

THE ISLAMIC REPUBLIC OF PAKISTAN

MASTER PLAN STUDY

FOR

INTEGRATED RURAL DEVELOPMENT PROJECT

FINAL REPORT

VOL. I

MAIN REPORT

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ISLAMIC REPUBLIC OF PAKISTAN

MASTER PLAN STUDY
FOR
INTEGRATED RURAL DEVELOPMENT PROJECT

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FINAL REPORT

VOL. I

MAIN REPORT

MARCH 1986

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a Master Plan Study for the Integrated Rural Development Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Pakistan a survey team headed by Dr. Takashige Kimura, Managing Director of International Project Department, Chuo Kaihatsu Corp., from March to April and from June to September, 1985.

The team exchanged views on the Project with the officials concerned of the Government of Pakistan and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

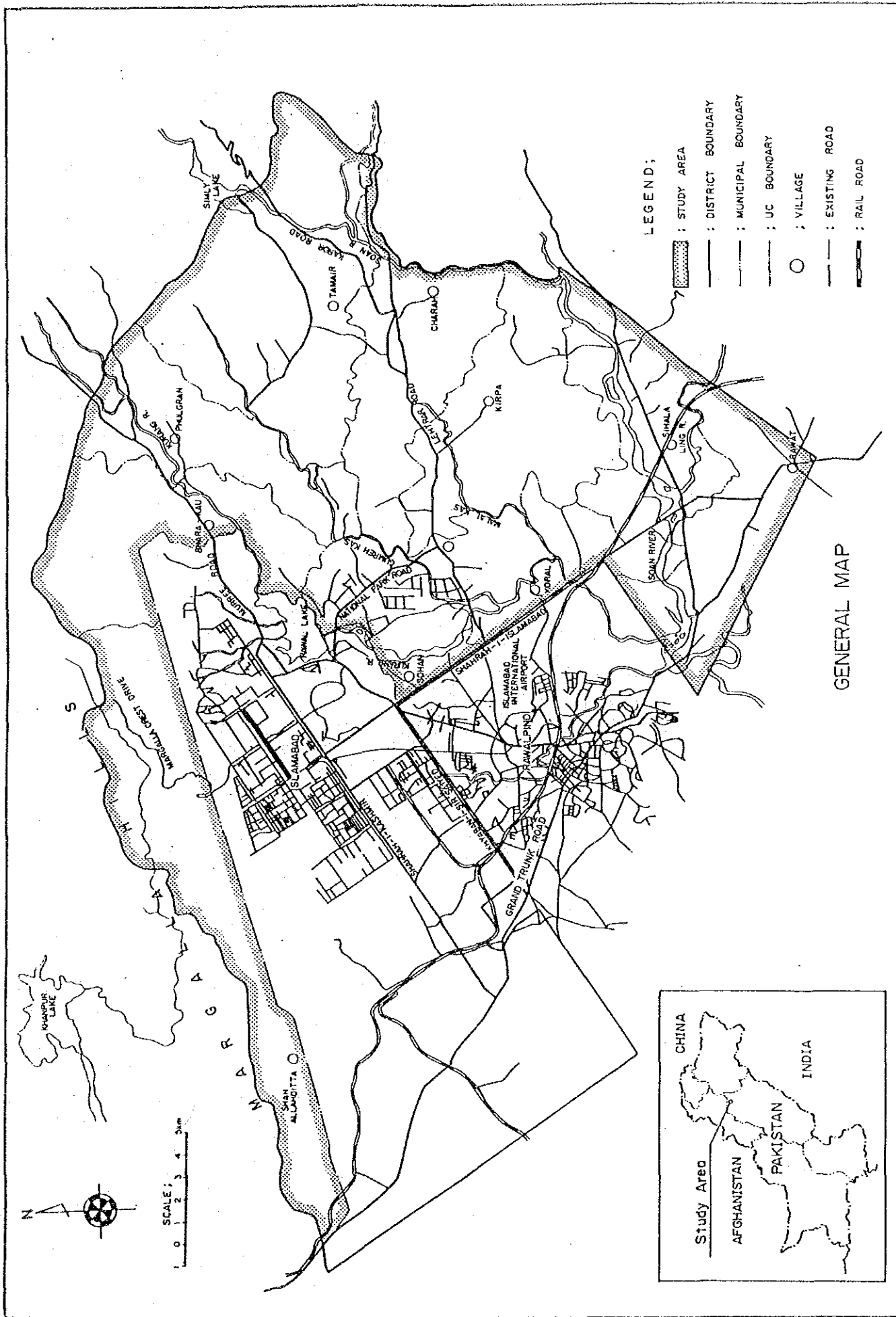
I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

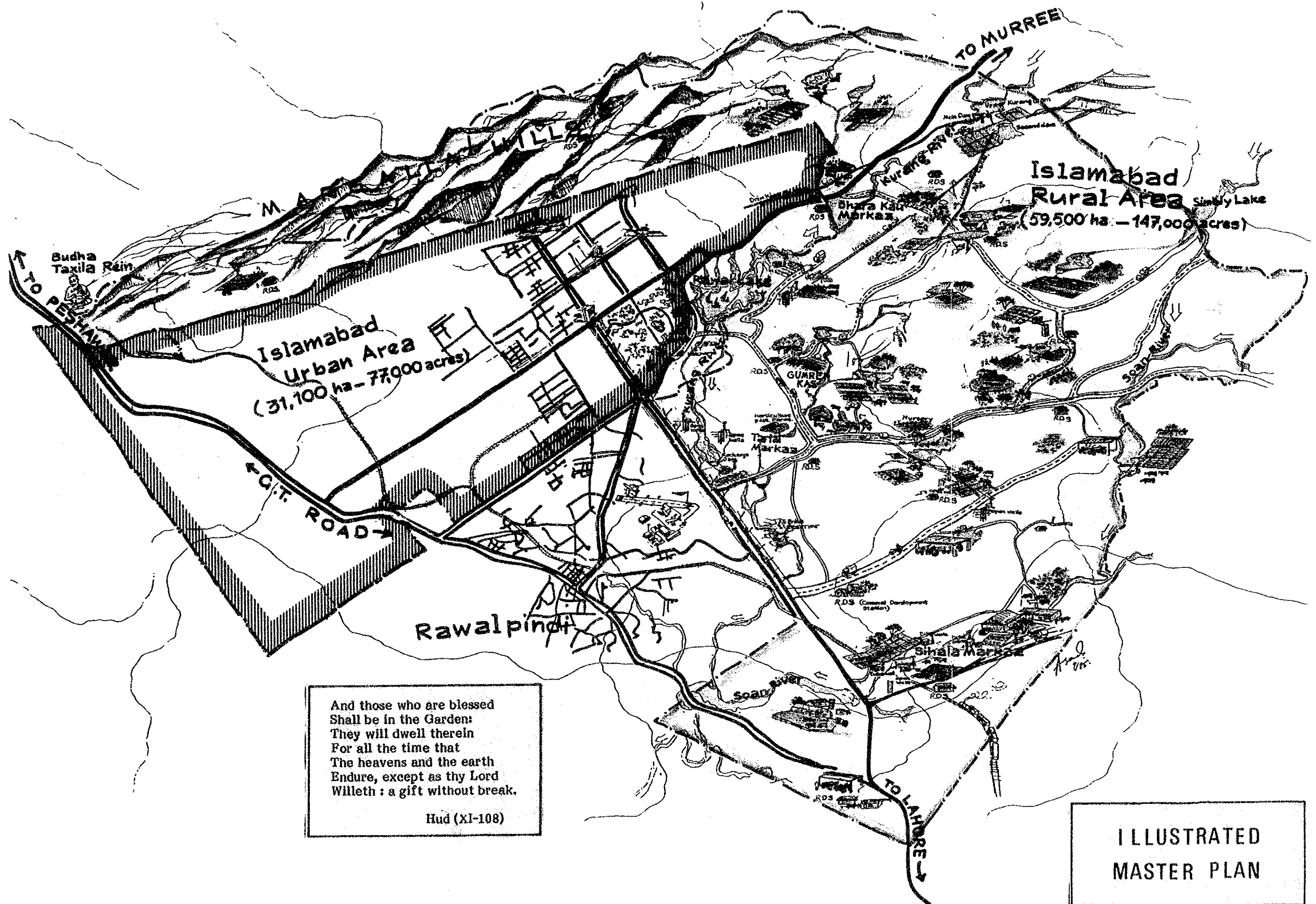
I wish to express my deep appreciation to the officials concerned of the Government of the Islamic Republic of Pakistan for their close cooperation extended to the team.

March, 1986



Keisuke Arita
President
Japan International Cooperation
Agency (JICA)





And those who are blessed
 Shall be in the Garden:
 They will dwell therein
 For all the time that
 The heavens and the earth
 Endure, except as thy Lord
 Willeth : a gift without break.

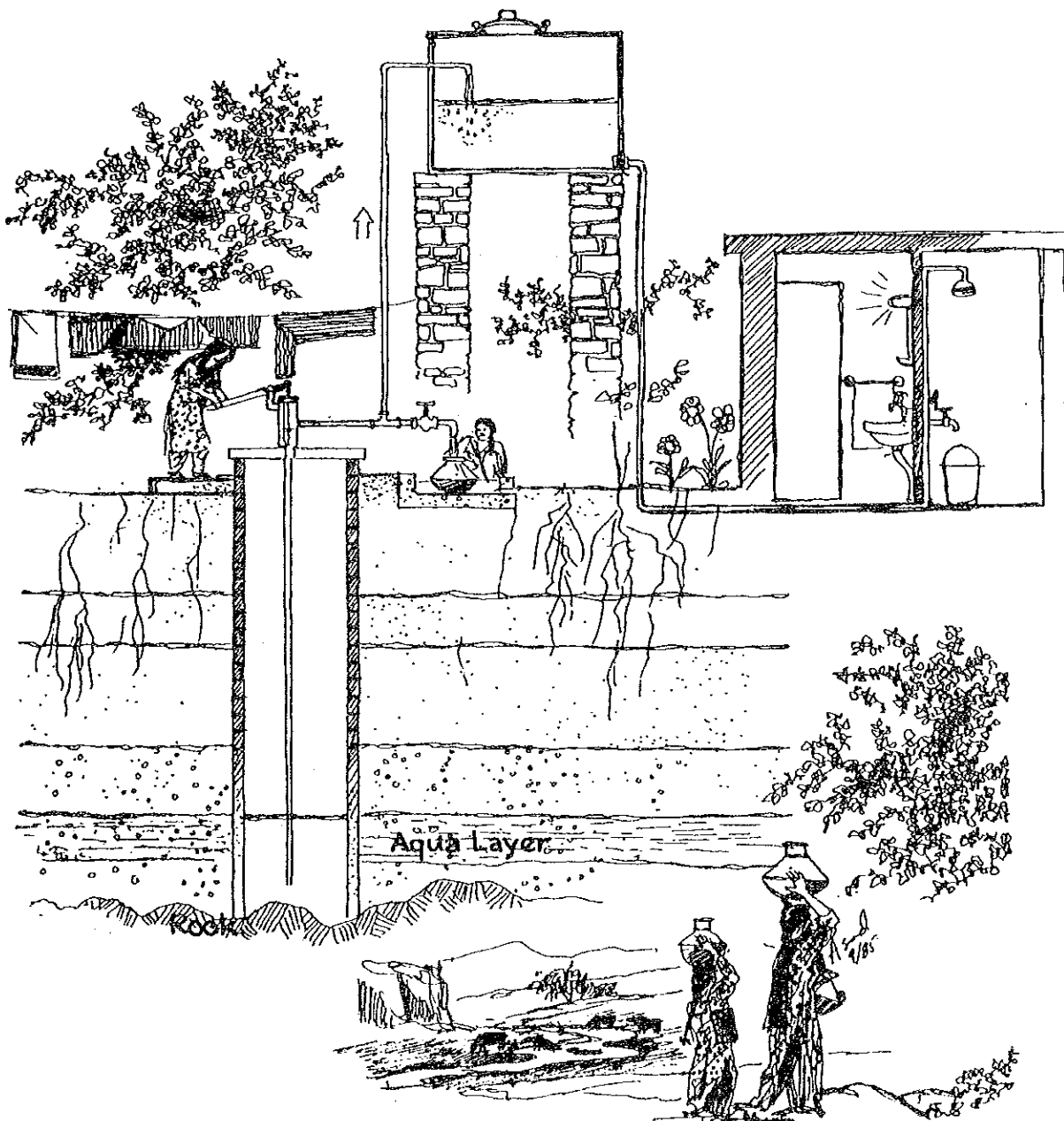
Hud (XI-108)

ILLUSTRATED
 MASTER PLAN

CONTENTS
(MAIN REPORT)

ILLUSTRATION No. 1

Clean drinking water scheme.
Improved village well.



And remember Moses prayed
For water for his people;
We said: "Strike the rock
With thy staff." Then hushed forth
Therefrom twelve springs.
Each group knew its own place
For water. So eat and drink
Of the sustenance provided by God,
And do no evil nor mischief
On the (face of the) earth.

Baqara (II-60)

MAIN REPORT

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ABBREVIATIONS AND GLOSSARY

(1) Agencies

JICA	Japan International Cooperation Agency
IA	Islamabad Capital Territory Administration
CDA	Capital Development Authority
LGRD	Department of Local Government and Rural Development, IA
NARC	National Agricultural Research Centre
PARC	Pakistan Agricultural Research Council
SDO	Small Dams Organization
WAPDA	Water and Power Development Authority
ADBP	Agricultural Development Bank of Pakistan
ABAD	Agency for Barani Agricultural Development
BARD	Barani Agricultural Research & Development Project
TTU	Technology Transfer Unit, NARC
DTO	District Transportation Office, Pakistan Railway
LAMEC	Literacy and Mass Education Commission
NCRD	National Centre for Rural Development
PERI	Punjab Economic Research Institute
PINSTECH	Pakistan Institute for Nuclear Science and Technology
IDWP	Islamabad Development Working Party
RACC	Rural Area Coordination Committee
UC	Union Council
UNICEF	United Nations Children's Fund
WHO	World Health Organization
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPU	Universal Postal Union
IRRI	International Rice Research Institute
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo

(2) Others

RHC	Rural Health Centre
BHU	Basic Health Unit
LHV	Lady Health Visitor
IRDP	Integrated Rural Development Programme

ICT	Islamabad Capital Territory
FGBSS	Federal Government Boys Secondary School
FGGSS	Federal Government Girls Secondary School
FGBMS	Federal Government Boys Middle School
FGGMS	Federal Government Girls Middle School
FGBPS	Federal Government Boys Primary School
FGGPS	Federal Government Girls Primary School
TDN	Total Digestive Nutrients
DCP	Digestive Crude Protein
Study	Master Plan Study for the Integrated Rural Development Project in the rural area, ICT
Study Area	The area to be covered by the Study
Team	The team assigned for the Study by JICA
Master Plan	The master plan embodied in this report
Barani	Rainfed
Kharif	Summer season
Rabi	Winter season
Katcha	Unmetalled or Unpaved
READ	Rural Education and Development Project
Markaz	Integrated Rural Development Centre
Panchayat	Local elected body at grassroots level
Sarpanch	Head of the Panchayat

(3) Measurement

<u>Length</u>		<u>Time</u>	
mm	millimetre	sec	second
cm	centimetre	min	minute
m	metre	hr	hour
km	kilometre	d	day
ft	foot	yr	year
<u>Area</u>		<u>Electrical Measures</u>	
cm ²	square centimetre	V	volt
m ²	square metre	kV	kilovolt
km ²	square kilometre	W	watt
ha	hectare	kW	kilowatt
		MW	megawatt

Volume

cm ³	cubic centimetre
ℓ	litre
gal.	gallon (Imperial)
m ³	cubic metre
A.F	acre foot
MCM	million cubic metre
cusec	cubic feet per second

Others

%	percent
HP	horsepower
°C	degree in centigrade

Weight

g	gramme
kg	kilogramme
t/ton	metric ton

Currency

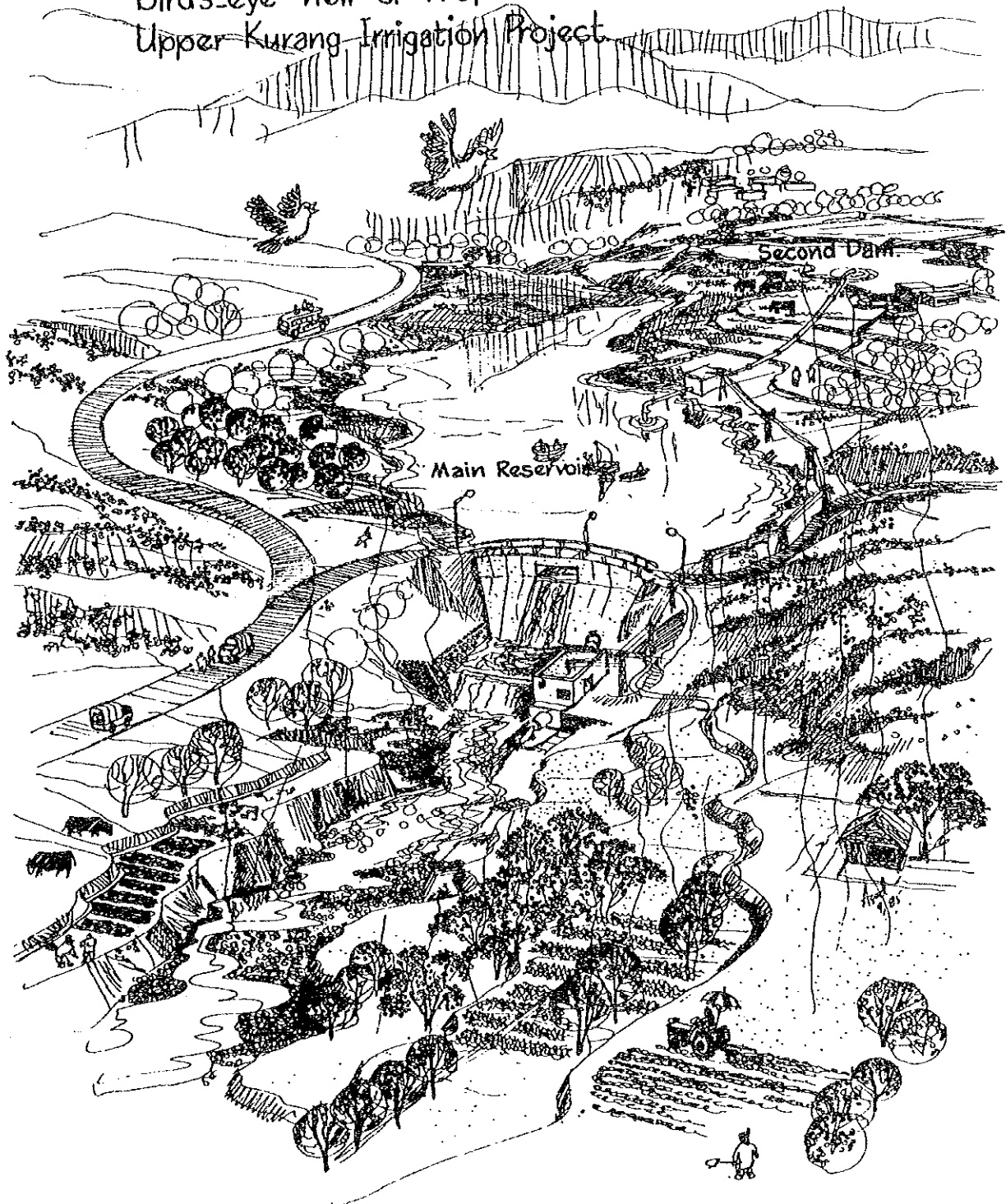
Rs	Pakistani Rupees
¥	Japanese Yen
US\$	US Dollar

SUMMARY AND RECOMMENDATIONS

ILLUSTRATION

No.2

Bird's-eye View of Proposed Upper Kurang Irrigation Project



And do We not send down
From the clouds water
In abundance,

That We may produce
Therewith corn and vegetables,

And gardens of luxurious growth?

