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ENVIRONMENT STATISTICS OF PAKISTAN 1986

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FEDERAL BUREAU OF STATISTICS
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FOREWORD

Economic development and population growth have resulted in very significant changes in many diverse directions in the environment and quality of life. Hence measuring and monitoring of those changes have gained importance. Data gap and a rising demand for environment statistics have been identified as major development in the recent period for national planning and policy making. To bridge current gaps in the collection of environment statistics, Federal Bureau of Statistics have initiated to coordinate and publish data having direct and indirect bearing on environment statistics on annual basis. This is the third issue of is brochure on Environment Statistics of Pakistan which inter-alia provides information on five principal areas of environmental concern viz; natural resources, energy, land, human settlements and pollution.

2. The Federal Bureau of Statistics through concerted and continued efforts have enlarged the scope and spectrum and improved the quality and quantity of the information and the process of improvement and enlargement will continue in future issues.

3. The Bureau is grateful to the organizations which provided assistance and active cooperation in furnishing the data included in this issue. Comments and suggestions for improving the publication will be highly appreciated.

S. M. ISHAQUE
Director General

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ERRATTA

Page No.	Reference	Incorrect	Correct
	Column Load factor % Warsak	58.500	58.580
	Column Plant utilization factor (%) Shadiwal	42.07	47.07
165	Table 2.2.29 Column Maximum load (MW) NTPS Hyderabad TPS Quetta TPS REPCO	27.05 60.08 3.07	27.50 60.80 3.70
	Column Minimum load (MW) NTPS Hyderabad TPS MESCO TPS REPCO	1.05 1.07 0.07	1.50 1.00 0.70
167	Table 2.2.31 Unit value	GWH (% TOE)	GWH (TOE)
169	Table 2.2.33 Unit value	GWH (% TOE)	GWH/TOE
217	Table 4.1.10 Column Population of urban areas in number 1981-Sialkot	320.009	302,009
234	Table 4.1.10 Column Population of urban areas in number 1981-Khairpur Nathan Shah	19,540	10,540
245	Table 4.2.01 Column Total 1980-81 Column Hightype 1981-82	90,436 30,824	96,436 36,824
260	Table 4.2.17 Column Both areas 1982-83 Mining and quarrying	0.14	0.10
278	Table 4.2.35 Column Universities (Nos.) Female 1983-84	70,000	7,000
279	Table 4.2.36 Column Year Column Secondary school (a) Total 1983-84*	1983-84 4,300	1983-84* 4,380
315	Table 5.1.13 Unit value Column Relaxed Standard (upto 1990) last line other sources Column Ultimate Standard after 1990 Last line other sources	-	MgM3 11,000.00 400

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particle sizes of 104 to 101 mass omission per unit
Time for large emitters

In defining more stringent standards attention
should be paid to particle sizes of 10
Account should also be given to the total mass
emission per unit time for large emitters.

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INTRODUCTION

I N T R O D U C T I O N

Economic development has improved the quality of life but the environmental damage associated with a higher level of resource consumption tends to mitigate against some of this progress. The need assessing for environmental conditions has stimulated an attempt to develop a new type of statistics called environment statistics. Environment statistics are defined as the statistics required for assessment and management of the environment and of the effectiveness of measures for environmental protection. Environment statistics are primarily used for monitoring the state of the environment and its evolution over time as well as the characteristics of the influence of human activities on the environment; identifying areas of action and the effectiveness of measures taken on environmental protection. Sets of indicators are to be constructed which may be useful to central and local authorities within the decision making process, particularly for the formulation of policies, the allocation of resources and appropriate information on the phenomena involved (1).

2. The need for work on environment statistics has been taken up at many international forums including the United Nations. The United Nations Statistical Office (UNSO) initiated work in the mid-1970's on statistics of the environment to lay the foundation of a continuing programme of use to countries in developing their statistics, and to initiate international reporting and dissemination. The UNSO has since sponsored and organised a number of international and regional meetings to discuss the institutional responsibilities of data collection/coordination in this area; importance of a framework; need for the development of manuals, guidelines, and classification systems; the role of statistical Offices in data collection/compilation; on-going methodological work in international organisations; etc. International meetings worth mentioning in this connection are: Pacific Workshop on Environment Statistics in Oct. 1980 held at Honolulu, USA; (7) Asian Workshop on Environment Statistics in Feb. 1981 held at Pattaya, Thailand, (8) and the U.N. Expert Group meeting on Environment statistics in Sep. 1982 held at New York, U.S.A.

