), overall project coordination to a Project Coordination Committee (PCC) and actual implementation to line-Departments concerned in the Local Government under the Project Management Unit. The objective of this structure is to maximize coordination among the various implementing line-Departments and Project Management Unit.

Project Steering Committee

The Project Steering Committee (PSC) would be organized and chaired by the Additional Chief Secretary, Planning and Development Department, Government of NWFP, and would exercise all policy and important implementation matters. All relevant Secretaries would be represented in the PSC. Members of the Committee would be as follows;

- Secretary, Planning and Development Department
- Secretary, Local Government and Rural Development Department
- Secretary, Irrigation Department
- Secretary, Agricultural, Food, Livestock and Dairy Department
- Chairman, Area Electricity Board, WAPDA Peshawar
- Secretary, Communication and Works Department
- Secretary, Public Health Engineering Department
- Secretary, Education Department
- Secretary, Health Department
- Secretary, Industry Department
- Secretary, Social Welfare Department
- Secretary, Forest Department

FIGURE 6-2 PROPOSED ORGANIZATION FOR PROJECT IMPLEMENTATION



Project Coordination Committee

The Project Coordination Committee (PCC) headed by Project Director would also be established, and line-Departments and Government Agencies with direct involvement in the project would nominate their most senior officers at the District level to this Committee. The PCC, furthermore, include the District Council Chairman and one representative of Union Councils. To ensure an active cooperation of the rural population, it would be essential that Chairman of the District Council and representative of Union Councils become members of the PCC. PCC should take enough coordination with District Coordination Committee.

The function of the PCC would be as follows;

- To coordinate the preparation of annual operation plan of the participating line-Departments to ensure that the proposed activities are in line with the project concept and design, and are also integrated with each other,
- To coordinate and monitor project activities during project implementation, assemble relevant data and prepare progress reports,
- To consolidate project accounts, and arrange for reimbursements, and
- To expedite procurement matters.

Project Director would be fully versed in all aspects of project implementation and play the role of liaison officer vis-a-vis Federal Government, Provincial Government and other related Agencies. Most importantly, the Project Director would be the principal motivater and catalyst among farmers, Village Communities and line-Departments.

Project Management Unit

The Project Management Unit (PMU) would be an actual implementation body headed by the full-time Project Manager especially appointed for the task. The Project Manager would be supported by the joint Project Manager of line-Departments concerned.