Nabaa (LXX VIII-14,15,16)

SUMMARY AND RECOMMENDATIONS

01 PROJECT BACKGROUND

(1) Agriculture remains the most important economic base in Pakistan employing 72% of the total population (1981) and occupying the major portion (25%) of Gross Domestic Product. However, the socioeconomic conditions of the rural population including mean per capita income are far below those of urban population by 34%.^{1/} The current Sixth Five Year Plan aims at rapid economic growth and equal distribution of benefits to the majority of the people. Recognizing that economic growth must benefit the poor and reflect participation by all segments of the population, predominant stress is layed on rural development as a basis for regional development in the Plan.

The basic aim of the Plan rests not only on increasing agricultural productivity through specific agricultural development but also at a general improvement of the overall socioeconomic foundation as a means towards raising the living standard and providing equitable employment opportunities for the rural population.

(2) In consideration of the above, the Government of Pakistan requested the Government of Japan to provide technical cooperation in formulating a master plan for integrated rural development in Islamabad Capital Territory in February, 1984. In response to the request, the Government of Japan dispatched a JICA team for preliminary survey and conclusion of a Scope of Work for the Study, and, subsequently, the Government of Japan dispatched the Master Plan Study Team from March to April and from June to September 1985 for field studies.

This report reflects the results of the said field studies.

^{1/} The Sixth Five Year Plan, 1983 - 88

02 PHYSICAL CONDITIONS OF THE STUDY AREA

(3) The area proposed for the Master Plan Study is referred to as the rural area of Islamabad Capital Territory, which is located on the northernmost edge of the Pothwar Plateau, and is adjacent to the city of Rawalpindi where approximately 800,000 people reside. Situated between north latitudes 33°29' and 33°49', and longitudes 72°24' and 72°50', the Study Area is bounded by the Murree Hills in the northeast and by the Margalla Hills in the north and northwest. In the eastern portion of the Study Area, a sharply undulating plateau stretches from the Siwalik Hills southwestward from 600m to 450m in elevation. The Kurang, Gumreh Kas, Malal Kas and Soan rivers run through the Study Area.

(4) The Study Area is referred to as the rural area as defined by the Capital Territory Local Government Ordinance, 1979, and delineated by municipal boundaries. The extent of the Study Area is measured as follows based on 1:50,000 scale topographical maps of the area:

Study Area (Rural area)	59,500ha
Islamabad urban area	31,100ha
<hr/>	
Islamabad Capital Territory	90,600ha

(5) The geologic history of the Pothwar Plateau begins with the uplift of the Himalayas during the Neocene Period and consists roughly of sandstone and limestone of Cretaceous period, Eocene limestone, Quaternary deposits, etc. The undulating landscape is composed of exposed bedrock, loessic uplands and gully eroded land.

Vegetation in the Study Area is comprised of sparse subtropical savannah and sparse subtropical forest, featuring numerous drought-resistant leguminous species.

The Study Area belongs to semi-arid climatic zone and has the following five seasons.

Season	Period	Av. Temp. (°C)	Av. Rainfall (mm)
Winter	Dec. - Feb.	11.3	157 (14%)
Spring	Mar. - Apr.	19.9	151 (13%)
Summer	May - Jun.	29.6	99 (9%)
Monsoon Season	Jul. - Early Sep.	28.7	613 (55%)
Autumn	Mid. Sep. - Nov.	22.2	96 (9%)

The river runoff is concentrated in three months from July to September due to mass rainfall in those months. As for the ground water, Quaternary deposits are thin and discontinuous due to occurrence of numerous detached bedrock outcrops and, with the exception of areas immediately adjacent to rivers, ample aquifer is not present. The results of field observation of existing shallow wells (20 to 30m deep) indicated that ground water is weakly alkaline with average pH of 8.2 and its electric conductivity counted 857 μ S/cm on the average.

03 SOCIOECONOMIC CONDITIONS

(6) In 1960, a new site for the national capital was designated as Islamabad and the Capital Development Authority (CDA) was established for its construction. However, in response to the urgent need for an administrative system invested with judicial and administrative control over the ICT, administrative functions were resumed by the Federal Government in 1981. The President or his appointed Administrator directly administers the ICT through the Islamabad Administration (IA) which exercises equivalent powers and functions of a Provincial Government.

(7) The rural area of Islamabad is spread over 59,500ha where 133 villages are administratively placed under 11 local government organizations called Union Councils (UC). The Study Area corresponds entirely to this rural area.

The Study Area is divided into 3 rural development areas each administrated by a Markaz which undertakes coordination of various nation-building departments, services for the inhabitants and regional development activities.

(8) The total population of Islamabad Capital Territory is presently estimated as approximately 380,000 of which the rural area accounts for roughly 150,000. According to the 1981 Census, the total population of Islamabad rural area was about 136,000 among which the total available labor force was 35,500 and the actual working population was 30,697. Agriculture, including forestry, hunting and fishing, constitutes the largest labor sector with a working population of 38.8%. In addition, a large part of the working population listed in other occupational sectors is estimated to include farmers as well. The unemployed account for 13.5% of the total labor force. The male unemployed against the total labor force constitutes 13% which is 6 times over the national average, while female unemployed is estimated at 38.6% which is 5.4 times over the same.

(9) The average monthly income of Islamabad rural households is estimated as Rs 810. Nearly 80% of the rural households have a monthly income of less than Rs 1,000 while 40% of the same have less than Rs 500 per month. This low income level accelerates the rates of infant mortality (21.9%) as well as of malnutrition (50%) of children (UNICEF 1984).

(10) The Study Area is served by about 390km of various types of roads, 65% of which are unpaved. Total number of motor vehicles registered in the ICT is about 10,000 after 1981, among which motorcars occupy 43% while motorcycles occupy 34%. Average increase in registered vehicles in the ICT is 2,500 per year or 6.7 per year per 1,000 persons. This is higher than the national level of 1.7 and clearly shows rapid progress of motorization in the ICT.

(11) The Study Area has 12 sub-post offices and 26 branch post offices. This is sufficient to meet the minimum requirement of Universal Post Union (UPU) standards. However, there are no postboxes in the Area. About 150 telephones have been installed in the Area and 870 persons are served by one unit of telephone, which is considerably less than the national level of 200 persons per unit. There are no public telephones in either the Islamabad urban area or the Study Area.

(12) The roughly 150,000 population in the Study Area is dispersed among 133 villages, which depend almost entirely on water obtained from shallow wells for human consumption and other domestic use. Spring water is used in hilly areas and in the cases of villages along the Simly Dam Road, drinking water is obtained from pressure-reducing valves located on the water pipeline from Simly Dam. At times wells dry up during the dry season. At such times, conveyance of potable water to households, which is traditionally a female job, becomes an arduous task due to the long distances that water must be carried.

Approximately 50 village ponds are located throughout the Study Area, and are used variously as sources of drinking water for domestic animals, bathing, and laundering. Only a very small portion of either wells or ponds is used for irrigation.

(13) The Study Area is supplied with electric power from the Mangla (maximum generating capacity of 800MW) and the Tarbela (maximum generating capacity of 1,575MW) dams. There are 6 substations within the Study Area. The degree of electrification varies from village to village, with 53 villages (44%) totally electrified, 26 villages (21%) partially electrified, and 42 villages (35%) remaining unelectrified. Almost all electricity is used for lighting purposes, with only a very small portion being used as a mechanical power source.

(14) There are 159 schools in the Study Area, of which 114 are primary schools, and 45 are secondary (middle and high) schools. The student body at all schools is either all male or all female. The average number of students to teacher is 14.7 to 1, which compares favourably to the nationwide average of 25.5 to 1. One third of all teachers are female.

School facilities are severely inadequate. Nine schools are held entirely out-of-doors, while some schools utilize rented rooms. For example, only 16% of boys primary schools have desks and chairs for students, and the figure for girls primary schools is only 19%. Only 4% of boys schools have toilet facilities, and 11% for girls schools.

(15) Vocational training opportunities are few within the Study Area. Vocational training is offered at 3 boys secondary schools in agriculture,

electronics, metal working and wood working. Each course features one teacher and one assistant.

Vocational training facilities have been established in 20 villages under the Rural Education and Development (READ) program of the Ministry of Education. Of these facilities, 14 locations (155 students) are for wood working, 3 locations (30 students) are for blacksmithing and 2 locations (22 students) are for bricklaying.

(16) A total of three Rural Health Centres (RHC) and 12 Basic Health Units (BHU) are planned for the Study Area, of which 1 RHC and 4 BHUs have already been completed. Three mobile health clinics are also in service. There are currently only 2 doctors to whom approximately 100,000 patients come a year for consultation. Due to inadequate medical staff, roughly 9% of such patients do not receive attention. Principal illnesses are respiratory (22%) and digestive tract (21%) ailments.

(17) The CDA Fire Brigade comprised of 140 personnel and 9 vehicles is responsible for fire fighting activities in both urban Islamabad and the Study Area. However, vehicles are in seriously dilapidated condition, and 7 are planned to be replaced. Inadequate roads, water sources, and communications greatly impede fire fighting capabilities within the Study Area.

Police under IA consist of 4,200 personnel. Although a police phone and radio communications network is in effect, there are only 2 police stations situated within the Study Area.

(18) Activities in the non-agricultural sector of the economy within the Study Area consist of retailing, short distance hauling, construction, etc. Also the Team found some cottage industries such as pottery, blacksmithing, shoe-making wood-working, etc. during the field study.

04 AGRICULTURAL CONDITIONS IN THE STUDY AREA

(19) Located adjacent to the twin cities of Islamabad and Rawalpindi, the socioeconomy of the Study Area is greatly influenced by urban development. Nevertheless, the economy of the Area remains dependent on agriculture, and 85% of the total is agricultural population. These conditions highlight the fact that the society within the Study Area is predominantly an agricultural one.

Despite the pervasive socioeconomic impact of agriculture inside the Study Area, the local population continue to rely on traditional dry farming characterised by low productivity and livestock raising. This low productivity is manifest in such characteristics of Area agriculture as the small scale of farming and the predominant majority of part-time farmers.

DISTINCTIVE FEATURES OF AGRICULTURE IN THE STUDY AREA

1. Population

Total Population	152,164 (100%) ^{1/}
Agricultural Population	129,200 (85%)

2. Farm Households

Total No. of Households	20,800 (100%)
No. of Farm Households	14,170 (68%)(100%)(100%)
No. of Cultivators	12,100 - (85%) -
No. of Landless Livestock Holders	2,070 - (15%) -
No. of Farm Households with Livestock	12,830 - - (90%)

3. Total Area 59,500ha (100%)

4. Cultivated Area

Total Cultivated Area	23,120ha (39%)
Total Cultivated Area/No. of Cultivators &/Farm Households	1.9ha & 1.6ha
Total Cultivated Area/Total Population &/Agricultural Population	0.15ha & 0.18

- cont'd -

5. Livestock

Total No. of Head (Adult cow units)	48,590
No. of Head/Farm Households with Liverstock (Adult cow units)	3.9 head

6. Farm Economy

No. of Farm Households with Primary Income Sources from Agriculture	6,800 (48%)
No. of Farm Households with Primary Income Source from Non-agricultural Sector	7,370 (52%)

1/ Estimated as of 1985.

(20) The cultivated area in Pakistan which is totally rain-fed is referred to as "Barani". Mean annual rainfall within this region varies from 200mm to 1,500mm. The Study Area is contained within the vast Barani tract, and features a relatively favorable mean annual rainfall for this tract of 1,100mm. Nevertheless, highly irregular distribution of rainfall throughout the year compounded by lack of irrigation severely limit the application of fertilizers as well as the introduction of new technology. Consequently yields are low and farm management is unstable. In addition, soil conditions are poor, with soil erosion posing a major problem for agriculture.

(21) Farm size in the Study Area is characterized as small-scale. On the basis of available data, farm size within the Area has been determined at 95% under 10ha and 60% under 2ha. The 1981 census reveals that one farm is comprised of 6.8 registered plots in Rawalpindi District in average which is 1.6 times the average for both Punjab Province and the country as a whole.

(22) The Study Area is largely non-irrigated. However, a total of 188ha are irrigated by means of tubewells (11ha), shallow wells (102ha) and ponds (75ha). The Soil Conservation Department, IA has recently formulated a plan for surface water irrigation from mini-dams at 11 locations, of which 3 are currently under construction. However, the

irrigable area from each location is only 5 to 20ha, benefitting only 5 to 7 households.

(23) Almost all cultivated land is rain-fed. The winter crop is largely wheat (90%); summer crops consist of maize, beans, sorghum, millet, etc. Cropping intensity is approximately 105% with average yields being at low levels, for example, wheat is 1t/ha and beans are 450kg/ha.

Plowing is done by rented tractor or by draft animal. There are 225 tractors in the Study Area.

Ninety five percent (95%) of the wheat crop consists of improved varieties. As fertilizer for wheat, 70 to 80% of farmers apply urea or di-ammonium phosphate.

(24) Almost all farmers (90%) raise livestock (dairy cattle, water buffalo, goat, sheep, bulls, etc.). The average head of livestock per household is 3.9 (adult cow units). Almost all livestock are mixed breeds, feed is insufficient, and productivity is low. Chickens are raised by almost all households, with an average of 6 chickens per household. Commercial poultry farming has been promoted by CDA. Poultry farms now number 162 in the Study Area, on which 145,000 birds are maintained.

(25) Inland fisheries are in an initial stage of development within the Study Area. Inland fisheries are currently conducted in 1,770ha of water surface. However, this figure drops to only 70ha if Rawal and Simly lakes, under the jurisdiction of CDA, are excluded from consideration. Fish varieties include Taila, Mori, Mahaseer, Rohu, etc. all of which are common on the Indian Subcontinent. The Punjab Government's hatchery near Rawal Lake produces 2 million fingerlings per year which is insufficient to supply to potential demand for 5 million fingerlings within ICT.

(26) Studies in agricultural technology are currently being undertaken by the Pakistan Agricultural Research Council (PARC) and the National Agricultural Research Center (NARC). However, technology transfer to the individual farmer remains insufficient. Although positions have been established for one agricultural specialists in each of the 3 Markaz of the Study Area, only two posts has currently been filled. Furthermore,

only 5 agricultural extension workers are presently serving in the 11 UCs (one sanctioned post for each UC) with each individual worker responsible for 4,600ha.

Agricultural support services are provided by such institutions as the Punjab Agricultural Development and Supplies Corporation (PADSC) and the Punjab Seed Corporation (PSC), which provide for distribution of agricultural materials, machinery and seeds. Agricultural financing institutions such as the Punjab Provincial Cooperative Bank (PCB), the Agricultural Development Bank of Pakistan (ADBP), and various commercial banks provide financial assistance to farmers.

Within the Study Area, there are 81 cooperative societies registered with the Cooperative Department. However, due to lack of adequate staff and incomplete reconciliation with prevailing social and religious notions, cooperative activities remain limited. An irrigator's cooperative society has also been established at Talhar.