3. At the Asian and Pacific level, the ESCAP Secretariat at Bangkok showed much interest in developing relevant and meaningful environment statistics in the countries of the region. In particular the ESCAP Committee on Statistics discussed this topic, time and again in its meetings. In its 4th session held in June, 1981, the Committee adopted the recommendations of Asian Workshop on Environment Statistics and recommended that the work relating to coordination of concepts, definitions and methodologies for data collection in this respect should be done by the National Statistical Offices. In its 5th session held at Bangkok in June, 1983, the ESCAP Committee on Statistics noted that the UNSO had released its publication entitled 'Survey of Environment Statistics: Frameworks, Approaches and Statistical Publications' (9) and was working on a publication on "conceptual framework for the development and organisation environment statistics", designed to help countries in the field. The Committee welcomed the plans of the ESCAP Secretariat to make advisory services in environment statistics available to countries.

4. Environment statistics has been one of agenda items of the UN Statistical Commission meetings. In the latest (i.e. the 23rd) session of the UN Statistical Commission held at New York from 25 February-6 March, 1985, the Commission was informed of certain important developments in the environment statistics programme. The UN-Directory of Environment Statistics (10) had been published and A

Framework for the Development of Environment Statistics (11) was being published. Draft guidelines on freshwater statistics had been prepared and reviewed in detail by an expert group during a meeting held at UN Headquarters in December 83. The U.N. Statistical Office had co-sponsored a workshop on natural resources and environment Statistics in West Africa in November 1983.

5. In Pakistan, the environment statistics has been the subject of discussion at a number of forums, particularly by the Technical Advisory Committee (TAC) of the National Statistical Council and the Working Group on Environment Statistics constituted under TAC.

6. The Federal Bureau of Statistics, therefore, initiated the collection and compilation of environment statistics. So far data on few aspects of meteorology, energy, marine environment, oceanography and industrial waste pollution (16) could only be collected. Efforts are still being made to collect environment statistics from the concerned agencies. However, to present the existing data, alongwith gaps therein, in a single publication, the first brochure on Environment Statistics of Pakistan was issued in June, 1984. The present brochure, the second one in the series, shows enlarged coverage both in terms of quality and quantity. As before, this brochure has been divided into five sections relating to natural resources, energy, land, human settlements; and pollution aspects of environment. Each section has been divided into two parts, first for explanatory notes and the second statistical tables. Explanatory notes are generally based on information provided in the UNSO Technical reports on Environment Statistics (1-6).

7. As will be evident from the discussions in the above paras, some research work, both at national and international levels, have been/are being undertaken by the concerned agencies. Apparently, data on environmental aspects are generally lacking, but much data on the subject are probably available in the administrative records of different agencies. Efforts are being made to collect the required data as early as possible. The policy of the Government on the environment aspects of the economy are (12):-

- i. to adopt a model of development in pakistan through which all strata of the society could be assured a balanced progress and a life of peace and tranquility;
- ii. to adopt a model which ensures better living conditions for the low income population, provision of safe drinking water, cleanliness of roads and streets and facility to become co-operative production units;
- iii. special attention to be paid to the development of rural areas to discourage migration to the cities;
- iv. natural environment being a gift of Allah, special attention to be paid to its preservation; and
- v. to enforce a Federal Law for the betterment of the environment and for the national policy on housing.

In fulfilment of the above policies of the Government, and to provide for the control of pollution and preservation of living environment, the Pakistan Environmental Protection Ordinance 1983 was promulgated by the President (Appendix III). Under the Ordinance two bodies have been set up: the Pakistan Environmental Protection Council; and the Pakistan Environmental Protection Agency. The former is a top level body with the President as the Chairman, whereas the latter, headed by a Director General, is responsible for important tasks like identification of legislative needs and framing of a national environmental policy for approval of the Council. The requirement laid down in the Ordinance that an environmental impact statement will have to be submitted by those who are settling up projects which are likely to have adverse effects on the environment will be of considerable benefit. It is hoped that the Pakistan Environmental Protection Agency will provide some important information on environment as an administrative by-product. This will help in filling up gaps in this areas of statistical concern.

SECTION 1

NATURAL RESOURCES

SECTION 1. NATURAL RESOURCES - EXPLANATORY NOTES

1.01 The field of natural resources covers a wide range of activities, commodities and problems. Natural resources are of three types: renewable, non-renewable and conditionally renewable. Renewable includes both inflowing and cyclical types (for example solar radiation and air mass meteorology, etc.). Non-renewable resources constitute those used in their original form, such as coal or oil and those that change form or concentration with usage, such as basic elements, minerals, sand and gravel. However, a classification based on physical characteristics does not focus on environmental concerns, which are in essence the result of human activities in the transformation and use of resources. The definition of a natural resource as such is predicated upon the simple fact that it must have a perceived human use or application. In environmental analysis it is essential to have a classification which is based on the way in which natural resources are used. (3)

1.02 Topics of environmental concern with respect to natural resources fall into three main types: those related to availability, utilization and the impact of extraction and use. (3)

1.03 Questions concerning resource availability centre upon: the rate and amount of extraction of the resource in comparison to known reserves estimated over time; identification of the rate at which biological resources such as fish or trees are harvested in comparison with the natural renewal rate for that resource with regard to the resources represented by environmental media (air, water, soils) the focus of attention is on new ways of manipulating the resource and their impact on present patterns of use of the resource and the loss of agricultural quality land to urban agglomeration. (3)

1.04 Those relating to utilization explore the advantages which accrue to the use of a resource; examine the possibilities for substitution of scarce resources by similar resources of comparable quality (e.g. from natural to synthetic cryolite); looks at the capacity for improvement of production processes in order to use resources to greater advantage; analyse the possible adjustments in the pattern of consumption to restrain the use of scarce resources. (3)

1.05 Those in conjunction with impact focus on the effects of natural environment; included here are: the impact of extraction methods; the impacts of effluents and wastes from production processes; and the impact of consumption of a resource, either on itself or as final products. (3)

1.06 The individual elements for treatment in the field of natural resources are food, forestry, water, mineral and materials resources. The available data in respect of these four areas are given in Tables: 1. 1.01 to 34 (food resources), 1.2.01 to 08 (forestry resources), 1.3.01 to 11 (water resources) and 1.4.01 to 14 (mineral and material resources).

Food Resources (Land based):

1.07 Food resources are land-based and ocean-based. For land-based food resources, the first stage is to examine those natural conditions which are essential to the provision of food resources, namely: soils, Vegetation and climate. The climate

processes between these three elements effect soil development. From an environmental point of view, the density of population compared with 'usable' land, the proportion of 'usable' land to total land area, the area potentially arable or culturable land compared to total land area and existing cultivated area, the cultivated area per capita, are all useful dimensions of what might be called the 'food resource base'. Soils are the medium in which the food resources are created. These are important because they limit directly the types of crop which can be grown. (6)

1.08 Tables 1.1.01 to 05 relate to temperature, rainfall, air pressure, vapour pressure, and sunshine hours for 15 selected centres. Table 1.1.06 provides information on pressure, temperature, humidity and vapour pressure in respect of Peshawar based on data for 1931 to 1960 such data for Karachi and Lahore was already published in previous brochures of 1984 and 1985 respectively. The different terms used in these tables are explained below :-

- i) Temperature: It is defined as the measure of degree of hotness and coldness of the substance and it is measured according to various scales. The scale in use is centigrade. Maximum and minimum temperature are the highest and lowest temperatures respectively recorded during the 24 hours.
- ii) Rainfall: The total product of precipitation or condensation from the atmosphere as received and measured in a raingauge. The unit of measurement in use is millimeter.
- iii) Pressure: It is defined as the force per unit area. The unit of pressure is the dyne per square centimeter. In meteorology a unit called millibar is used and is defined as $1 \text{ mb.} = 1000 \text{ dyne/cm}^2$. Mean sea level pressure is the pressure of the atmosphere produced by the weight of overlaying air at mean sea level. Station level pressure is the pressure of atmosphere produced by the weight of overlaying air at station level.
- iv) Vapour pressure: The partial pressure exerted by the water vapour is called vapour pressure and its unit is millibar.
- v) Sunshine hours: It is the duration or hours of bright sunshine in a day. Sunshine percentage of long term average is the ratio of monthly total hours of bright sunshine to that of 30 years average of hours of bright sunshine expressed in percentage.

1.09 Table on land-use (Table 1.1.08) shows that of the total area of 79.61 million hectares, 73% is reported and 27% is not reported, cultivated area constitutes 26% and forest area 4% of the total area. Turning to the specific resources which provide the food energy for human activities the following table shows the composition of each of the major food commodities.

Food Resources

<u>Resources</u>	<u>Total production</u> 1984-85 (000 tonnes)
Rice	3,315
Wheat	11,703
Maize	1,028
Other cereals (Bajra, Flawar + Barley)	646
Pulses (Gram + Masur + Mash + Mong) + other pulses	732
Potato	543
Onion	515
Other vegetables	1,907
Fruits	2,893
Nuts	69
Sugarcane	3,214
Livestock products (Milk, Beef, Mutton, Poultry meat)	11,979
Fish	393*
Total	<u>38,937</u>

1.10 The data gaps in the area of food resources (land-based) relate to the area by type; categories of land-use area; bioclimatic regions area; vegetation regions area by type; acreage of agricultural type; storage; processing and food contamination.

Food Resources (Ocean-based)

1.11 The second type of food resources are those derived from the oceans. The open sea provides 81% of total catch of fish and has good prospects of yielding more in the future.