05 CONSTRAINTS AND DEVELOPMENT STRATEGY

(27) The problems faced by the Study Area population stem from numerous factors linked to both natural and social conditions prevailing within the Area. Women and children, who must play an active role in any successful development of the Area, at present continue to remain largely excluded from the benefits of agricultural production, home industry technology, elementary medical services, nutritional and health training, as well as job opportunities. Development strategy must reflect a long term viewpoint towards comprehensive amelioration of health, education and living conditions as a means of soundly integrating the aspirations of all segments of the Area population with the objectives of rural development. The needs and requirements of the local populace must constitute the central issue in all aspects of development planning. It cannot be overemphasized that the development approach must be first and foremost people oriented. The parameters for the present study were established on the basis of the above considerations.

(28) With overall enhancement of living standards as the primary objective for integrated rural development, planning must encompass not merely improvement of agricultural productivity, but rather focus on

strengthening the social base within the Study Area. This would include factors indirectly affecting productivity such as improvement of health and education facilities, expansion of communications and housing improvement. Exploration of employment opportunities outside the agricultural sector is also essential. Benefits and services envisaged through integrated rural development must be equally available to all segments of the Area population and must include social welfare functions as well as strictly economic ones. Integrated rural development is thus viewed as an effort to strengthen and enhance all dimensions of the living environment within the Study Area.

(29) Development of the Study Area must be seen in perspective as one important segment in the larger national development strategy. The small-scale farmers, landless farmers and impoverished workers of the Study Area must be properly viewed as comprising an important national resource, and as such must be targeted to benefit from the fruits of development. If priority for distribution of development benefits is merely accorded the already privileged segments of the population, it is doubtful, given limitations on resources within the Study Area, that the large strata of low income farmers and rural labourers mentioned above will enjoy any of the net results of economic growth. As such, this broad low income segment will remain impoverished and consequently fail to realize its potential as an incalculably valuable national asset. Accordingly, the primary task of integrated rural development is to draw this sector of the population into the mainstream of economic development and social progress.

Integrated rural development must therefore embrace the following 3 key points;

- Equal distribution of development benefits to the low income segment of the rural population.
- Improvement in income levels for all segments of the rural population as the principal economic objective.
- Involvement of the Area population in project planning and implementation.

Towards these ends, it is essential that full knowledge of present conditions and aspirations of Area inhabitants constitute a precondition for project formulation.

(30) The Team conducted a series of investigations to ascertain the desires and aspirations of the Area population regarding rural development objectives.

After thorough consultation with IA and on the basis of the 1981 census, 450 households in 9 villages were selected from a total population of 137,854 (about 20,800 households) as the object of a sample survey. For this purpose, a questionnaire covering all aspects of daily life for inhabitants within the Study Area was prepared and target households were visited. The questionnaire was prepared both in English and Urdu.

Fact finding discussions were held at each of the 11 UCs wherein Team members met with council chairman and members to examine problems faced by Area inhabitants as well as the general aspirations of the local population.

A questionnaire survey was conducted at each of the 68 Panchayats within the Study Area. Within the questionnaire, 50 potential development objectives were specified and representatives (Sarpanch) were requested to select the 5 which they felt should be given greatest priority.

The aspirations of the local population gleaned from the above investigations may be collated as indicated in the following table. The results of the above interviews and discussions were first cross-compared with current Government development policy to insure the absence of any discrepancies, and subsequently utilized as a crucial reference in Master Plan formulation.

PRIORITY LIST FOR RURAL DEVELOPMENT

Government Policy			People's Intension Survey (Study Team)		
Order of	Planning Commission	IA ^{1/} 5 Year Plan	Questionnaire Survey (450 samples)		Questionnaire Survey
Priority	Guideline	Priority	Production Goods	Betterment of Living ^{3/}	(68 Panchayat)
1	Road	Road	Farm machinery	Drinking Water	Drinking Water
2	Drinking Water	Drinking Water	Vehicles	Medical & Health	Agricultural Machinery ^{5/}
3	Electrification	Electrification	Land ^{2/}	Gas (Fuel)	Agricultural Develop. Station ^{6/}
4	Education	Agricultural Extension	Poultry	Road	Animal Husbandry & Meadow Develop. ^{7/}
5	Medical & Health	Skilled Training	Well Pump	Electricity	Vocational Training
6	-	-	Domestic Animals	Cottage Industry	Road & Medical Services
					Electri- fication ^{8/}

Note: 1/ Education is not included
2/ Farm land
3/ Education is not included
4/ Including irrigation, mini-hydropower, horticulture, fish fly, etc.
5/ Lease system
6/ Supporting facilities for agriculture village life
7/ Including land conservation & environment
8/ Including mail box, public telephone

(31) In accordance with the accepted approach for integrated rural development, the subject Master Plan envisages a phased implementation of a series of specific projects for productivity improvement, expansion of employment opportunities, equitable distribution of income, modernization of facilities and services, improvement of the village environment, etc.

(32) The major background considerations for the Master Plan Study may be described as: i) the Study Area comprises the rural portion of the special political district designated as the Islamabad Capital Territory; ii) the Study Area encompasses an extensive 60,000ha (approx.); and iii) the Study Area lies within a semi-arid climatic zone and accordingly features only limited water resources.

Against this background, the Study proceeds to focus central attention on maximum incorporation of the aspirations and participation of the Area population in development planning and implementation.

The Study is a reflection of data gathered in the field as well as examination of problems, countermeasures and development approach encountered in previous projects both in Pakistan and in other countries with similar development requirements.

(33) The outline for Master Plan formulation was prepared in conjunction with detailed discussions with concerned agencies and individuals within the Government, local officials, and Study Area residents. This outline may be described as follows:

- a) Integrated rural development will emphasize not only agricultural productivity, but also improvement of living standards and environment.
- b) Rural development will be implemented in a stepwise fashion with focus on long term, sustained benefits.
- c) The implementation period for the Master Plan is originally envisioned as 15 years, with the target year for completion being 2001.
- d) However, in order to ensure congruence with the Five Year Plans of the Government, a marginal period for adjustment was incorporated making the actual targeted year for completion 2003.
- e) Participation by the Area population in both formulation and implementation of the Master Plan is considered vital for its success.

(34) The basic philosophy of the Master Plan focuses on the elimination of disparities in socioeconomic status affecting the population of the Study Area. Emphasis has accordingly been shifted from the traditional approach of solely targeting the agricultural production base for improvement to a broader effort embracing enhancement of health, education and welfare facilities; strengthening of road and communication networks; expansion of employment opportunities; and other aspects directly or indirectly affecting the living standard of Area residents. Accordingly, in the selection of development schemes for incorporation in the Master Plan, the following factors were taken into consideration: i) consistency with current development planning at Government, local government and grassroots level; ii) aspirations of the local population; iii) expansion of employment opportunities; iv) fulfillment of basic requirements for a satisfactory standard of living; and v) investment scale and availability of Government financial resources.

On the basis of the above criteria and additional consideration of development potential and environmental conditions of the Study Area, 13 development schemes were selected for inclusion in the Master Plan as listed below.

Direction of Development	Selected Scheme
I. Development of Agricultural Sector	<ul style="list-style-type: none"> - Land & Water Conservation' - Irrigation (surface water) - Ground Water Multipurpose Development (irrigation) - Intensive Horticulture Promotion - Agricultural Machinery Station - Livestock Development Promotion - Inland Fishery Development
II. Improvement of Living Conditions	<ul style="list-style-type: none"> - Village Environmental Improvement - Land & Water Conservation' - Medical and Health Services Improvement - Rural Development Supporting Services - Ground Water Multipurpose Development (drinking water) - Transportation and 'Communication
III. Manpower Development	- Manpower Development
IV. Industrial Development	- Small-scale Industry Development

' Indicates the same scheme.

(35) Implementation of all aspects of integrated rural development envisaged in the Master Plan would require a huge allocation of funds. Realization of various schemes included in Part IV in the Main Report plus additional conceivable programs to address requirements for recreational facilities, river training, hamlet rationalization, dwelling improvement, water purification facilities, domestic water supply, hill reforestation, bridge construction, secondary and higher educational facilities, etc. would entail an estimated investment of 200 billion yen (about Rs 14.5 billion).

However, such an allocation of funding would be impossible given the current availability of domestic and foreign financial resources. As a result, implementation has been focused on those schemes considered most

essential in rural development of the Area. Implementation period would be 15 years and require about 60 billion year (about Rs 4.4 billion).

06 MAIN SCHEMES EMBODIED IN THE MASTER PLAN

(36) Brief descriptions of the selected 13 schemes are presented below.

1) Irrigation Scheme

Upland farm management under typical Barani agriculture is the principal form of farming in the 23,120ha of cultivated land encompassed by the Study Area. Almost none of this cultivated land is irrigated. Rainfall is unstable in the Area. The rural population suffers from damages by drought and is particularly eager for stabilized agriculture based on irrigation.

According to field study, while rainfall exhibits extreme variations through the year, annual rainfall averages about 1,100mm. Surface water resources development is possible by dam construction conforming to the natural lay of the land. In view of the extent of available water resources, topography and economic considerations, irrigable area is determined at 8,600ha. There exist twenty candidate sites for dams and weirs. A small-scale project is, therefore, to be planned at each site. The largest project will have an irrigated area of 6,400ha supplied with irrigation water from the Upper Kurang Dam (with storage capacity of 11MCM) envisaged for construction at Dohala on the Kurang River (see Illustration No.2 on the title page for Summary and Recommendation). Mini-hydropower station may be installed at this dam. Other smaller dams will have an irrigated area of 2,200ha collectively. The size of individual irrigable areas varies from 5 to 1,400ha by location. The yield will increase by an estimated two to three fold in the benefit areas encompassed by these irrigation projects, with subsequent increase in farmers' incomes.

2) Ground Water Multipurpose Development Scheme

Rural inhabitants consume 19ℓ (5 gal.) of water per person per day through most of the year from small shallow wells near their settlements. However, many of these wells are depleted

during the dry season. A portion of these wells are also used for limited irrigation of upland fields on alluvial terraces.

Hydrogeologic investigation indicated the presence of significant aquifer in Quaternary sediment deposits (over 100m thick) along principal rivers in the Study Area. However, in most other sections of the Study Area aquifer are only 20m thick. Ground water development will accordingly focus on shallow wells in those areas, with deep wells to be constructed in the previously described sectors where water bearing strata are thickest.

A ground water multipurpose development scheme was formulated to improve current water use through ensuring the quantity and quality of domestic water supply, water for upland crop irrigation (principally vegetables) and water supply for public facilities (see Illustration No.3 on the title page for Part I). Shallow wells (collector wells, 15-30m deep, 3.5m dia.) at 45 locations, deep wells (60-100m deep, 0.35m dia.) at 7 locations, and related distribution facilities are planned for construction. Water catchment facilities are to be established in areas of spring activity. Hand pumps are to be installed at 200 of the approximately 1,000 current shallow well sites to facilitate water procurement. Lavatory and laundry facilities are to be included in rural development stations and other public institutions to enhance sanitary conditions (see Illustration No.1 on the title page of the Contents).

The above scheme will provide for a sanitary water supply for daily use, as well as increased farm income through crop diversification.

3) Intensive Horticulture Promotion Scheme

Current cultivation practices in the Study Area are characterized by low productivity. The Study Area is situated adjacent to the large consumption center comprised by the twin cities of Rawalpindi and Islamabad where demand for vegetables, flowers, and other produce of intensive horticulture is high. Pilot farms are to be constructed under this scheme at 5 locations to promote the extension of intensive horticulture technology in the Study Area.

The functions of the pilot farms will encompass the 3 activities of production and marketing, training, and demonstration. Horticulture produce of good marketability will be cultivated and sold by the farm to provide employment and expanded income opportunities to landless farmers and farmers situated outside irrigation benefit areas. Farmers and potential farmers trained at the pilot farm will be instructed in sufficient technology to independently manage their own farms as a means to promote intensive horticulture throughout the Study Area.

4) Transportation and Communication Improvement Scheme

Road construction in the urban area is based on the master plan issued in 1960 for the captial area. The roads have adequate width and are paved with asphalt. Although the road network in the urban area is in generally good condition, that in the rural area remains underdeveloped with the national and provincial roads which serve as trunk roads located largely in close proximity to the urban area. There are 133 villages in the Study Area, of which only around 40% are linked by roads, while the remaining are connected by non-motorable pathways. About 65% of those rural roads are unpaved and in poor condition. In the rainy season in particular, the road base softens and passage of motor vehicles is difficult. Therefore, village-link roads and farm-to-market roads which are fundamental to the lives and activities of rural people require urgent development.

The rural roads (see Illustration No.8 on the title page for Tables and Figures) are envisaged as paved roads to accomodate heavy light truck traffic. The proposed road scheme will service the entire Study Area by 200km in length and result in a two-fold increase in road surface over the present condition.

The communication system in the Study Area is severely inadequate. Minimum requirements should be fulfilled for administrative as well as for socioeconomic reasons; and consequently, telephones will be installed at 300 important locations connected with telephone stations under construction.

Another simplified and economic telephone system is also planned. Switchboards will be installed at each rural development station envisaged under the Master Plan, and 10 telephone units shall share one line thus benefiting one fifth of the total households (estimated as 6,500 in 21st century). This system will improve and enhance the communications in the Area.

5) Agricultural Machinery Station (AMS) Scheme

In the Area, farmers generally use 40-50HP medium sized tractors equipped with cultivators for land preparation. Tractor hiring services are extended to the farmers, but the number of tractors is not sufficient to meet peak demand for land preparation in July. In order to handle this peak demand for tractors and coordinate timely land preparation and sowing, Agricultural Machinery Stations (AMS) will be established at suitable locations in the Study Area where farmers may conveniently hire tractors. The AMS will provide basic implements for plowing, sowing, harvesting, threshing, etc. Horsepower of proposed tractors will mainly be around 40-50HP, the same as those presently used in the Area. In addition, tractors of 30HP or less are also planned for small-scale farming. Besides tractors, bulldozers of 120-140HP will be planned for land conservation and farm road maintenance.

According to the AMS scheme, farmers in the Area will perform the related farm works, machinery maintenance, land conservation and road maintenance as required. In the above manner, the overall Agricultural Machinery Station (AMS) Scheme is expected to substantially enhance agricultural productivity in the Study Area.

6) Livestock Development Promotion Scheme

Almost all the farm households in the Study Area raise livestock and the livestock sector accordingly plays an important role in the agriculture and daily life of the rural population. The productivity of the livestock sector, however, is low and integrated implementation of various countermeasures is required.

Accordingly, the establishment of a livestock development station, livestock pilot farms and veterinary facilities is

proposed with a view to: i) improving genetic quality of livestock (including distribution of qualified livestock and extension of artificial insemination); ii) strengthening of animal health service (including construction of veterinary facilities); iii) development and extension of a livestock raising system and range management system appropriate to the Study Area; and, iv) training and education of farmers.

The scheme will be implemented in two phases. Three Pilot Farms focusing on development and demonstration of range management system will be introduced during the first stage. In the second phase, a Livestock Development Station will be established as a regional center for the promotion of livestock development.

With the implementation of the proposed scheme, farm income of livestock holders, accounting for a great majority of the famers in the Study Area, will be considerably increased and effective land use and conservation of land and water will also be promoted by the extension of an improved range management system.

7) Inland Fishery Development Scheme

Inland fisheries are envisioned to increase farm income, diversify the agricultural sector and provide a source of inexpensive protein. Development of the same in the Study Area, however, is presently only in an initial stage and facilities and systems required for further development have not been established. Accordingly, the implementation of the following countermeasures will be planned in order to promote inland fishery development emphasizing participation of farmers.

- establishment of a fish hatchery (construction of a small-scale fish hatchery including rearing facilities and demonstration ponds) and distribution of fish fry/fingerlings
- construction of village community ponds (one pond at each UC, 11 ponds in total)
- inland fishery development of existing water bodies and proposed water bodies under the present Master Plan, and also promotion of construction of mini-size fish ponds by farmers

A polyculture system for fish farming and raising of ducks will be introduced aiming at intensive utilization of water bodies (see Illustration No.5 on the title page for Part III).

With the implementation of the proposed scheme, increase of farm income, diversification of the agricultural sector and diet improvement of the rural population will be achieved.

8) Village Environmental Improvement Scheme

In the Study Area, village living and sanitary environments are extremely poor due to lack of water bodies and green areas, and also poor road conditions and drainage facilities. Moreover, fuel and domestic water supplies are difficult to procure, and hand transport of the same place an extreme burden upon women and children. Improvement of these living environment conditions, therefore, is a basic objective of rural development (see Illustration No.4 on the title page for Part II).

Accordingly, enhancement of the village environment is envisaged in the proposed scheme through: i) improvement of inner-village roads, and access roads to village-link roads; ii) pond construction and tree planting; iii) construction of recreational parks; and, iv) development of fuel forests and access roads to the same.

Reinforcement of the living and sanitary environment in villages through the implementation of the proposed scheme will be an important first step towards enhancing village comfort.

9) Land and Water Conservation Scheme

Degeneration of vegetation is extremely advanced in the Study Area, and degradation of land is proceeding due to climatic, topographic and soil conditions as well as artificial conditions such as overgrazing and destruction of vegetation for fuel wood supply. Encroachment of eroded land in particular causes direct loss of farmland. Urgent implementation of countermeasures towards conservation of land and water resources, as well as effective utilization of land is therefore required.