Fish production from inland waters (including fish farming) represents a vital source of high quality protein which is 19% of total catch of fish. Total catch of fish and fish production targets are given in table 1.1.29 to 30, while data on fishermen engaged, fishing crafts, fish processing plants and fish stocks are given in tables 1.1.31 to 34.

1.12 The position of nutrient supply, marine pollutants and toxic chemicals etc. in respect of Baluchistan coast based on the information supplied by the Fisheries Department, Govt. of Baluchistan, are given below:-

Nutrient supply: Some nutrients are derived from the flash floods of Purali and Hub around Sonmiani, Hingol and Basol around Ormara, Brangoli, Rumbra and Makola around Kalamat, Shadikor, Shinzani and Saur around Pasni, Karwat and Akhra around Gwadur and Dasht around Jiwani besides several intermittent small streams. These streams play a significant role as chemical barriers in the distribution movements and triggering reproduction mechanisms of some estuarine and non-estuarine coastal fauna.

However, bulk of the nutrients are recycled from the sea bed and atmosphere by upwellings, sea currents, eddies, turbulence, condensation, surface and sub-surface replenishment, upwellings are considered as the major source and an index of fertility in nutrients. These occur between Jiwani and Ormara during the summer monsoons. Currie (1973) states that Arabian Sea particularly during southwest monsoons is an exceptionally fertile area. Currie further reports considerable degree of hydrographic complexity, and indication of an extremely dynamic state of circulation represented by non-stationary eddies producing intensive turbulent exchange and replenishment of surface waters with biogenic substances. Limited observations indicate a rate of 1.45gC/square metre/day. Nearby Gulf of Oman shows a rate of 5.7 to 6.4gC/square metre/day which is at par with most fertile seas of the world like Peru and studies reveal that such a rate may occur also off Makran Coast. An intensive research cruise has been undertaken by Fridtjoff Nansen in 1977 to estimate nutrients in our waters but its results are yet to forthcome.

Marine pollutants toxic chemicals: Ship wrecking industry at Gaddani and effluent discharge into some streams of Lasbella district by the quickly coming up industries cause some pollution and toxicity extent of which has yet to be estimated. Otherwise, remaining portion of Baluchistan being virgin from industries, has no danger from pollution. Pollution from oil slicks in the Gulf may have its impact the extent of which to some degree have been studied by Baluchistan Fishing Directorate at Pasni and National Institute of Oceanography. Articles on 'oil pollution along the Pakistan Coast' are of some interest. (24).

Fishery yields, stocks: Baluchistan coast is about 720 km long and constitutes 70% of Pakistan's coastline. However, the breadth of its shelf is shorter than the Province of Sind. In consonance with the general agreement that the Provincial waters of Baluchistan contains 50 to 60% of the total fish resources of Pakistan, a standing stock of 7 to 9 lakh tons is estimated for Baluchistan upon the basis of the stock assessment carried out by various international surveys more especially by the research cruises of Fridtjoff Nansen during 1976 and 1977. It estimated a total biomass above 1 million tons for Pakistan outside 15 misobath and excluding mesopelagic fishes. The latest assessments have been estimated by the Asian Development Bank (Baluchistan Fisheries Development Project T.A. 397) during 1981-82 based mainly on above mentioned surveys. They agree that the large pelagic fishes may be found in greater abundance

than estimated. Their assessment of stocks in Pakistan, potentials of maximum sustainable yields in Pakistan and Baluchistan province and broad taxonomic groups are given in Table-1.1.34 alongwith the actuals of yields.

Equipments: There are over 2500 fishing boats ranging from 15ft. to 70ft in length operated by over 17,000 fishermen. Most of the boats are fitted with engines ranging from 3HP to 150HP depending upon the size of the boats. Gillnets may be used as fixed nets. These range from a few metres to over 2000 metres in length. Castnets are used by the smaller boats for fishing within the bays and coastlines. Loglines and hanlines are also extensively used. Seining is practiced around Sonmiani area. There are 3 ice plants in Gwadur, 2 in Pasni and one in Ormara. There is no danger of pollution or release of chemicals or toxicants from the above mentioned units. However, fish drying and curing practices are still indigenous require a considerable improvement. There is no concept of town planning or sewerage disposal on the coast. Proper town planning and sanitation is required to infuse hygienic sense for producing a good quality of fish with the development of fish industry.

Freshwater Fisheries, Pollution problems: Some freshwater fishes are found. Major carps are found in commercial abundance in the Kirthar and Pat-feeder canals. Otherwise, fishes are not found elsewhere in commercial abundance. In the absence of industries near these areas they are not endangered by effluents or toxicants.

1.13

The position of marine environment in respect of Sind coast as supplied by the Directorate of Fisheries, Sind, are given below:-

The major area of concern for the study of marine environment lies in the south of the province of Sind and constitutes the District of Karachi. The immediate hinterland of the district is drained by three river viz; Hab in the West, Lyari running through the heart of the city and Malir which flows in the East while the coast line consists of lagoons, cliffs, sand hills, and dunes and a large network of creeks.

The Hab river is a perennial river on which a dam has recently been constructed and water is being stored there. The river drains the western side of the Kirthar range and does not receive any water from the vicinity of Karachi because of the intervening Jhil hills. It falls into the sea few miles west of cape Monze.

Malir and Lyari the two important rivers remain dry throughout the year until they reach the city limits. They receive their water from surface flows after heavy rains which occur for a few days every year. The Lyari river drains the eastern side of Manghopir hills and their northern extensions. It terminates into the marshy flats west of the harbour area. Large quantities of silt are discharged by this river from the surface flow during the few days of rain. This silt is deposited into the harbour channel. Its tributaries the Orangi and the Gujro emerge from the Manghopir range and join the Lyari near the coast. The Lyari plain is now in the middle of the city and shapes into a delta towards the end of its journey near the west wharves harbour and has perennial flow. The source of this water is the indiscriminate discharge of sewerage as well as industrial effluents from a large industrial estate called Sind Industrial Trading Estate located immediately west of Gujro and north of Lyari.

The Department of Fisheries is undertaking research in the applied aspects of fish culture and on such basic problems as are being encountered in the field by both the department and the private fish farmers. Training workshops and training programme for departmental employees and private fish farm is in progress. A training target of 350 personnel will be achieved before the year is out.

Achievements and targets on fish seed production/stocking, fish production and area under fish farms are given below:-

<u>Items of work</u>	<u>Position during 1977-78</u>	<u>Achievement during 1983-84</u>	<u>Targets for 1984-85</u>
Fish seed production/stocking	2.91 million	10.012 million	13.00 million
Fish production	9400 M.tons	17890 M.tons	18640 M.tons
Area under fish farms	2100 Hectares	3470 Hectares	3700 Hectares

The development work is planned to be augmented in the coming years with special attention on improvement and intensification of fish culture practices on commercial scale especially in private sector and development of various categories of feasible water resources of public sector. The targets under major disciplines during sixth plan period would be as under:-

<u>Items of work</u>	<u>Position on 30.6.84</u>	<u>Anticipated targets 1987-88</u>
Fish seed production/stocking	10 million	30 million
Fish production	17740 M.tons	25000 M.tons

Forestry Resources:

1.15 Like food resources, forests are renewable if harvested under national management procedures. Although diverse in character, forests serve several common functions in environmental terms: (3)

- maintenance of ecological diversity
- preservation of watersheds and prevention of erosion (and thence siltation of dams)
- moderation of climate
- supply of wood products for fuel, structures and paper
- provision of areas of aesthetic value for recreation or for hunting grounds.

Accordingly, much of the environmental analysis focusses on deforestation and its consequence. Data required on forests are: forest stocks; rate of cutting; rate of reafforestation; and related environmental issues. Forest resources are used in industries like: pulp and paper, construction, fuel and furniture. Table 1.2.01 to 08 provides information on area of forest by vegetation type, Area afforested, Area regenerated uses of forest, Availability and use of forest resources in Baluchistan, out term of forest and sixth plan targets.

1.16 The statistical gap in this area relates to: availability of forest resources (rate of cutting, deforestation/soil erosion) and use for forest resources recreational use/forest reserve.

Water Resources:

1.17 Water, another renewable resource, is continually reprocessed and recycled to the land by the hydrologic cycle under natural conditions. Functions and availability of water are: for drinking; cooking; washing and bathing; as an industrial raw material and coolant; as a medium for transportation, recreation and transmission of diseases. Three major concerns can be identified as far as environmental aspects of water resources are concerned: conditions of availability; present and projected patterns of use and supply; and the nature and costs of water transport and supply of technology. A basic distinction is made between fresh-water and salt-water resources. Looking first at the background environmental parameters of water as a resource, the volume of water available for runoff on the surface and underground is the difference between precipitation and evapotranspiration. Floods and droughts are major problems. There are several indicators of the availability of water based on stream flow e.g. dependable flow or maximum dependable flow. Other data which can supplement flow rates concern dams/barrages, volume of water impounded, length of canalisation, length of distribution and irrigation networks, etc. In addition to surface water, it is essential to establish parameters for the availability of ground water. Reservoirs of ground water (aquifers) are recharged naturally by seepage from the surface and underground flows, usually at slow rates. (3).