Accordingly, countermeasures are planned for land and water conservation consisting of: i) levelling of cultivated land and improvement of levees; ii) engineering measures; iii) vegetative measures including afforestation, grass land reclamation and reseeding; and iv) establishment of four (4) Nursery Stations aiming at production and supply of tree seedlings required for the above vegetative measures.

Through the implementation of the proposed scheme, land and water resources conservation, improvement of natural environment, livestock development and fuel wood supply will be promoted (see Illustration No.7 on the title page for Part V).

10) Medical and Health Services Improvement Scheme

Medical and health services constitute one of the least developed sectors covered by the Plan. This sector is plagued by both shortages of doctors, nurses, mid-wives, and technical staff, as well as insufficient budget for pharmaceuticals and utilities. An urgently required 3 ambulances and 25-bed Maternity Homes at 3 locations are planned under the scheme.

These measures will provide a base for rapid response service for sudden illness, accidents, and childbirth; and are expected to contribute significantly to lowering the unusually high infant mortality rate in the Study Area, estimated by UNICEF at 21.9%.

11) Manpower Development Scheme

In principal, manpower development begins with primary school. In addition to such traditional institutions, facilities for skill, technical and vocational training are inadequate in the Study Area. A large portion of the Area population remain confined to low income, unskilled labour due to a lack of vocational training.

Accordingly, a Vocational Training Station (one location) featuring a varied curriculum is envisaged under the scheme to increase employment potential for the Area residents.

Primary education, the basis for sound nation building, remains non-obligatory. School facilities and educational materials are inadequate. The scheme calls for construction to ensure minimum requirements are met for facilities at the 114 primary schools within the Study Area.

Implementation of the scheme will establish basic facilities for primary education (classrooms, desks, chairs, blackboards, lavatories, etc.) as crucial to a foundation for manpower development.

12) Small-scale Industry Development Scheme

Small-scale industry development is a significant sector of rural development from the standpoint of expanded employment opportunities, income generating and the prevention of population migration to urban centers. However, constraints regarding raw materials, marketing and manpower are numerous.

In this scheme, three industries were selected for consideration: gabion factory, livestock feed factory, and match factory. These industries were determined as appropriate for conditions of the Area applying criteria of scale, technology, raw materials, markets, etc. If in-depth marketing investigation subsequently bear out the applicability of introducing these industries, they would provide approximately 150 jobs to Area residents.

13) Rural Development Supporting Services Scheme

In order to ensure distribution of project benefits to each and every resident of the Study Area, the facilities and activities of the Markaz must be strengthened. Toward this end, a rural development station, to also function as a Markaz branch office, is to be established at each UC. This facility will contain the UC office, public workshop, nursery, library, conference room, clinic public warehouse, marketing facilities, firefighting equipment (including light truck), sports facility etc.

These facilities will be directly available to Area residents for public use: i.e., meetings, public activities, social events, commercial space, etc.

(37) Following table shows the brief quantitative description of 13 development schemes mentioned before.

SUMMARY OF DEVELOPMENT SCHEMES

Schemes	Brief Description
Irrigation	<ul style="list-style-type: none"> - Kurang River System dam (2 sites), weir (3 sites), irrigable area (6,364ha) - Other Sources dam (12 sites), weir (3 sites), irrigable area (2,188ha) - Total Irrigable Area: 8,552ha
Ground Water Multipurpose Development	Deep well (7 sites), shallow well (45 sites), spring (1 site), beneficiary (32 villages), irrigable area (123ha), hand pumps (200 sites)
Intensive Horticulture Promotion	Pilot farm (5 sites)
Transportation and Communication Improvement	Road paving (200km), telephone installation (300 places), simplified telephone communication system (13 places), beneficiary (6,500 households)
Agricultural Machinery Station	Main station (1 site), sub- station (2 sites), tractor shed (10 sites)
Livestock Development Promotion	Pilot farm (3 sites), development station (1 site), veterinary hospital (4 sites), veterinary dispensary (5 sites)
Inland Fishery Development	Fish hatchery (1 site), community pond (11 sites)
Village Environmental Improvement	Access road to main roads (24.2km), access road to forest (60.5km), inner village road (60.5km), afforestation (605ha), pond (605 sites), recreation park (8 sites)

- cont'd -

Schemes	Brief Description
Land and Water Conservation	Control of soil erosion (23,120ha), prevention of encroachment (292 sites), conservation and utilization of culturable wasteland (3,630ha), same of unculturable wasteland (5,000ha), nursery station (4 sites)
Medical and Health Services Improvement	Ambulance car (3 units), maternity homes (3 sites)
Manpower Development	Vocational station (1 site), primary school construction/reconstruction (114 sites)
Small-scale Industry Development	Gabion factory (1 site), livestock feed factory (1 site), match factory (1 site)
Rural Development Supporting Services	Rural development station (13 sites)

The UC-wise distribution of above schemes is presented in the following table.

UC-WISE DISTRIBUTION OF DEVELOPMENT SCHEMES

Facility	Total Q'ty	Koral	Rawat	Kirpa	Charah	Tarlai Kalan	Sohan	Phulgran	S.Allah Ditta	Sihala	Bhara Kau	Tacair
<u>IRRIGATION SCHEME</u>												
Dams	14nos. (4,647ha)	-	-	1 (96)	2 (1,452)	-	-	4 (2,650)	1 (15)	-	3 (172)	3 (262)
Weirs	6nos. (3,905ha)	-	-	-	-	2 (1,350)	2 (2,515)	-	2 (40)	-	-	-
Mini-hydropower	10nos.	-	-	1	2	1	-	2	2	-	1	1
<u>GROUND WATER MULTIPURPOSE DEVELOPMENT SCHEME</u>												
Shallow Well	45nos.	-	-	6	8	3	4	4	2	6	4	8
Deep Well	7nos.	2	1	-	1	-	-	-	-	2	1	-
Spring	1no.	-	-	-	-	-	-	-	1	-	-	-
<u>INTENSIVE HORTICULTURE PROMOTION SCHEME</u>												
Pilot Farm	5nos.	-	-	-	-	1	-	-	1	1	1	1
<u>TRANSPORTATION AND COMMUNICATION IMPROVEMENT SCHEME</u>												
Road	200km	6.2	12.8	46.0	24.1	12.7	5.6	21.0	6.4	11.3	25.5	28.4
Telephone	300nos.	10	30	35	30	30	10	25	20	40	30	40
Simplified Telephone System	6,500nos.	500	500	500	500	500	500	500	1,000	500	500	1,000
<u>AGRICULTURAL MACHINERY STATION SCHEME</u>												
Main & Sub-station	3nos.	-	-	-	-	1	-	-	-	1	1	-
Tractor Shed	10nos.	1	1	2	1	-	1	1	1	-	1	1
<u>LIVESTOCK DEVELOPMENT PROMOTION SCHEME</u>												
Development Station	1no.	-	-	-	-	-	-	-	-	1	-	-
Pilot Farm	3nos.	1	-	-	2	-	-	-	-	-	-	-
Veterinary Hospital	4nos.	-	-	-	-	1	-	-	1	1	1	-
Veterinary Dispensary	5nos.	1	1	1	1	-	-	-	-	-	-	1
<u>INLAND FISHERY DEVELOPMENT SCHEME</u>												
Fish Hatchery/Pond	12nos.	1	1	1	1	1	2	1	1	1	1	1
<u>VILLAGE ENVIRONMENTAL DEVELOPMENT SCHEME</u>												
Recreation Park	8nos.	-	-	1	2	1	-	1	-	-	1	2
<u>LAND AND WATER CONSERVATION SCHEME</u>												
Nursery Station	4nos.	1	-	2	-	-	-	-	-	-	1	-
<u>MEDICAL AND HEALTH SERVICES IMPROVEMENT SCHEME</u>												
Maternity Home/Ambulance Car	3nos.	-	-	-	-	1	-	-	-	1	1	-
<u>MANPOWER DEVELOPMENT SCHEME</u>												
Vocational Training St.	1no.	-	-	-	-	-	1	-	-	-	-	-
Primary School Construction/Reconstruction	114nos.	4	12	13	11	10	3	10	7	17	10	17
<u>SMALL-SCALE INDUSTRY DEVELOPMENT SCHEME</u>												
Factories	3nos.	-	3	-	-	-	-	-	-	-	-	-
<u>RURAL DEVELOPMENT SUPPORTING SERVICES SCHEME</u>												
Rural Development Station	13nos.	1	1	1	1	1	1	1	2	1	1	2

SUMMARY OF THE PROJECT COSTS OF THE MASTER PLAN

Project Component	Total Costs		Proportion(%)
	mln. Rs	mln. Yen	
1. Irrigation	792.30	10,918.05	17.5
2. Ground water multipurpose development	251.46	3,465.00	5.5
3. Intensive horticulture promotion	254.01	3,500.25	5.6
4. Transportation and communication	310.16	4,274.25	6.8
5. Agricultural machinery station	207.41	2,858.25	4.6
6. Livestock development promotion	195.56	2,694.75	4.3
7. Inland fishery development	18.51	255.06	0.4
8. Village environmental improvement	633.92	8,735.40	14.0
9. Land and water conservation	686.90	9,465.30	15.1
10. Medical and health services improvement	69.21	953.55	1.5
11. Manpower development	887.84	12,234.45	19.6
12. Small-scale industry development	51.00	702.90	1.1
13. Rural development supporting services	176.61	2,433.60	4.0
Total Project Costs:	4,534.89	62,490.81	100.0

Note: (1) Project costs consist of direct costs and indirect costs. Direct costs include direct construction costs and machinery and equipment costs. Indirect costs include the costs for land acquisition (5% of direct costs), administration (10%), engineering services (15%) and physical contingency (20%).

(2) Cost estimates for 13 development schemes are presented in TABLE 15.2-1 and the detailed cost estimates are provided in the Annex.

07 MASTER PLAN IMPLEMENTATION SCHEDULE

(38) An implementation period of 15 years was envisaged for the Study Area. In order to allow periodic adjustment with the Government's overall development planning, Master Plan implementation is divided into four steps. A best-case scenario for implementation would call for commencement in 1986 and completion in 2001. However, an adjustment margin period was incorporated to allow for the above-mentioned coordination of implementation with the Government's general development plans, thus resulting in targeted completion for 2003.

(39) Total project cost is estimated at about 60 billion yen (about Rs 4.4 billion). Priority for implementation was given to schemes which require limited funding and promise early benefits. In line with the above approach, the initial phase of Master Plan implementation will call for commencement of those schemes of highest priority, with lesser priority schemes to be implemented in subsequent stages. The priority projects envisaged by each such scheme were incorporated into a Model Integrated Rural Area Development (MIRAD) and assigned the highest priority for implementation.

Furthermore, a feasibility study is planned for the proposed Upper Kurang Irrigation Project (UKIP) which envisages construction of two reservoirs along the upper reaches of the Kurang River approximately 10km upstream from Rawal Lake, and multipurpose development of water resources (irrigation, potable water, water for domestic use). If this project is determined as feasible, it will also be accorded priority for implementation.

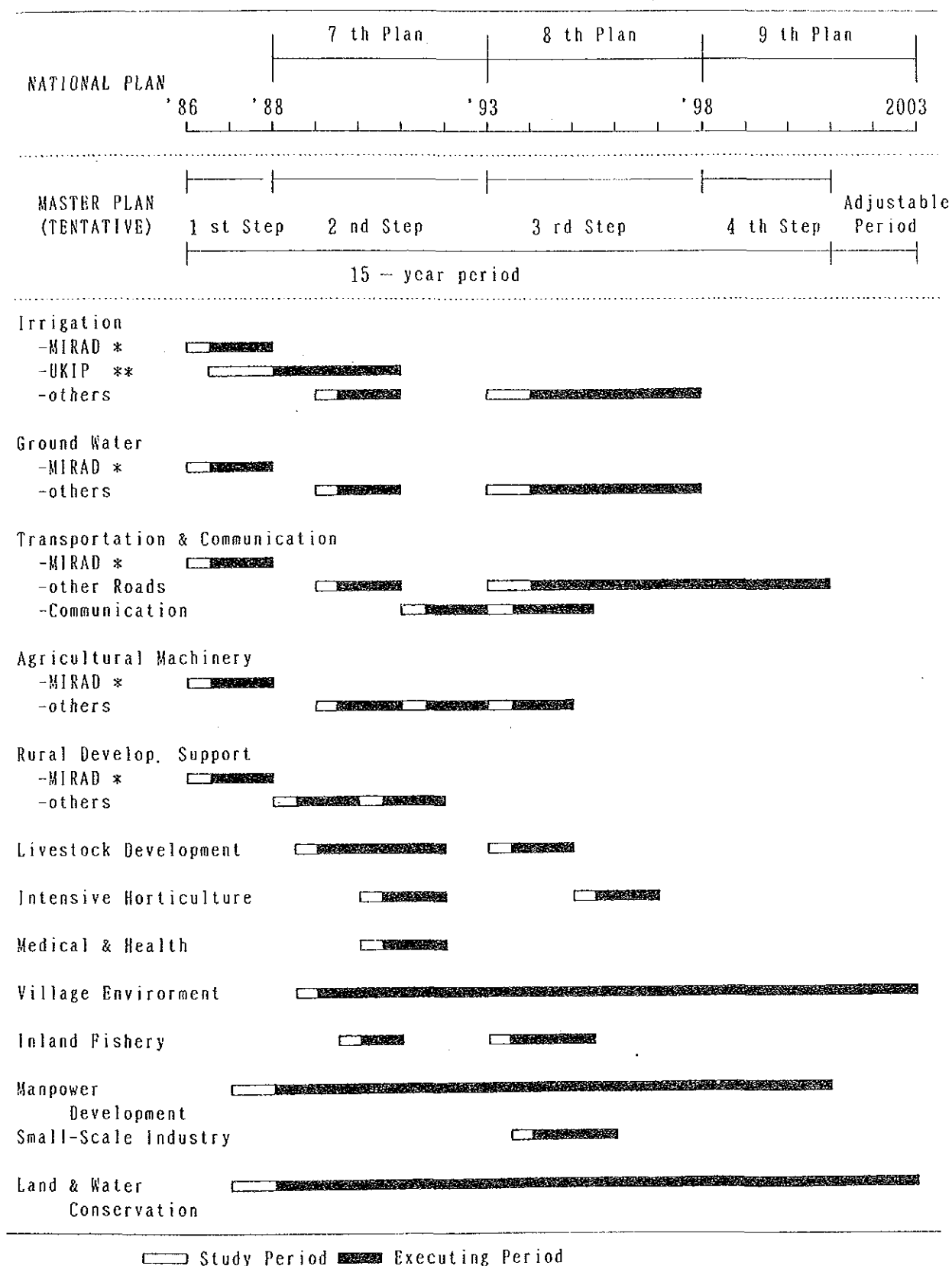
(40) MIRAD, mentioned above, constitutes an integrated plan focusing on potable and domestic water supply, irrigation, road network, agricultural machinery hire services, various public facilities, etc. as principal elements in agricultural, village environment, income and welfare development.

UKIP envisages effective use of surplus water from the Kurang River for irrigation of 6,400ha. The project will favorably influence a variety of conditions related to the every day life of Area residents including environment, vegetation, ground water, etc.

COMPONENT OF MIRAD PROJECT (EXAMPLE)

Project Component	Sub-Component
Ground Water Multipurpose Development	(a) Rural water supply from deep wells - 5 units (b) Village wells - 20 units (c) Rehabilitation of existing wells - 40 units
Irrigation	(a) Dams/weirs - 5 units Irrigable area: 1,500ha (b) Groundwater irrigation - 7 sites Irrigable area: 140ha (c) Village pond - 25 units Irrigable area: 300ha
Transportation and Communication	(a) New construction - 23km (b) Rehabilitation - 12km Total length: 35km
Agricultural Machinery Station	(a) Main Station: 1 (b) Sub-Station: 2 (c) Workshop: 3 (d) Tractor Shed: 5
Rural Development Supporting Services	R.D.Station: 6

PROPOSED IMPLEMENTATION SCHEDULE (TENTATIVE)



* MIRAD : = Model Integrated Rural Development Project
 ** UKIP : = Upper Kurang Irrigation Project

08 ANTICIPATED PROJECT IMPACT

(41) Implementation of the integrated rural development called for by the Master Plan would in the beginning of 21st century greatly contribute to modernization of the rural area of the Islamabad Capital Territory. Living conditions would be considerably enhanced, and stable, diversified farm management would be practiced throughout the Area. The anticipated effectiveness of the Plan stems from the integrated interaction of the individual proposed schemes of each sector. Furthermore, Project benefits would be equally distributed throughout the rural area.

Predicted benefits may be examined in relation to the following four salient areas:

1) Agricultural Productivity

The introduction of new technology related to irrigation, mechanization, intensive horticulture, livestock raising, fisheries, etc. is expected to increase both land and labour productivity. Development of unused land will provide opportunities for promotion of livestock development as well as expanded agricultural production for small-scale and landless farmers. Irrigated area will increase to 38% of the total Study Area, contributing to the emergence of rural cooperative societies based around water usage.

2) Employment and Income

Introduction of intensive technologies, improvement of cropping intensity and promotion of livestock development in the agricultural sector will expand employment opportunities, including participation on a family-unit basis. The establishment of labour intensive small-scale factories, vocational training centres and rural development stations will generally promote employment and income opportunities, including more active participation of the female work force.

Furthermore, construction under the 15 year implementation schedule for the Master Plan will provide employment for both skilled and unskilled workers. The gross income of farmers within the irrigation benefit area is calculated to increase 2-3 fold.