1.18 A key issue in the availability of water is its quality. Independent of the pollutants added by man, water quality varies widely because of natural factors, such as colour, taste, smell, temperature, oxygen content, dissolved salts and load of suspended organic and inorganic material. The most widespread cause of natural water quality problems is dissolved salts. The amount of withdrawn water actually consumed may vary widely by use: for example, (13)

- electricity generating plants consume water, as a medium to dissipate heat, less than 1% of withdrawals
- industry consumes about 11% of withdrawals
- domestic and commercial water consumption from municipal systems comprise just over 20% of withdrawals, but
- irrigation consumes some 75% of withdrawals, and the water returned carries a heavy load of dissolved salts.

Problems of water-logging and salt accumulation raise questions of the feasibility of continued expansion of irrigation: as irrigated areas become more saline they become less fertile, requiring elaborate drainage, which in turn further raises the cost of irrigation. (3)

1.19 Table 1.3.01 to 14 provides information on river flow availability, quality and availability of ground water, tubewells installed, water availability at farm gate and targets of water resource development. The statistical gap in this area relates to:-

- availability of water resources: incidence of floods/droughts, parameters of their occurrence; for major rivers dependable stream flow and maximum dependable flows; dams, barrages, volume impounded, canalisation, distribution networks, aquifers, wells, water standards, by use e.g. drinking, irrigation, livestock etc.
- use of water resources: agriculture, withdrawal, consumptive use, flow requirements-irrigation, industry by type, municipal intake-domestic commercial uses, rural domestic use, electricity generation, and cooling.

Mineral Resources:

1.20 Mineral resources can be divided into non-renewable and renewable types, or stocks and flows. The elements to be covered from an environmental point of view are: the availability of selected materials; the impact of the extraction and processing of these minerals; and the use of these minerals as embodied in final goods and services. (3)

1.21 As a result of systematic exploratory efforts, made by Geological Survey of Pakistan (GSP) the presence of a large number of promising mineral localities was established. Some of these are likely to become economically viable deposits in not too distant future. A few of the more significant mineral finds and assessments made so far are very briefly described below:-

- Saindak porphyry copper deposit-discovery and preliminary assessment carried out by GSP.
- Fluorite deposits (100,000 tons) at Phade Maran, Kalat District, Baluchistan.
- Copper deposits at Koh-i-Dalil, Dasht-e-Kain and Ziarat Pir Sultan, Chagai District, Baluchistan. The reserves are expected to be fairly large.
- Molybdenum occurrences at Durbanchah, Chagai District, Baluchistan.
- Lead-Zinc deposits (5 m tons with 6% combined-Pb-Zn) in Gunga valley, Khuzdar District, Baluchistan.
- Coal deposits in Duki area, Baluchistan and Thatta Sonda, Sind. The evaluation studies are in progress.
- Manganese deposits in Waziristan Agency, NWFP. Further studies to evaluate the deposit are in progress.
- Marble occurrences in parts of Mohmand Agency, NWFP.
- Lightweight aggregate raw materials in Margalla Hills and Attock-Cherat Range in Punjab NWFP areas respectively. Detailed studies are in progress.

1.22 Table 1.4.01 to 03 provides information on reserves of principal minerals, status and scope of some workable deposits and mineral production. Table 1.4.04 provides information on PMDC's three years rolling plan for exploration & evaluation of coal, salt, and other minerals. The statistical gap in this area relates to:

- availability of minerals/metals: facilities for extraction/processing, consumption
- impact of extraction/processing/use: balances, residuals, pollutants associated with processes, embodied materials
- use of minerals/metals: main uses e.g. construction, fertilizers, impact of substitution/recycling.

1. TABLES ON NATURAL RESOURCES

ASPECT OF ENVIRONMENT

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1.1 FOOD RESOURCES

Table 1.1.01 Temperature at selected centres

Year/Station	Peshawar	Parachinar	Jhelum	Zhob	D.I. Khan	Lahore	Quetta	Multan
Height in meters above sea level	359	1725	234	1407	174	214	1589	123

MEAN OF MAXIMUM TEMPERATURE

1978	29.7	20.7	30.3	25.4	31.5	31.0	24.2	32.6
1979	29.8	20.9	30.7	25.7	31.3	30.9	24.1	32.8
1980	29.4	20.9	30.9	26.6	31.9	31.1	25.0	33.4
1981	29.9	18.1	30.5	25.9	31.6	30.8	24.6	33.2
1982	29.0	20.7	29.2	24.0	30.9	29.9	22.9	35.0
1983	28.5	20.3	29.0	25.0	30.7	29.7	24.0	31.8
1984	30.7	21.0	30.6	27.0	31.9	31.1	25.8	32.9
1985	30.5	21.4	31.4	26.5	33.1	31.7	25.3	33.3

MEAN OF MINIMUM TEMPERATURE

1978	16.3	9.8	16.7	13.0	17.3	18.3	6.8	17.7
1979	14.8	9.3	16.7	11.3	16.6	17.8	6.4	18.2
1980	15.3	10.0	17.0	12.6	17.2	18.1	7.3	18.5
1981	15.6	6.7	16.3	12.7	16.7	17.7	7.3	18.3
1982	15.5	9.4	16.3	11.4	15.9	17.2	7.3	18.8
1983	15.1	8.8	15.7	12.0	15.9	17.0	7.1	17.3
1984	15.5	9.6	16.3	13.3	16.0	18.0	8.1	17.5
1985	16.3	10.0	16.8	12.4	14.7	18.3	7.6	18.2

Contd.

Table 1.1.02 Rainfall at selected centres (nearest whole millimeter)

Year/Station	Dalbandin	Jacobabad	Panjgur	Jiwani	Hyderabad	Chhor	Karachi (Airport)
Height in meters above sea level	850	56	981	56	30	6	22

1978	053	338	100	082	416	397	387
1979	159	128	118	140	153	156	381
1980	112	014	086	037	119	062	195
1981	058	173	061	013	117	231	186
1982	204	084	205	386	054	092	162
1983	113	077	124	142	301	386	281
1984	043	020	093	115	206	274	270
1985	26	183	079	032	117	195	157

DEPARTURE FROM NORMAL RAINFALL

1978	-031	+250	-022	-067	+261	+236	+166
1979	+075	+040	+004	-009	-002	-005	+160
1980	+028	-074	-036	-112	-036	-099	-026
1981	-026	+085	-061	-136	-038	+070	-035
1982	+120	-004	+083	+237	-101	-069	-059
1983	+029	-011	+002	-007	+146	+225	+060
1984	-041	-068	-029	-034	+051	+113	+049
1985	+034	+094	-043	-117	-038	+034	- 64

Table 1.1.03 Air pressure at selected centres

Year/Station	Peshawar	Parachinar	Jhelum	Zhob	D.I. Khan	Lahore	Quetta
Height in meters above sea level	359	1725	234	1407	174	214	1589

(mbs)

MEAN STATION LEVEL PRESSURE

1978	968.0	840.2	980.9	853.3	987.4	983.1	839.5
1979	967.4	826.2	981.4	855.3	987.9	983.7	839.8
1980	967.1	830.6	980.9	855.7	987.4	983.1	839.5
1981	967.1	827.5	980.9	864.5	987.3	982.9	839.5
1982	967.5	824.7	981.5	856.1	987.9	983.7	839.3
1983	967.7	826.1	981.6	855.2	988.1	983.9	839.9
1984	996.3	825.2	980.2	854.9	986.5	982.4	838.1
1985	967.3	833.9	981.2	856.5	987.5	983.1	840.0

MEAN SEA LEVEL PRESSURE

1978	1008.6	1430.1	1007.5	1436.9	1006.8	1007.4	1481.5
1979	1008.0	1484.6	1007.9	1457.1	1007.5	1008.0	1485.6
1980	1007.7	1485.5	1007.4	1461.4	1007.1	1007.4	1481.6
1981	1007.6	1498.9	1007.5	1460.5	1006.9	1007.2	1485.9
1982	1008.1	1476.6	1008.1	1456.1	1007.4	1008.1	1481.3
1983	1008.4	1482.7	1008.3	1461.5	1007.8	1008.3	1485.5
1984	1006.8	1472.6	1006.7	1451.1	1006.1	1006.7	1467.2
1985	1008.3	1478.8	1008.1	1469.0	1007.3	1007.7	1492.0

Table 1.1.03 Air pressure at selected centres

Year/Station	Multan	Dalbandin	Jacobabad	Panjgur	Jiwani	Hyderabad	Chhor	Karachi (Airport)
Height in meters above sea level	123	850	56	981	56	30	6	22

MEAN STATION LEVEL PRESSURE

1978	993.3	913.5	1000.3	899.8	1002.7	1004.0	1006.1	1005.4
1979	993.7	915.0	1000.7	901.4	1002.4	1004.6	1006.5	1006.1
1980	992.5	914.3	1000.0	900.8	1001.7	1004.0	1006.0	1005.6
1981	996.2	915.8	1000.1	900.9	1000.7	1004.0	1006.0	1005.5
1982	992.1	914.7	1000.7	901.3	1002.3	1004.6	1007.6	1006.0
1983	993.9	914.4	1000.9	901.7	1002.3	1004.5	1006.5	1005.9
1984	992.4	914.1	1000.4	900.9	1001.6	1004.7	1005.4	1005.0
1985	992.7	916.9	1000.9	901.9	1002.5	1005.0	1007.1	1006.1