3) Improvement in Quality of Living

Release from the burden of hand procurement and transport of potable water through development of ground water resources, reduction of physical toil through agricultural mechanization, and the convenience of improved road and communications systems will serve to lighten current demands of daily life on both physical labour and time. Also, health services, reduction of the infant mortality rate and spread of infectious diseases through development of ground water source, improved nutrition through fisheries and vegetable horticulture, as well as other welfare enhancements will derive from the Master Plan.

Of particular importance is the expansion of primary school facilities under the Plan. This contribution to a firm educational base will have an incalculable positive effect on the formative years of subsequent generations of children reared within the Study Area.

4) Environmental and Socioeconomic Effects

Environmental improvements through land conservation, afforestation, reservoir and pond construction will provide additional benefits that directly affect daily life including flood control, ground water replenishment, firewood supply, fodder trees, and fisheries.

The Master Plan would stimulate the economic development and modernization of living conditions in the Study Area. This would result from such factors as increased economic activity induced by improvements in agricultural inputs, distribution system for agricultural products, and general standards of living, as well as increased interaction and exchange between area inhabitants and population segments adjacent to the Study Area, in particular the inhabitants of the urban areas of Islamabad and Rawalpindi. It is anticipated that this would serve to draw the Area population into the mainstream of social progress.

09 RECOMMENDATIONS

(42) Further development of the Islamabad Capital Territory (including the rural area) is necessary to render Islamabad the modern national capital it should appropriately be for Pakistan. At central issue here is the need to achieve a simultaneous and equivalent pace of development for both the urban and rural areas of ICT. In this regard, the lesser developed rural area merits urgent attention.

(43) The following recommendations are made as a basis for smooth implementation of the proposed Master Plan:

1) The subject Plan envisages an integrated series of schemes directly affecting the living standards of Study Area residents. Accordingly, administrative personnel must strive to include and stimulate the active participation of Area residents in planning and all subsequent phases of project implementation.

2) The organization and functions of existing Markaz should be strengthened to enable said bodies to directly supervise project implementation under the Master Plan.

3) A Project Coordinating Committee should be established composed of the responsible officials from concerned governmental agencies to ensure smooth communication and coordination between said agencies regarding project implementation.

4) The subject Master Plan will be implemented principally under the administrative supervision of IA and CDA. However, being a national project, Master Plan implementation should reflect the consensus and cooperation of all concerned governmental agencies.

5) Due to their response to various technological and economic urgencies, as well as direct effect upon improvement of general population welfare, the 13 sector-wise schemes given priority in the Master Plan are of keen interest to the Pakistan Government, and should be formulated as laid out in the Master Plan.

6) Of the 13 schemes indicated above, those accorded the highest level of priority have been integrated into a Model Integrated Rural Area Development (MIRAD). Concrete measures for MIRAD implementation should be formulated as quickly as possible.

7) Implementation of the Master Plan will require the cooperation of city authorities in Rawalpindi, and they should be consulted and advised regularly on project progress.

8) Concerned agencies must periodically review project progress, and where necessary, modification in implementation procedure should be made.

10 CONCLUSION

(44) The advent of the 1980's witnessed the commencement of the "Third United Nations Development Decade" and the emergence of a new approach to fostering economic progress on a national basis. Focus began to shift from what had heretofore been strict emphasis on pure economic growth to a broader perspective embracing both social and economic development with equitable distribution of its fruits to all segments of the population. ^{1/}

Within the context of an international swing in mood in favor of this new approach based on an examination of past successes and failures in development strategy, the subject Master Plan envisages for the Study Area in Pakistan not only strengthening of the agricultural and/or industrial sectors, but also a more comprehensive enhancement of the overall social base including such indirect and supportive aspects of productivity as social infrastructure, and health, education and welfare services. These are oriented specifically towards the wellbeing of the rural population and although indirect in terms of immediately measurable economic effect, constitute a crucial underpinning for long term, sustained development.

^{1/} World Development Report, IBRD, 1978

In this light, the aspirations of the local population were the focal point for the formulation of this Master Plan, characterized by a realistic and phased implementation procedure reflecting the needs and aspirations of Study Area residents.

(45) The economic, as well as social, educational and welfare improvements envisaged in the Master Plan were shaped with the consultation and dedicated cooperation of Pakistani officials of concerned government bodies at the national and local levels, as well as farmers and their representatives at the grassroots level. The Plan is anticipated to render the Study Area by the 21st Century as a model for rural development in Pakistan, and transform the Islamabad Capital Territory into an area characterized by balanced development of both urban and rural sectors.

(46) The Master Plan is comprised specifically of the intergration of 13 major schemes. The principal elements of these schemes which were identified as most urgent in priority were further consolidated into a Model Intergrated Rural Area Development (MIRAD) to be given primary weight in the initial stages of project implementation. Subsequent stages will ultimately bear out realization of all components of the Master Plan.

In contrast to previous development planning which has entailed implementation of narrow focus, isolated schemes, the current approach envisages an integrated effort to upgrade all aspects of rural life. The result is a multifold magnification of collective benefits over what would be obtained through isolated implementation of independent schemes.

(47) The proposed development is now only at the Master Plan stage. The further effort of concerned agency officials will continue to be required in giving more specific shape to envisaged schemes. This will entail additional, more indepth investigations and further identification of the aspirations of the local population. It is hoped that the Plan will serve as a model for rural development throughout Pakistan, and contribute to establishing a firm foundation for a sound and prosperous nation.

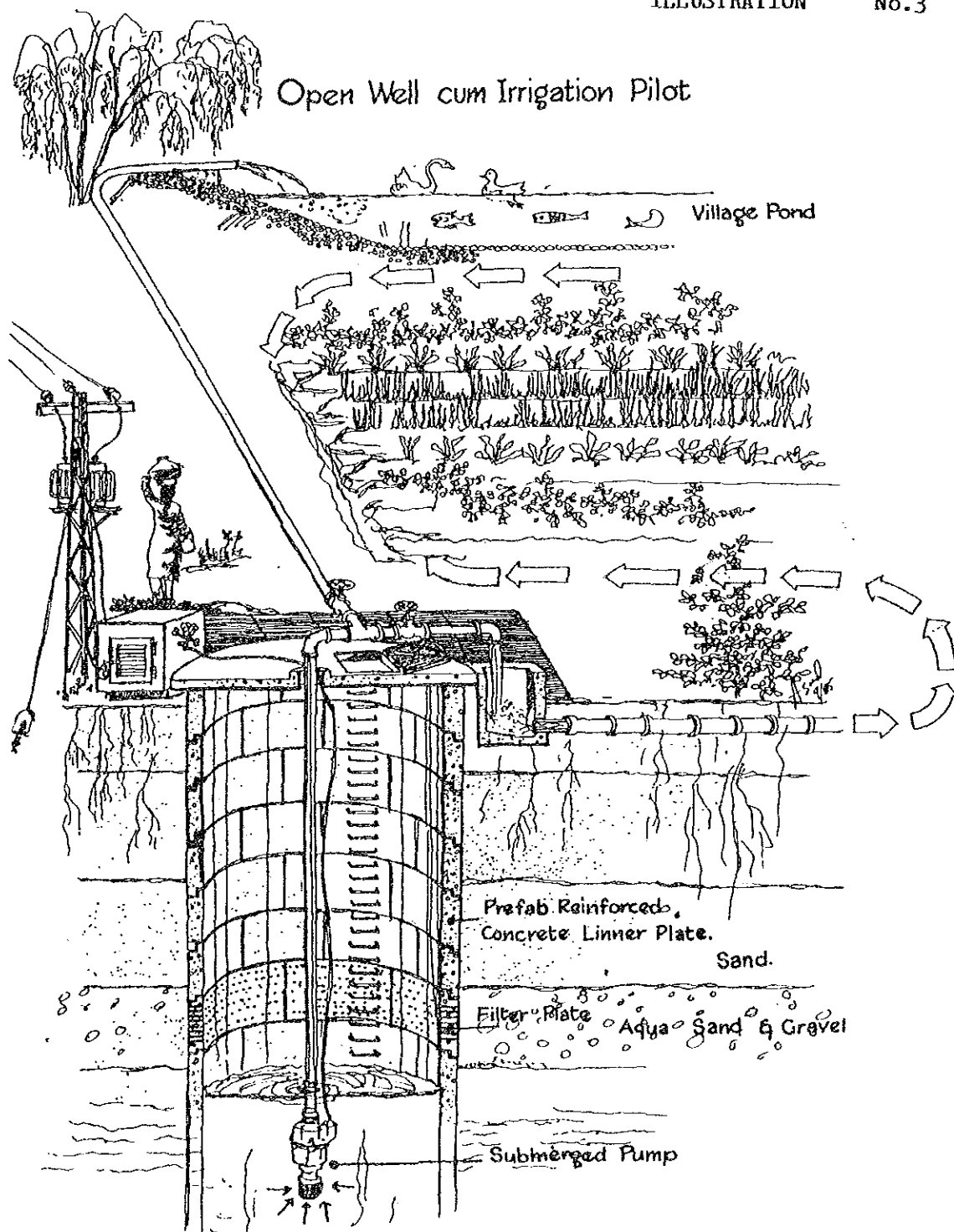
In closing, the Team wishes to sincerely thank all officials of concerned Government agencies and institutions, representatives of local bodies and particularly the farmers in the Study Area itself for the cooperation and kindness so graciously extended the Team in the course of its study.

PART I

BASIC APPROACH FOR MASTER PLAN FORMULATION

ILLUSTRATION

No.3



And God sends down rain
From the skies, and gives therewith
Life to the earth after its death:
Verily in this is a Sign
For those who listen.

Nahl (XVI-65)

CHAPTER I

PROJECT BACKGROUND

1.1 Historical Background

Pakistan covers a wide area of about 800,000km² with a variety of geographical features from the many beautiful peaks of the Karakoram Range in the north rising to around 7,000m, to the hot and barren desert spreading over Sind in the south. The Indus River, the lifeline of the country, passes through Pakistan, from the north to the south.

Pakistan is an Islamic country located in the westernmost part of the Indian subcontinent bordering on Middle Eastern Islamic countries to the west. Agriculture is the country's main economic base. Although paddy cultivation predominates in Southeast Asian countries where the monsoon brings heavy rain, agriculture in Pakistan consists mainly of multi-crop dry farming of wheat and maize due to the arid climate. Cattle breeding and nomadism are also practiced in Pakistan.

The civilization of Pakistan has a very long history, developing along the Indus during prehistoric times, and it is believed to have contributed to the advancement of many subsequent cultures. Mohenjodaro, an ancient city which flourished in the lower reaches of the Indus from 25 to 15 B.C. had a high cultural level, and was well planned with an efficient sewage system. Many scholars study the ruins of this city to unravel the mysteries of ancient civilization. These ruins reveal that the majority of its citizens were farmers using controlled inundation to produce high yields. In the northwestern region along the Kabul River, a tributary of the Indus, where the present Peshawar lies, farmers practiced irrigated agriculture over a wide area utilizing water from the Kabul River for stable agricultural production.

In the 1st to 5th centuries A.D., Buddhism prevailed in the northern subcontinent where the Gandhara school of art flourished. Punjab Province is located in the center of the country, and is the largest of all 4 provinces in terms of economy and population. The economy of the Punjab is supported mainly by irrigated agriculture. Irrigation in Pakistan has a long history which is generally divided into three phases;

irrigation by conventional techniques in the pre-colonial era; irrigation introduced by colonial authorities for the purpose of colonial management; and, irrigation introduced after the Partition illustrating the country's independence. In every phase, the most advanced engineering technology of the time was used in construction of irrigation networks, and for this reason "Punjab Irrigation" attracted attention throughout the world. In the Punjab, the present ratio of irrigation to total cultivated land is about 70%, making Pakistan the most advanced country in Asia with respect to irrigation.

1.2 Background of the Study

Agriculture remains the most important economic base in Pakistan employing 72% of the total population (1981). The agricultural sector produces raw materials for numerous industries and basic food stuffs and comprises the major portion (25%) of Gross Domestic Product. In spite of this, the socioeconomic conditions of the rural population are far below the normal standard of living in the country. A large proportion of people in rural areas live with inadequate infrastructures, limited social services and fewer opportunities for income-generating activities. In light of these circumstances, improvement of the living conditions of the rural people requires urgent attention.

The current Sixth Five Year Plan aims at rapid economic growth and equal distribution of benefits to the majority of the people. Recognizing that economic growth must benefit the poor and that all segments of the population must participate in economic life, greater stress is laid on rural development in the Plan. One of the basic aims is to enable the rural poor to obtain the necessities of life, including nutrition, housing, water, sanitation, and especially education and health services, and thus to increase their productivity and establish equal opportunity. In addition to agricultural development programs which aim at increased production, heavy emphasis is put on large scale expansion of physical and social infrastructures in rural areas.

In consideration of the above circumstances, the Government of Pakistan requested the Government of Japan to provide technical cooperation in formulating a Master Plan for integrated rural development in Islamabad Capital Territory in February 1984. In response to the

request, the Government of Japan dispatched a team in November 1984 through JICA to conduct a preliminary survey of the said Project.

The Preliminary Survey Team examined the envisaged Study Area for the proposed Master Plan and consulted with concerned Pakistani officials in IA and other involved agencies. Agreement by all parties regarding study implementation was achieved, and the Scope of Work for the Study was drawn up by the agencies concerned of both governments.

1.3 Study Objectives

As defined in the Scope of Work (See Annex), the objective of the Study is to formulate a Master Plan for an Integrated Rural Development Project in Islamabad Capital Territory. The Master Plan aims to strengthen the production, employment and income base and to improve the living conditions of the people residing in the Study Area. The Project is designed to promote sustained economic growth in the area through a broad-based integrated development approach focused on enhancement of the living environment as well as increased agricultural productivity, and featuring maximum utilization of indigenous resources.

1.4 Personnel and Agencies Concerned

In order to achieve the above mentioned objectives, JICA dispatched a Study Team headed by Dr. Takashige Kimura of Chuo Kaihatsu Corporation, for field work from March - April and June - September, 1985.

Data and information necessary for Master Plan formulation were collected mainly from the Islamabad Administration (IA) and other agencies concerned in both federal and provincial governments, as well as local representations, authorities and farmers in the Study Area. Names of personnel directly or indirectly concerned with the Study are listed in the Annex.

CHAPTER II

BASIC APPROACH TO THE STUDY

2.1 Basic Concept of Project Formulation

Projects seeking to establish stable rural communities through the modernization of rural areas, viz., raising agricultural productivity and improvement of living conditions and social environment are currently underway in numerous countries. A multi-faceted and integrated approach is necessary to establish adequate living conditions in rural communities, to develop agriculture and farming techniques and to raise the overall quality of life in rural areas.

Thus far, however, agricultural development projects have generally concentrated solely on increasing agricultural productivity. In villages with acute shortages of drinking water for example, priority is often given to activities directly related to agricultural production despite the fact that a plan for a rural domestic water supply system could be included. In rural areas without irrigation water, productivity has been given solely to the construction of irrigation facilities. In similar fashion numerous other projects have been implemented focusing on one specific problem such as road construction, introduction of agricultural technology, organization and promotion of farmers' cooperatives, establishment of a farm inputs supply system (fertilizer and other chemicals), and creation of agricultural mechanization centers. In new settlement areas, government assistance in the form of low interest loans has been used for housing construction and well perforation for rural residents. These projects however, have largely been implemented separately as individual schemes.

The above mentioned scatter shot approach to isolated implementation of individual schemes affecting only one limited sector has been characteristic of development efforts in developing countries. Even in developed countries comprehensive and integrated efforts at rural modernization have not become major policy until only very recently. Experienced planners in Pakistan are well aware that no significant effects in rural area modernization can be achieved by the isolated execution of individual schemes. They recognize that the most

important thing in rural development projects is to provide integrated farming incentives to rural residents.

In addition to the above integrated approach, an important emphasis in project formulation should also be placed on the generation of farmers' income. The implementation of agricultural development projects has often resulted in increased agricultural production within a project area, without any increase in the farmer's net per capita income. One reason is that farmers' prices for staple food crops (rice, corn, wheat, sorghum, etc.) are subject to price control for consumer protection while, through the influence of sectors totally unrelated to agriculture, the purchasing prices of goods consumed by the farmer increases, a situation further aggravated by inflation. These conditions prevalent in developing countries today, clearly illustrate that satisfactory improvement in the living conditions of rural residents cannot be achieved solely by increasing agricultural production. This is the focal point of this Study.

Based on the above criteria, the Team conducted a study on the formulation of the master plan concept in Pakistan where an excellent foundation for rural development exists. A series of discussions were held among the parties concerned during the course of Master Plan formulation with each party reaching a general consensus on the plan. To ensure an integrated approach, the Team adopted the following methods for master plan formulation.

2.2 Planning Method

(1) Full-scale Approach towards Integrated Rural Development

The Study aims to formulate a master plan embracing a new approach which combines and integrates every prospective scheme in order to achieve modernization and development of the rural area in the ICT. This challenges the conventional rural development style which places priority solely on increasing agricultural production. The Team conducted an extensive investigation of the Study Area with this view in mind.

(2) Importance of People's Needs

The Study Area encompasses an Islamic rural society situated within the capital territory. An Islamic society places equity and social justice at the center of its values. In this light, participation of the rural population is a prerequisite for successful rural development. It is therefore important to precisely grasp the needs and demands of the people and to reflect them in the Project in order to ensure their active support and cooperation in project implementation. Rural development planning must center around the aspirations of the intended beneficiaries, in other words the population within the proposed project area. Such planning is to be incorporated as a fundamental part of the Master Plan.

(3) Congruence with National Development Plan

Any regional or rural development programs are, by nature, implemented within the framework of overall national or provincial development plans. Therefore, the Master Plan should coincide with the goals and thrust of such plans. In this respect, the Team has made a concerted effort to consult and discuss with the agencies of the federal and provincial governments concerned.

(4) Feasibility Plan

Master plans often tend to create non-realizable independent schemes which over-emphasize certain aspects of development. The Team endeavored to check the economic as well as the technical feasibility of every scheme in order to create a realizable rural development project. In addition, the Team endeavoured to apply technical standards acceptable to the people of the Study Area so that subsequent transfer of technology for maintenance and management can be done easily.

(5) Integration of Schemes

Effective integration of independent schemes creates a project which can render effects greatly multiplied over what would result if such schemes were implemented on an isolated basis. In this respect, the Team made an effort to find the best combination

of schemes whereby supplemental effects could be realized. After repeatedly studying the prospective implementation schedule of each scheme under the Master Plan, the optimum integration of schemes was selected. At all times, however, primary attention was given to incorporation of incentives to ensure active participation by Area farmers in project implementation.

PART II
PRESENT CONDITIONS OF THE RURAL AREA

ILLUSTRATION No. 4



Matyaran. carrying water from a village well, in Islamabad Rural Area.

(The command was given:)
"Strike with thy foot:
Here is (water) wherein
To wash, cool and refreshing,
And (water) to drink."

Sād (XXX VIII-42)

CHAPTER III

THE STUDY AREA

3.1 Location and Topography

3.1.1 Location

The area proposed for the Master Plan Study is referred to as the rural area of Islamabad Capital Territory, which is located on the northernmost edge of the Pothwar Plateau. The Study Area lies adjacent to the urban area of Rawalpindi with a population of 800,000. Situated between latitudes 33°29' and 33°49', and longitudes 72°24' and 72°50', the Study Area is bounded by the Murree Hills in the northeast, by the Margalla Hills in the north and northwest, by the Siwalik Hills in the east and by the Grand Trunk Road and Rawalpindi in the west and south (see General Map).

The Study Area is referred to as the rural area as defined by the Capital Territory Local Government Ordinance, 1979, and delineated by municipal boundaries. The extent of the Study Area and its relationship to the entire Islamabad Capital Territory is as follows:

Study Area (Islamabad Rural Area)	59,500ha
Islamabad Urban Area	31,100ha
<hr/>	
Islamabad Capital Territory	90,600ha

3.1.2 Topography

The Study Area lies in the northern part of the Pothwar Plateau which lies between the Himalayan foothills in the north and east and the Salt Range in the south. The Indus, flowing from north to south, forms the western boundary. The Plateau has a complex geologic history of mountain-building, fluvial and aerial deposits and erosion including gully erosion. The result is a varied landscape of mountains and hills, exposed bedrock uplands, intricately dissected loessic uplands and alluvial plains. The basic topographical contours are controlled by the bedrock.

The Study Area is bounded by the Margalla Hills in the north and northwest with a maximum height of 1,605m, by the Murree Hills in the

northeast and the Siwalik Hills in the east. The undulating uplands rise gradually from an elevation of 450m in the southwest to 600m in the northeast. The exposed bedrock uplands, composed of sandstone and shale of the Nimadrics, are arranged in four belts running in a northeast to southwest direction. The intervening parts of the exposed bedrock uplands are covered with loessic deposits which feature advanced gully erosion.

The pattern of the rivers in the Study Area is also controlled by the bedrock and is divided into four systems. The Kurang, Gumreh Kas, Malal Kas and Soan rivers, running from northeast to southwest, form four lines from north to south. The Kurang River shifts southwards near Lawal Lake and joins the Gumreh Kas and Malal Kas at their lower reaches. The Soan River joins the Ling and Kurang rivers to flow southward through the Pothwar Plateau. Terraces are formed on both sides of the rivers.

3.2 Geology

The geologic history of the Pothwar Plateau begins with the uplift of the Himalayas during Neocene. Following the uplift of the mountain range, the Study Area was occupied by a part of the Indo-Gangetic geosynclinalorium. The Margalla Hills limestone and non-marine rocks of the Nimadrics were highly folded and faulted during the lower Pleistocene forming an undulating terrain. The terrace gravels and loessic deposits accumulated on the uneven terrain of the Nimadrics during the middle pleistocene. Subsequent erosive action resulted in an undulating landscape of microscale ridges and trough uplands composed of exposed bedrock and loessic uplands, and gully erosion.

The geologic stratigraphy of the Study Area is roughly classified into four groups:

- a) Sandstone and limestone of Cretaceous Period
- b) Eocene Laki series limestone
- c) Miocene and lower Pleistocene Nimadrics
- d) Quaternary deposits

The geologic stratigraphy of the Study Area is shown in TABLE 3.2-1 while a geologic map is shown in FIG. 3.2-1. Bedrocks are composed of Nimadric sandstone, shale and claystone.

3.3 Soil

3.3.1 Soil Distribution^{1/}

The soils distributed in the Study Area have developed from wind deposits, alluvial deposits, weathered materials of sedimentary rocks and from mountain outwash deposits as shown below. Classification and general characteristics of the soils are described in detail in CHAPTER 5, section 5.2.

SOIL DISTRIBUTION

Soils	Distribution (ha)	(%)
Soils derived from alluvial deposits	1,190	2.0
Soils derived from wind deposits	13,490	22.7
Soils derived from mountain outwash deposits	2,150	3.6
Residual soils (derived from weathered materials of sedimentary rocks)	6,290	10.6
Miscellaneous land types	36,380	61.1
Total	59,500	100.0

3.3.2 Soil Erosion

(1) Soil Erosion in the Study Area

A vast area of reticulated gullied lands covers the Study Area. The formation of these gullied lands is attributed to previous geological erosion. However, eroded lands are still ex-

^{1/} The Study was based on data obtained from the field surveys and from the following soil survey reports.

- Reconnaissance Soil Survey, Rawalpindi Area, 1967, Directorate of Soil Survey, West Pakistan. Scale of soil map prepared: 1/250,000.
 - Agricultural Development Possibilities, Integrated Rural Development Project, Federal Area, Islamabad, 1974, Soil Survey of Pakistan. Scale of soil map prepared: 1/50,000.
- Prepared based on the above soil map.

panding due to natural conditions of the Study Area such as weather conditions (a hot dry summer followed by heavy rains in monsoon season) and geological conditions (deposits of windlaid materials), and human activities such as overgrazing and destruction of vegetation. Actively eroding lands usually border on cultivated lands and the expansion of the former directly results in loss of cultivated land.

Cultivated lands are generally benched terraced and/or levelled and also embanked in order to prevent soil erosion and conserve rain water. However, soil and water conservation is not completely achieved by these countermeasures and rapid runoff of water and loss of surface soil are caused by heavy rains during the monsoon season. Major causes of soil erosion are as follows:

- a) Incomplete terracing and levelling;
- b) Inadequate construction and maintenance of levee;
- c) Destruction of levee by small animals such as rats;
- d) Defective drainage measures; and,
- e) Erodibility of soils.

(2) Present Soil Conservation Measures

In the Study Area, the importance of measures for soil conservation is recognized and the following countermeasures although limited in scale are being taken;

- a) Terracing of cultivated land and establishment of drainage outlets;
- b) Reclamation of eroded and gullied land, including drainage work;
- c) Gully plugging;
- d) Construction of mini-dams; and,
- e) Afforestation.

3.4 Vegetation

Vegetation in the Study Area is classified into two distinct types; sparse subtropical savannah in the plains and sparse subtropical forest in the hilly areas.

The original vegetation in the plains was thicket savannah. However, this natural vegetation has been almost entirely cleared and more than half of the plains area is cultivated. Due to overcutting, overgrazing and erosion, vegetation in uncultivated land consists of scattered scrubs and grasses. The principal plant species are;

- a) Trees: Acacia modesta (phulai)
Prosopis julifolia
- b) Shrubs: Zizyphus numularia (mullah)
Capparis aphylla
- c) Forbs: Conyza canadensis
- d) Grasses: Chrysopogon aucheri
Cymbopogon shoenanthes
Desmostacha bipinnata

Vegetation cover is thickest during the monsoon season. However, vegetation cover in the rest of the year is poor, resulting in a low annual grazing capacity on the plains.

Vegetation in the hilly areas is subdivided into two types; subtropical dry semi-evergreen forest and subtropical pine forests. The principal tree species of the former vegetation type are Acacia modesta and Olea ferruginea occurring as an admixture in varying proportions. The main shrub layer constitutes Dodenaia viscosa and Carissa opaca. The grass layer is generally comprised of Chrysopogon aucheri and Andropogon pertusus. The latter vegetation type lies at higher elevation than the subtropical dry semi-evergreen forest zone and is found only in Margalla Hills. Pinus roxburghii is the principal species with undergrowth of Myrsine africana and Woodfordia floribunda. Vegetation cover in the hilly areas located north to northeast of the Study Area is less thick compared with the same in the Margalla Hills due to the rocky land surface.

Most of the hilly areas in the Study Area are classified as reserved forests which are, in principle, under the control of the Forestry Department of the Federal Government. Management of the Margalla Hills, however, is presently under the jurisdiction of CDA. The reserved forests are conserved primarily for watershed management; therefore, cutting and grazing are strictly prohibited.

3.5 Climate

(1) Meteorological Data

Meteorological data including rainfall, temperature, humidity, wind velocity, wind direction and sunshine hours are recorded at the meteorological station branches, located in the Rawalpindi and Murree, of the Regional Meteorological Center in Lahore, and are shown below (TABLE 3.5-1, FIG. 3.5-1 & 3.5-2).

METEOROLOGICAL STATIONS AND METEOROLOGICAL DATA^{1/}

Observation Items	Observation Period	Station	Location	
			North Latitude	East Longitude
Rainfall	1954 - 1984	Rawalpindi	33°37'	73°06'
Rainfall	1954 - 1983	Murree	33°54'	73°24'
Temperature	1954 - 1984	Rawalpindi	33°37'	73°06'
Humidity	1954 - 1984	Rawalpindi	33°37'	73°06'
Sunshine Hours	1954 - 1980	Rawalpindi	33°37'	73°06'
Wind Velocity	1954 - 1983	Rawalpindi	33°37'	73°06'
Wind Directions	1954 - 1965	Rawalpindi	33°37'	73°06'

^{1/} Meteorological data on a yearly basis are presented in the Annex.

The following reports are also available for meteorological studies of the Study Area.

- Meteorological data for 1954-1984 at the Islamabad Airport, Rawalpindi
- Rainfall Probabilities in Rawalpindi Islamabad Area, PARC, 1985
- Flood Control Measures of Lai Nullah, Rawalpindi, Feasibility Report

(2) General Climatic Conditions

Located at the southern foot of the Murree and Margalla Hills, the Study Area belongs to an semi-arid climatic zone and has

an average annual rainfall for the past 31 years of about 1,100mm. Annual rainfall ranges markedly from season to season and from year to year, and is concentrated during the monsoon season from July to early September. The hottest month is June with a mean daily maximum temperature of 40°C and a mean monthly temperature of 31.6°C, while the coldest month is January with a mean daily minimum temperature of 3.0°C and a mean monthly temperature of 10.0°C.

Relative humidity is lowest in May and June with a mean daily relative humidity of about 40%. In the afternoon, the same falls to the 20% level. During monsoon season in August and September, relative humidity rises up to around 70% occasionally becoming quite sultry.

Sunshine hours vary from 10.3 hours in June to 5.3 hours in January with an average of 8.2 hours. Wind velocity is generally low throughout the year. Minimum velocity occurs from October to December with an average velocity of around 0.9m/sec while maximum velocity occurs in May with an average velocity of 1.9m/sec. Annual average wind velocity is 1.4m/sec.

Variations in climatic conditions of the Study Area may be categorized into the following five seasons.

CLIMATIC SEASONS

Season	Period	Av. Temp. ^{1/} (°C)	Av. Rainfall ^{2/} (mm)
Winter	Dec. - Feb.	11.3	157 (14%) ^{3/}
Spring	Mar. - Apr.	19.9	151 (13%)
Summer	May - Jun.	29.6	99 (9%)
Monsoon Season	Jul. - Early Sep.	28.7	613 (55%)
Autumn	Mid. Sep. - Nov.	22.2	96 (9%)

^{1/} Average mean temperature (average of 1954 to 1983)

^{2/} Average rainfall (based on average daily rainfall of 1960 to 1983)

^{3/} Proportion to average annual rainfall

(3) Seasons

1) Winter

The cool winter season begins in December and is characterized by fine weather and a large diurnal range of temperature. Westerly low pressure systems in the season cause fairly widespread rain in January and February. Mean daily minimum temperatures are 3.4, 2.7 and 4.8°C, respectively, in December, January and February and the minimum temperature rarely falls below the freezing point.

2) Spring

From March to April, it becomes progressively warmer and drier. In April, temperature rises day by day and toward the end of the month it becomes rather hot. However, the diurnal range of temperature is still remarkable and pleasant climatic conditions prevail throughout the season. Recorded mean daily temperatures are 17°C in March and 23°C in April.

3) Summer

The Study Area in summer is exposed to an extreme continental climate with hot and dry weather in May and June. The mean daily range of temperature is around 15°C while average relative humidity of the season is around 40% in the morning and as low as 20% in the afternoon. The maximum daily temperature is generally recorded in June. The mean daily maximum temperature in May and June is 35.5 and 39.7°C, respectively.

4) Monsoon Season

The southwest monsoon reaches the Area towards the beginning of July and is firmly established by the middle of the month. The strength of the monsoon increases from June to July, stabilizing and starting to retreat toward the end of August. Occasionally, however, it remains active even in September. Tropical depressions brought by the monsoon discharge heavy rains which cause floods and soil erosion in the catchment area. About 55% of annual rainfall is

concentrated during the monsoon season from July to September. The mean daily maximum temperature of the season is from 33 to 35°C and humidity is high throughout the season.

5) Autumn

From the middle of September through October and November a transition period occurs with pleasant weather becoming increasingly cool with much sunshine. Rainfall is lowest in this season.

3.6 Hydrology

Hydrological data is crucial for planning water resources development. Fortunately, the rainfall data obtained from the Rawalpindi station nearby the Study Area is available and complete. The data are shown below and the studies conducted were based on these data.

HYDROLOGICAL DATA

Item	Period Available	Kind of Data	Name of Station
Rainfall	95 years (1890-1984)	Mean monthly rainfall	Rawalpindi
	30 years (1954-1983)	Mean daily rainfall	Rawalpindi
River Runoff	5 years (1960-1964)	Runoff discharge	Soan River (Rawalpindi)
	5 years (1960-1964)	"	Soan River (Charah)
	4 years (1961-1964)	"	Kurang River (Loi Bher)
	23 years (1962-1984)	Water Management	Rawal Dam

(1) Rainfall

There are two rainy periods in the Study Area; one in summer which is dominated by the monsoon from July to September and one in winter from January to March. Annual rainfall averaged 1,000mm over the past 95 years and 1,100mm over the past 30 years with 55% occurring during the monsoon season. According to daily rainfall pattern observations, rain duration is generally less than several hours, with cases where rain continues for several days being rare. Long-term rainfall is clarified in the following analysis.

1) Long-term Rainfall Fluctuation

In order to clarify characteristics of rainfall variation, long-term rainfall fluctuation in the ICT was studied by moving average method on the basis of the rainfall data for 95 years from 1890 to 1984.

From this analysis, it was judged that annual rainfall had fluctuated in 20 years cycles up to 1960. However, these rainfall cycles are not evident in the subsequent 25 years. Annual rainfall has exhibited a marked increasing tendency over the past 10 years (FIG. 3.6-1).

This is attributed mainly to manmade influences including progress of afforestation of dry desert areas as set out in the master plan for the metropolitan area of Islamabad and creation of the water surface at Rawal Dam.

2) Probable Rainfall

The F/S report^{1/} probability analysis using daily rainfall data for 92 years (from 1890 to 1981) from the Rawalpindi Meteorological Station is shown below. Judging from the analysis of long-term rainfall fluctuation, rainfall in recent years has tended to increase. Therefore, the probability analysis (Iwai Method) was made using the rainfall data for the last 30 years (from 1954 to 1983). The result is compared below showing an increasing ratio of about 1.2.

^{1/} "Flood Control Measures of Lai Nullah, Rawalpindi, Feasibility Report in 1982" by Lai Nullah Management Committee

PROBABLE RAINFALL

(Unit: mm/day)

	F/S Report (1)	Probability Analysis by Iwai Method (2)	Ratio (2)/(1)
No. of Years	92	30	-
Return Period			
10	119	141	1.18
50	152	187	1.23
100	165	208	1.26

(2) River Runoff

Long-term river runoff data is not available at present. However, short-term data on the Soan and Kurang rivers were compiled as shown in TABLE 3.6-1, 3.6-2, 3.6-3, and FIG. 3.6-2.

As seen from the above data, the runoff coefficients indicate low values of 25% to 34%. The river runoff throughout the year is characterized by rainfall concentration during the monsoon season from the end of July to September. Higher discharge thus appears during this period. On the other hand the dry season from April to May has a smaller discharge and drought flow occurs in these months as well as ground water retreat.

According to the Rawal Dam water operation records for 23 years as presented in TABLE 3.6-4 and FIG. 3.6-3, the runoff coefficient is about 20%. Consequently, effective use of river discharge is difficult under present conditions. River runoff exhibits a generally increasing tendency over recent years in keeping with the above described increase in yearly precipitation amounts (FIG. 3.6-4). Location of appropriate sites for dam construction and storage of river discharge during the rainy seasons would allow for stabilized water resources development.

Based on results of water quality analysis, river water is suitable for irrigation.

RESULTS OF WATER QUALITY ANALYSIS 1/

Name of River	Location	pH	EC (μ S/cm)	Temperature (°C)
Malal Kas	Kirpa	8.7	600	31.3
Malal Kas	Tamair	7.8	570	32.0
Soan River	Sihala	8.6	540	28.0
		8.2	460	28.0
Bahudra Kas	Dhok Jori	8.5	820	31.7
Nala Nilan	Gokina	8.5	580	24.9

1/ : From June to August, 1985

3.7 Ground Water Resources

The Study Area lies in a semi-arid climatic zone and as such is not blessed with ample surface water resources. With this in mind, a detailed investigation of ground water resources was undertaken.

3.7.1 Physical Features and Present Ground Water Usage

There are about 1,000 shallow wells and 36 tubewells in the Study Area. Ground water pumped through 33 tubewells in the UC Sohan area along the Kurang River is supplied to urban Islamabad. There are only three tubewells in the model villages of Kuri and Hummak in the rest of the Study Area.

The results of the questionnaire survey (TABLE 3.7-1) and field observation for 80 shallow wells (TABLE 3.7-2) reveal as follows: i) The average well is 2.1m in diameter and 18m deep. ii) In one month from dry season to wet season, water level rises by 2 to 5m. iii) The average pH is 8.2 and ground water is weakly alkaline while concentrations of ammonium are very low at 0.4 to 0.5ppm. iv) The average electric conductivity of shallow wells is 857 μ S/cm (which is slightly higher than FAO specifications for irrigation water) and higher values are observed near exposed bedrock uplands. v) Average water temperature is 24.5°C and is about 5°C lower than the average air temperature in July and

August. vi) There are some springs in Shah Allah Ditta, Shah Darah and Maira Begwal villages and spring water is used for domestic water supply.

3.7.2 Electric Resistivity Surveys

Electric resistivity surveys were carried out at 68 sites to clarify the hydrogeological structure in Islamabad rural area (FIG. 3.7-1). Five (5) sites were selected in the UC Bhara Kau, ten (10) sites in the UC Phulgran, ten (10) sites in the UC Tamair, three (3) sites in the UC Sohan, eight (8) sites in the UC Charah, three (3) sites in the UC Tarlai, twelve (12) sites in the UC Kirpa, two (2) sites in the UC Koral, three (3) sites in the UC Sihala, four (4) sites in the UC Rawat and three (3) sites in the UC Shah Allah Ditta.

Measured apparent resistivity-depth curves are matched with standard theoretical curves and computer produced curves in order to determine true resistivities of individual layers. The strata are classified into three groups (FIG. 3.7-2); surface soil, Quaternary deposits (separated into a sand and gravel layer, and a silt and clay layer) and bedrock Nimadrics. The hydrogeologic structure was determined in accordance with these strata classifications.

3.7.3 Hydrogeologic Structure

Hydrogeologic structure in Islamabad rural area was determined on the basis of results of electric resistivity surveys at 68 sites as mentioned in 3.7.2, drilling data at 25 sites obtained from WAPDA and CDA (FIG. 3.7-1), and field observations for 80 shallow wells (FIG. 3.7-3 and TABLE 3.7-2). Twelve sections of the hydrogeologic structure have been drawn including 7 sections in the same direction as the general topographical gradient, 4 sections at right angles to the gradient and a section in Shah Allah Ditta village (see Annex).

Hydrogeologic structure is controlled by features of the Nimadric sandstone and shale bedrock. Quaternary deposits are thin and discontinuous due to occurrence of numerous detached bedrock outcrops and can be regarded as poor aquifers except on the river banks. Quaternary deposits on both sides of the Kurang, Gumreh Kas and Soan rivers can be regarded as highly productive unconfined aquifers. Highly productive

confined aquifers are found in the National Park area and the lower part of the Soan River including Sihala village.

Transmissibility of the highly productive confined aquifers is about $1 \times 10^{-3} \text{ m}^2/\text{sec}$. Permeability in the highly productive unconfined aquifers is about $1 \times 10^{-2} \text{ cm/sec}$ on both sides of the Kurang, Gumreh Kas and Soan rivers. Permeability in thin unconfined aquifers within weathered rocks and sand and gravel layers of the lower part of loessic deposits is about $1 \times 10^{-3} \text{ cm/sec}$ in Tarlai Kalan village.

CHAPTER IV
SOCIOECONOMIC CONDITIONS

4.1 Administration

4.1.1 Administration of ICT

The Government of Pakistan decided to establish a new capital named Islamabad, the "domain of Islam", on February 24, 1960. Construction work began in 1961 and its first residents immigrated from other parts of the country in 1963. The Capital Development Authority (CDA), established in 1960 to undertake construction of the new capital, was later reorganized and empowered to undertake municipal functions through legislative amendments in 1966 as the city continued to be occupied by new immigrants.

In response to the urgent need for an administrative system invested with judicial and administrative control over the ICT, the District Administration was established in 1980 assuming the role formerly performed by Rawalpindi District under the Punjab Government. However, this arrangement, was considered inadequate for various reasons.

Accordingly, on January 1, 1981, administrative functions were resumed by the Federal Government with direct administration by the President or an Administrator appointed by him, and the IA was established and assigned all the powers and functions of a Provincial Government^{1/}. The organization chart of IA is presented in FIG. 4.1-1.

The Administrator is supported by a Deputy Commissioner, an Inspector General of Police, a District and Sessions Judge and related staff in undertaking the following duties in the ICT.

- a) Policy formulation (in consultation with the Ministry of Interior if necessary);
- b) Execution of government policy through its attached departments; and,
- c) Coordination with various nation-building departments on behalf of the President.

^{1/} Islamabad Capital Territory Administration Order 1980
(Presidential Order 18 of 1980)

The Capital Territory is spread over an area of 906km² and is divided into two segments; namely, i) Islamabad urban area proper, including institutional and industrial areas, and ii) Islamabad rural area. The rural area of Islamabad encompasses 133 villages and administratively consists of 11 Union Councils (UC). It also contains a Park Area. The latter's activities are coordinated and supervised by the Rural Areas Coordination Committee (RACC) as mentioned hereinafter.

4.1.2 Local Government System

The Islamabad Capital Territory Administration Order, 1980 stipulates that the ICT shall be administered by the President or an Administrator appointed by him, directly under the Federal Government. The local government institutions in the Study Area, therefore, are slightly different from those of other districts in Pakistan (FIG.4.1-2).

(1) Panchayat

The Panchayat is a grassroots level organization in the rural area. According to the Capital Territory Local Government Ordinance, 1979, a Panchayat is constituted for a village or a group of villages, consisting of 5 to 7 members headed by a Sarpanch, or chairman. The members of a Panchayat are elected from among the local leaders on the basis of consensus, and designated to meet for discussion of the production plans and development schemes in their locality. The Panchayat is to organize the people for the purposes of identification of felt needs, formulation of action plans and development of local resources for self-management of projects. The Panchayat is a development body closely related with both the local population and the administrative affairs of the Union Council.

(2) Union Council

A group of villages (5-23) form a Union Council (UC), the basic administrative unit in the rural area. The members of the UC (Councilors) are elected by ballot on the basis of adult franchise with an average of one councilor for every 1,000 residents. The councilors elect one of their members as a chairman and hold a regular meeting at least once a month under his chairmanship.

There are 11 UCs presently in rural Islamabad with a secretary in each UC office.

The Union Council has various functions. Aside from the routine work of general administrative affairs, the UC undertakes, if necessary, the provision, maintenance, improvement and management of public structures such as roads, streets, culverts, bridges, public buildings, gardens and playgrounds, etc., as well as formulation of a Union development program, promotion of various cooperative associations, and approving projects to be constructed by the UC, especially with regards to educational and medical facilities, water supply system, sanitation and farm roads.

Each UC has its own local fund to facilitate the above mentioned activities. The local fund is credited by proceeds from taxes, tolls, fees and rates, as well as by grants and other revenue received by the UC.

The UC incorporates the development program's various schemes into the draft budget for the subsequent fiscal year and submits it to the Deputy Commissioner, the Project Director of rural Islamabad. The Deputy Commissioner subsequently refers these schemes to the Rural Areas Coordination Committee for coordination among the Union Councils in the Area in terms of their planning and implementation.

(3) Rural Areas Coordination Committee (RACC)

The Rural Areas Coordination Committee mainly coordinates the activities of all Union Councils and of all Government and semi-government departments or institutions in the rural area of the ICT. The RACC is a local government institution at the district level and consists of all the elected chairmen of the 11 Union Councils, and ex officio members such as representatives from CDA, WAPDA, PARC and heads of various other nation-building departments, including engineers and directors (See Annex).

The RACC coordinates agreement between various government and semi-government departments and Union Councils. It also coordinates planning and implementation of local development

schemes for each fiscal year, as well as various other activities. When a unanimous decision cannot be obtained at a meeting, the 11 elected chairmen of the Union Councils settle the issue by vote.

4.2 Institutional Framework for Rural Development

4.2.1 Markaz and Its Activities

(1) Historical Background

When the Integrated Rural Development Program was launched throughout the country, the ICT was largely neglected. However, in 1975 a Markaz was set up at Tarlai village as a Pilot Project, with a later addition of two other Rural Development Markaz, Sihala and Bhara Kau in 1977 and 1978, respectively.

The first Markaz, at Tarlai, was established by the CDA to improve the economic and social condition of the rural populace. In July, 1977 this Markaz was transferred to the Ministry of Local Government and Rural Development in compliance with a directive issued by the Prime Minister. The three Markaz now cover the entire rural populace of ICT, which consists of 138,000 people settled in 133 villages and grouped into 11 Union Councils.

(2) Objectives and Functions

The objectives and functions of IRD Markaz are coordinating, service and development as outlined below.

1) The Role of the Markaz as a Coordinating Unit

Markaz is envisioned to coordinate all activities of nation-building departments at the Markaz level in regards to development projects. The Annual Development Program is drawn up on the basis of consultation with local representatives at the Markaz level. The Markaz provides liaison between concerned development agencies and the local population.

2) The Role of the Markaz as a Service Agency

The Markaz is the focal point for provision of technical knowledge, advice and guidance to the local population (agriculture, veterinary, etc.). It serves as a

training center for upgrading the skills of field functionaries, councilors, progressive farmers and group leaders, etc. The Markaz may also provide assistance in upgrading the skills of the local people preparing them for meaningful and active participation in development and social activities.

The Markaz offers the possibility for the effective involvement of the local population through their representatives in the decision-making process, financing and execution of development projects. It also provides hire services for agro-machinery which is offered to the farmers at subsidized rates, and promotes an effective delivery system for agricultural inputs, as well as providing facilities for medical and health services.

3) The Role of the Markaz in Development Activities

As a viable development unit, the Markaz identifies local problems, prepares plans according to the potential of available resources and supervises implementation and execution. The Markaz may also promote job opportunities by providing physical infrastructures for agro-based and cottage industries.

(3) Present Activities

Despite limited resources, especially the absence of skilled technical support, development achievements have been made in coordination with UC's through schemes at Tarlai, Sihala, Bhara Kau and suburban villages. A total sum of Rs 30,079,000 was expended between 1979/80 and 1983/84 of which Rs 6,154,000 (20%) came from the fund raised by the Union Councils from local tax resources. Various achievements are outlined in TABLE 4.2-1.

(4) Constraints

Problems which restrict Markaz activities, impeding the programs, are as follows:

a) Absence of Firm Coordination with Local Government Tier

At present the Markaz lack proper coordination with local government tiers.

b) Lack of Local Participation

The public should be more effectively involved through their local representatives in the decision-making process, planning, financing and execution.

c) Lack of Village Organization

Effective village organization including cooperatives should be encouraged and federated into a Markaz Cooperative Federation for commercial and economic activities. Such cooperative federations are only in effect at Tarlai and Sihala, and their activities are limited.

4.2.2 Department of Cooperatives

(1) Organization

Registration of the cooperative societies in Islamabad Capital Territory differs from that in the Punjab Government and other provinces. The Deputy Commissioner of Islamabad has powers of registration for cooperative societies in ICT whereas the Circle Registrar registers cooperative societies in other provinces.

The Cooperative Department is supported by a Circle Registrar which consists of one assistant registrar, two inspectors and six sub-inspectors including one female sub-inspector (FIG. 4.2-1).

(2) Functions

The objectives of the Department are i) motivational, ii) educational, iii) organizational, iv) registrational, v) operational and vi) supervisory.

The field staff of the department make contact with the local population and encourage them to organize societies for their common interest. When residents agree to organize a society, they apply to the Deputy Commissioner or the Cooperative Society Registrar for registration. Normally, a sub-inspector prepares the registration on the spot and submits it to an inspector who checks the form and forwards it to the Assistant Registrar. The latter subsequently submits it to the Deputy Commissioner/Cooperative Society Registrar through the Circle Registrar for registration.

According to the Cooperative Act, 1925, amended in 1962, to form a cooperative there should be at least 10 member each having a Rs 10.00 share; in reality however, 30 members or more are required with a share of at least Rs 100.00 per member.

4.2.3 Department of Local Government and Rural Development

(1) Organization

Total population of the rural area is spread over 133 villages which are grouped into 11 Union Councils and 3 Rural Development Markaz. The Rural Areas Coordination Committee (RACC) constituted according to the Capital Territory Local Government Ordinance, 1979 coordinates the activities of Union Councils and other nation-building departments. The chairman of each Union Council is a member of the RACC and the district heads of nation-building departments serve as exofficio members of the RACC. The RACC functions similar to the Zila Council (District Council) in other districts of the country. For the smooth operation and coordination of the above mentioned local government institutions, the Department of Local Government and Rural Development under the Assistant Director at the district level, oversees and facilitates the affairs related to local government and the Integrated Rural Development Program in ICT. The organization chart is presented in FIG. 4.2-2.

(2) Functions and Activities

The main function of the Department of Local Government and Rural Development is to coordinate the activities of local government institutions at different levels including those of the Union Councils, Rural Development Markaz and RACC as well as activities among the other nation-building departments.

The department is responsible to:

- a) provide technical assistance to the Union Councils in the execution of their developmental schemes;
- b) guide the local representatives in their official routine work and supervise all the activities being carried out by the local government institutions;

- c) provide guidance in all processes from planning to implementation of developmental and non-developmental schemes;
- d) make arrangement to hold periodical elections for local bodies;
- e) perform duties according to the Muslim Family Act; and,
- f) mobilize human resources to solve their local socioeconomic problems on a self-help basis.

(3) Present Constraints

Under the new local government setup in ICT, the Department of Local Government and Rural Development is overloaded with assignments due to lack of local government at the Markaz as well as district level. All activities relating to the Markaz are supervised by the department including planning, monitoring and evaluation work.

The department has inadequate technical staff. There is no provision for an executive engineer while the post of assistant engineer has been vacant since its creation in 1980.

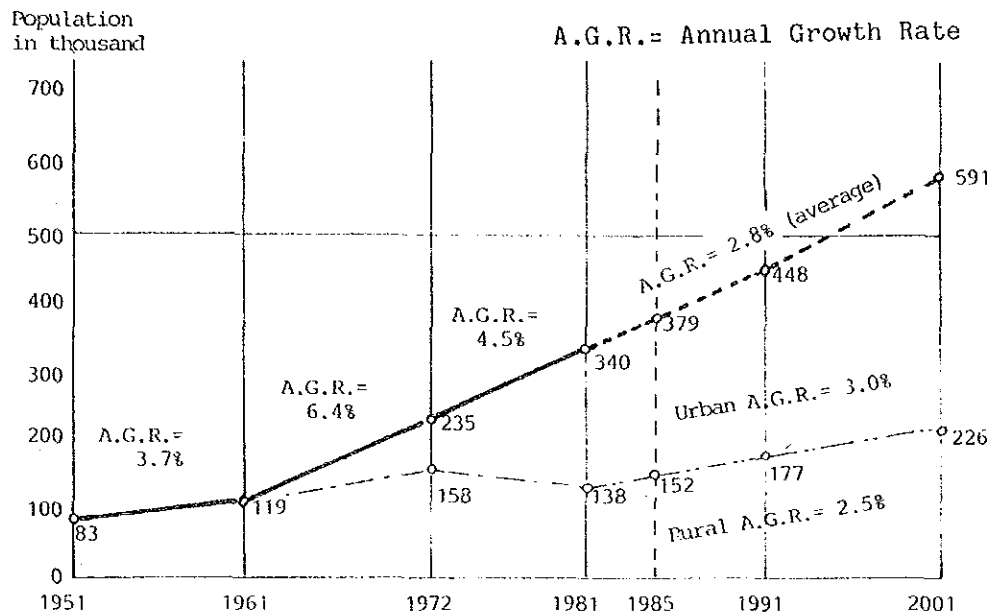
Lack of road construction equipment is another constraint to timely achievement of department goals.

4.3 Population and Labor Force

4.3.1 Population

The decision to locate the capital at the present site was taken by the Government in 1960 and construction work commenced in October 1961. Since then the population of Islamabad has increased at a rapid rate. The total population of Islamabad as of March 1, 1981 was 340,286 as compared to 234,813 in September 1972. The percentage increase during this period of 8.46 years was 45.0 with an annual growth rate of 4.5%. The total population of Islamabad since 1951 and population projection up to 2001 are presented in the following figure.

POPULATION TRENDS AND PROJECTION OF THE ICT



Note: (1) Population in 1951, 1961, 1972 and 1981 is based on census results.

(2) Population in 1985, 1991 and 2001 is estimated on the basis of population trends in the past.

On the basis of past and current population trends, an estimated population of 591,000 will exist within the ICT in the year 2001 of which 226,000 will be present in the rural area specifically.

As projected in the preceding figure, the total population of Islamabad in 1985 is estimated to be about 379,000 of which the rural population accounts for approximately 152,000. The following table shows the population of Islamabad rural area.

POPULATION OF ISLAMABAD RURAL AREA

Union Council	Population in 1981 <u>1/</u>	Population in 1985 <u>2/</u> (estimate)
Koral	4,546	5,018
Rawat	11,455	12,644
Sihala	16,033	17,697
Bhara Kau	10,590	11,689
Phulgran	11,248	12,416
Shah Allah Ditta	7,576	8,362
Tarlahi Kalan	12,289	13,565
Sohan	13,162	14,528
Kirpa	19,480	21,502
Tamair	13,638	15,054
Charah	17,837	19,689
Total	137,854	152,164

Source: 1/ Population in 1981 as per Census Report (See Annex).

2/ Population in 1985 is estimated at an annual growth rate of 2.5%.

Population densities were about 232 persons per km² in the rural area and about 650 persons per km² in the urban area (1981). As compared to the average national population density of 106 persons per km² in Pakistan, Islamabad has a remarkably high population density, especially in the urban area.

POPULATION DENSITY (1981)

	Area (km ²)	Population (in thousands)	Density (persons/km ²)
Pakistan	796,095	82,253	106
Islamabad			
Rural	595	138	232
Urban	311	202	650

Source: 1981 Census Report

4.3.2 Labor Force

(1) Labor Force

Labor force is defined as all persons of 10 or more years of age, who work or are looking for work for profit, a wage or a salary or who help any member of their family in agriculture, trade or any other profession. Excluded are housewives, students, pensioners, landlords, etc. The following table presents the available urban and rural labor force in Islamabad.

LABOR FORCE/SUPPLY OF MANPOWER BY URBAN
AND RURAL DISTRIBUTION, 1981

Item	Total	Urban	Rural ^{1/}
Population	340,286	204,364	135,922
Population of Working Age	243,800	148,200	95,600
Labor Force, i.e.			
Labor Supply	93,000	57,500	35,500
(Illiterate)	(39,100)	(19,500)	(19,600)
(Literate)	(53,900)	(38,000)	(15,900)

^{1/} Rural here refers to the area classified by Census Organization, which is slightly different from that of LGRD, IA.

Source: 1981 Census Report

The literacy rate for the labor force, i.e. the percentage of literates to total labor force, is 66% for urban and 44.8% for rural areas, which indicates that the majority of the work force in rural areas is illiterate (55.2%).

(2) Labor Force by Economic Activities

According to the 1981 Census report, the total labor force of 35,500 in rural areas can be classified into the following categories of economic activity presented in the following table.

WORKING POPULATION BY OCCUPATION

Occupation	Working Population	Percentage
1. Agriculture, forestry, hunting and fishing	11,911	38.8
2. Mining and quarrying	27	0.1
3. Manufacturing	2,790	9.1
4. Electricity, gas and water	807	2.6
5. Construction	2,665	8.7
6. Wholesale and retail trades	1,816	5.9
7. Transport, storage and communication	1,811	5.9
8. Financing, insurance and real estate	246	0.8
9. Community, social and personal service	6,105	19.9
10. Unclassified	2,519	8.2
Total	30,697	100.0

Source: 1981 Census Report

Occupation means the principal type of work usually performed and in the case of more than one occupation, only the principal occupation is recorded in the Census Report. Accordingly, some small farmers who work as government functionaries in administrative offices in either Islamabad or Rawalpindi or as factory workers, construction laborers, shopmen, etc., may not be listed under agriculture in the above table. Taking into consideration the fact that many small farmers in the rural area are likely engaged in non-agricultural activities, the working population engaged in agriculture may actually be more than 70%.

Although no official data was available, on the basis of questionnaire and livestock surveys the team estimated that 33% of households in the Area derive 50% or more of their income from farming, while 35% derive a portion of their income from agriculture which is less than 50%.

4.3.3 Unemployment and Job Opportunities

According to the 1981 Census Report, the total labor force was 35,500 in the rural area and the working population was 30,697. The difference of 4,803 persons is considered to comprise the unemployed, accounting for 13.5% of the total labor force. The table below shows the labor force participation rate and the unemployment rate in Islamabad and Pakistan.

LABOR FORCE AND UNEMPLOYMENT

Sex/Area	Pakistan	Islamabad
<u>Labor Force Participation Rates</u>		
Both Sexes		
Rural	28.5	26.1
Urban	25.3	28.2
Male		
Rural	52.8	48.7
Urban	45.2	39.4
Female		
Rural	2.0	1.0
Urban	2.4	4.4
<u>Unemployment Rates</u>		
Both Sexes		
Rural	2.3	13.5
Urban	5.2	9.0
Male		
Rural	2.2	13.0
Urban	5.1	8.3
Female		
Rural	7.2	38.6
Urban	8.2	17.7

Source: Main Findings of 1981 Population Census

From the above table, it is clearly observed that the labor participation rate in Islamabad rural area is lower than the national average. In particular, the labor participation rate of females in Islamabad rural area was only half the national average. Moreover the unemployment rate in Islamabad rural area is remarkably high as compared to the national average. It is estimated from these figures that a number of the rural population in Islamabad are actively seeking job opportunities to supplement their income. One of the reasons for this would be that small landholding and low land productivity prevent them from maintaining a proper livelihood from agriculture alone. Under the circumstances, the creation of job opportunities for the rural population, both men and women, is the most urgent task to be achieved in rural development planning.

In addition, the number of persons seeking employment abroad has increased dramatically since 1977, principally to neighboring middle eastern countries. In the 10 year period from 1971-81, the number of expatriate workers from the Study Area totalled 4,438, or approximately 12% of the labor population.

4.4 Land Use

4.4.1 Land Use in ICT

Islamabad Capital Territory (total area 906km²) is delineated by municipal boundaries into the urban area (311km²) and the rural area (the Study Area, 595km²). In accordance with the land use plan which emphasizes the functions of the urban area as a capital, the urban area has been developed for various purposes and is divided into administrative, commercial, industrial, institutional, and residential areas as well as other areas for recreation and afforestation. According to the Land Revenue Department of IA, about half of the urban area has been urbanized while the remainder is still rural. Meanwhile, systematic development of the rural area has not been realized and the role of the area in supplying perishables to the urban population and providing a green environment has not yet been fulfilled. In the rural area, cultivated land only accounts for about 40% of the total area and land use intensity is low. General features of land use in ICT are shown in the following table.

LAND USE IN ICT^{1/}

Land use	Area (ha)	Proportion (%)
Urban Area	31,100	34
(Urban conditions)	(13,890)	(45)
(Rural conditions)	(17,210)	(55)
Rural Area (Study Area)	59,500	66
(Cultivated land)	(23,120)	(39)
(Uncultivated land)	(36,380)	(61)
Total	90,600	100

^{1/} Based on data supplied by the Land Revenue Department, IA and measurements of present land use map.

4.4.2 Land Use in the Study Area

The principal land use pattern in the Study Area is cultivated land, while extensive coverages of wasteland and land acquisition by government organizations are also features. Land use categories include: i) cultivated land, ii) culturable wasteland, iii) unculturable wasteland and iv) reserved forests and others (institutional areas; industrial areas; and right-of-way areas, namely roads, rivers and villages). Present land use, based on the village land use data prepared by the Land Revenue Department and land use data of CDA, is summarized as shown in the following table.

PRESENT LAND USE IN THE STUDY AREA

Land Use Category	Area (ha)	Proportion (%)
Cultivated Land	23,120	38.9
Culturable Wasteland	3,630	6.1
Unculturable Wasteland	17,090	28.7
Reserved Forests	10,360	17.4
Others	5,300	8.9
Total	59,500	100.0

(See FIG. 4.4-1)

4.5 Living Conditions

4.5.1 House Structure

Structure of houses in Islamabad rural area differs according to financial and family status. Typical house features are stated below.

(1) Structure and Material

Dwellings consist of an area 15m by 12m enclosed by brick or stone walls bonded with mud, and with 3 - 4 living units, 3.5 -4.0m by 7 - 8m each, arranged within the compound. In front of the living units, there is an approximately 3.5m wide veranda. Buildings are one story and there are additional sheds for domestic animals, fuel storage and cooking. Middle and upper class dwellings feature basic toilet and washing facilities enclosed by a mud wall in one corner of the compound.

Two or three beds are provided in each living unit with a shelf attached to the wall for tableware etc. For each family, 3-4 chairs are provided on the veranda for relaxation during the evening. The number of available beds varies from family to family. Several family members may use one bed. Others may sleep directly on the veranda during the hot dry season (See Annex).

(2) Life Style

The head of the house arises at about 4 or 5 in the morning and retires at about 9 or 10 pm. An average day would include time for prayer, meals and work.

Under existing circumstances, although commuting time varies by location, it typically takes 1.5 hours one way or 3.0 hours round trip for laborers, teachers and security guards etc. to commute to the urban area.

Housewives, daughters and children spend large amounts of time travelling to draw water and gather firewood. Travel time is often greater than the time required for the activity itself. If and when an efficient water supply system is adopted for the villages, travelling time presently required for the drawing of water could be allotted to more productive domestic affairs.

4.5.2 Village Conditions

Village conditions in Islamabad rural area vary from the mountains to the plains. There are 133 villages, comprising of either dispersed or agglomerated settlements, in the Islamabad rural area. They are classified as stated below.

(1) Villages near the Urban Area and along the Main Road

These villages are situated on the plains or gently sloping area and include Sohan, Hummak, Rawat and Bhara Kau.

These villages were once dispersed settlements with fields which subsequently acquire more consolidated configuratives due to the influence of urban area development.

Moreover, these villages are becoming more crowded due to increased population.

(2) Villages on the Plateau

These villages are situated on a narrow plateaus sandwiched between wasteland and eroded gully and comprise mainly agglomerated settlement with some dispersed settlements mixed with farm fields. Pind Daia, Boora Bangial, Darwala, Phulgran and Shakrial belong to this group. Land conservation is critical to these villages.

Roads between villages are located on the top of the plateau and the villages are dependent upon wells for water supply. Development of water resources and water delivery facilities are critical requirements.

As a result of the watershortage, trees which are necessary for basic life support are scarce.

Drainage ditches are not utilized in the inner village and rainfall in the rainy season flows along the roads between houses, finally concentrating in the lower portion of the fields and in the gully-eroded wasteland.

(3) Villages at the Mountain Foot

These villages are situated on the skirts of the Margalla Hills and include Dhok Jori, and Shah Allah Ditta. These villages are of the agglomerated settlements type and are located at varying elevations.

Roads from the main road to each village are in good condition, but inner village roads are fairly narrow and muddy, particularly in the rainy season, due to lack of drainage ditches. Residents in these villages depend on a combination of spring water and wells for drinking.

(4) Villages in Ravines

Gokina and Shah Darah, among others, belong to this group of settlements which are dispersed on slopes along both sides of perennial rivers. As these villages are situated on the hillside, some residents secure their houses by partially banking the soil. Link roads between individual houses are natural paths.

As agricultural land area is limited, many workers commute to jobs in the urban area by a combination of on foot and bus. For this reason, motorable link roads to these villages are necessary.

As these villages are situated in deep gorges, residents depend on springs for their drinking water.

4.5.3 Income Level

In rural areas, landless and/or small plot farmers constitute the lowest income level. According to the Household Income Survey conducted by the Federal Bureau of Statistics in 1979, the average monthly income per household in urban areas was found to be Rs 1,345.91 whereas the same was reported as Rs 835.65 in rural areas. This indicated that the average rural income was 38% less than that of urban areas in Pakistan in 1979.^{1/}

Based on the results of socioeconomic survey carried out in Islamabad rural area by LGRD under the support of UNICEF in 1984, the income levels of 11 UCs were estimated as presented in the following table.

HOUSEHOLD INCOME OF ISLAMABAD RURAL AREA

Union Council	Monthly Household Income (1984)			
	Up to Rs 500 (%)	Up to Rs 1,000 (%)	Above Rs 1,000 (%)	Average Income (Rs)
Koral	26.7	54.3	19.0	854
Rawat	30.5	52.2	17.3	814
Sihala	36.6	35.8	27.6	912
Bhara Kau	34.5	42.7	22.8	863
Phulgran	41.6	39.9	18.5	773
Shah Allah Ditta	41.8	43.1	15.1	730
Tarlai Kalan	40.7	40.6	18.7	780
Sohan	19.4	46.1	34.5	1,084
Kirpa	34.6	39.8	25.6	897
Tamair	49.2	37.4	13.4	672
Charah	50.9	32.5	16.6	703
Total (Average)	39.3	40.2	20.5	810

Source: UNICEF/LGRD, IA, 1985

^{1/} Household Income & Expenditure Survey, 1979.

It is clear from the above table that nearly 80% of the rural population have a monthly income of less than Rs 1,000 and the estimated average monthly income is Rs 810 per household. Although identification of the "poverty line" is quite difficult, a monthly income of Rs 1,000 (1984 prices) is one criterion with which to identify rural poor. Taking into consideration farm size and estimated monthly income, about 80% of the population in Islamabad rural area are considered to live below the poverty level.

4.5.4 Welfare of Women and Children

(1) Background

Children (0-5 years) constitute 20.4% (24,806) of the rural population of ICT. According to estimations by UNICEF, Islamabad 1985, more than 76% of these children belong to the lowest income groups with an average of 6.4 persons per family and less than Rs500 monthly income which is about 40% in total household. The per capita total monthly income of these families is not more than Rs 78 (less than US\$5.00). Moreover, mortality rates of infants (0-12 month) is high at 21.9% and child (0-5 years) mortality is 0.4%. Moreover, more than 50% of malnutrition is concentrated in the children of these families (TABLE 4.5-1).

Although the parents, especially the mothers, are not totally illiterate, they lack any marketable skills other than traditional agricultural non-wage vocations. Job opportunities are scarce due to the limited rainfed cultivation practices and lack of any important industries in the rural area. Women work as household servants in Islamabad, help their husbands in the brick kilns, carry cement-mortar mixture when their husbands are engaged in construction work, make toys with paper and reed, weave baskets and hand bags from wheat stalks, collect cow dung and make cakes for fuel, and carry water.

Children of these families start helping their mothers in the household by the age of 4 to 5 years. They take care of their younger brothers and sisters, collect firewood, carry water, graze

goats and sheep and sometimes also assist in farming. Since the survival of these children is directly linked with the welfare of their mothers, steps should be taken in an organized way for the development of their families with special attention given to working women in the villages.

At present, there are many constraints to development for mothers and children in the rural area which can be overcome through implementation of the following programmes by the Government.

(2) Rural Education and Development Project

The Ministry of Education launched the Rural Education and Development Project (READ) under which, in collaboration with UNESCO in 1977, undertook an experimental pilot project with a principal aim to:

- To develop and test models of primary education which may be made available to the maximum number of rural children
- To establish improved educational services to be extended to an increasing number of primary school drop outs and others who need sound basic prevocational education and/or training
- To develop and test new skill-oriented programs for children, youths and adults
- To develop new communication and learning techniques
- To assist in the training and/or retraining of educational personnel (existing and potential)

The components of the said project are: (i) Women's Education Centers; (ii) Village Workshops, (iii) Mosque Schools, (iv) Mohallah Schools; and (v) Adult Literacy Centers (Community Viewing Center). Although facilities for these schools are provided by the community, the overall program is managed by a Village Education Committee which is comprised of the elected councilor as its chairman, 2-3 village elders and instructors. An Educational Facilitator is appointed for every 10 project villages.

Women's Education Centers

Women's Education Centers are envisaged to provide training for rural girls and women in income generating skills like sewing,

knitting and embroidery. There are 31 Centers with 771 enrollments in the Study Area as of September, 1985 (TABLE 4.5-2). A locally available qualified and experienced female is appointed to each Center. Accommodation is provided by the community and the necessary equipment, i.e. sewing machines, zig-zag machines, and knitting machines are provided by the project. The trainees are producing materials such as children's and adults' clothing, tablecloths, sweaters, mufflers, etc. to meet their own household needs as well as for sale. Most of the trainees are unmarried girls, and some of them quit training after they marry.

(3) Rural Women's Development Program

To cope with the difficult conditions faced by working women in the Study Area, the ICT in cooperation with government organizations concerned and UNICEF is planning to establish an operational local management system for a Women's Development Program promoting socioeconomic development through working women's groups in the villages.

According to the present draft plan, the projected area covers 25 of the most deprived villages distributed in the three Markaz of the ICT (TABLE 4.5-3).

The selection of villages for UNICEF assistance is based on the following criteria or indicators.

- Highest crude death rate for infants and children (0-5 years)
- Highest percentage of diarrhea in infants and children (0-5 years)
- Highest percentage of working women (women belonging to peasant families who own or are share croppers on land up to 2 acres, landless women laborers, women artisans, women shopkeepers, and women traders etc.)

In operational terms the design of the project for the rural women's development program through village working women's groups will include activities related to:

- organizing management and training regarding health education, sanitation and hygiene