MEAN SEA LEVEL PRESSURE

1978	1007.4	1471.5	1006.6	1473.5	1009.1	1007.5	1006.7	1008.0
1979	1007.8	1481.9	1007.0	1482.8	1008.8	1008.1	1007.2	1008.6
1980	1006.8	1476.2	1006.3	1480.5	1008.1	1007.5	1006.7	1008.2
1981	1010.4	1488.9	1006.4	1485.1	1007.1	1007.4	1006.7	1008.1
1982	1006.9	1469.5	1007.0	1475.6	1008.7	1007.8	1008.3	1008.5
1983	1008.0	1477.2	1007.2	1487.3	1008.8	1007.9	1007.2	1008.5
1984	1006.5	1473.0	1006.2	1479.0	1008.1	1008.2	1006.5	1007.5
1985	1008.3	1480.0	1007.4	1480.0	1008.9	1008.5	1007.8	1008.8

Table 1.1.04 Vapour pressure at selected centres

								(mbs)
Year/Station	Peshawar	Parachinar	Jhelum	Zhob	D.I. Khan	Lahore	Quetta	Multan
Height in meters above sea level	359	1725	234	1407	174	214	1589	123
1978	15.5	10.1	17.4	11.5	18.3	18.2	7.4	17.2
1979	16.9	8.8	17.7	11.4	17.7	17.8	7.5	17.9
1980	16.9	9.3	17.9	11.5	18.1	18.2	8.7	17.7
1981	16.2	7.6	17.9	9.7	17.8	17.7	9.6	16.5
1982	15.7	9.6	18.3	9.0	17.6	17.6	8.5	18.9
1983	17.3	9.7	18.3	8.9	17.9	18.3	8.9	19.3
1984	16.6	10.0	18.0	9.8	16.3	17.4	8.7	18.0
1985	15.5	9.7	17.6	9.0	16.9	17.8	5.5	18.6

Year/Station	Dalbandin	Jacobabad	Panjgur	Jiwani	Hyderabad	Chhor	Karachi (Airport)
Height in meters above sea level	850	56	981	56	30	6	22
1978	6.4	17.7	14.5	22.1	19.5	20.1	21.7
1979	6.0	17.0	13.7	23.3	19.0	19.7	21.8
1980	6.0	16.8	13.8	23.9	19.6	19.8	22.3
1981	6.3	17.2	12.4	24.5	19.5	19.6	21.7
1982	7.5	17.6	13.1	22.2	19.0	17.6	21.9
1983	7.6	17.7	12.5	23.3	19.5	19.4	21.8
1984	6.3	16.6	12.5	21.5	18.7	18.6	21.7
1985	6.3	16.9	13.3	22.2	19.3	19.3	21.9

Source: Pakistan Meteorological Department.

Table 1.1.05 Sunshine hours at selected centres (percentage of long term average)

						(%)
Year/Station	Peshawar	Lahore	Quetta	Jacobabad	Karachi (Airport)	
Height in meters above sea level	359	214	1589	56	22	
1978	96.1	98.9	101.0	92.4	94.0	
1979	95.5	96.9	98.8	90.8	102.8	
1980	100.2	101.3	97.3	93.2	107.4	
1981	99.2	91.0	101.1	93.4	101.4	
1982	85.2	88.3	87.3	92.5	97.9	
1983	100.9	99.3	96.3	92.9	97.3	
1984	98.6	102.2	95.7	96.3	94.2	
1985	101.3	91.4	94.5	96.6	96.9	

Table 1.1.06-1 Normals of pressure for 00, 03 and 12 GMT (Based on data 1931-60)

Station: Peshawar (PBO) (Estab: 1866)

LAT.	34°	01'N	LONG	71°	35'E	Height of bar: Cistern a.m.s.l. = 1177 ft.(359 m)			
Month	P r e s s u r e (Mbs.)								
	Station level			Reduced to mean sea level					
	00	03	12	00	03	12			
1	2	3	4	5	6	7			
Jan.	976.0	977.3	975.6	1019.0	1020.6	1017.6			
Feb.	973.8	975.2	973.0	1016.3	1017.9	1014.3			
Mar.	971.1	972.8	970.4	1012.9	1014.7	1010.9			
Apr.	968.4	969.7	966.8	1009.4	1010.3	1006.4			
May.	962.9	964.3	961.0	1002.9	1003.7	999.5			
Jun.	957.4	959.1	955.2	996.6	998.0	993.1			
Jul.	957.3	958.4	954.5	996.5	997.4	992.6			
Aug.	958.7	960.6	957.0	998.0	999.9	995.5			
Sep.	963.3	965.1	961.7	1003.1	1005.0	1000.5			
Oct.	969.7	971.8	968.7	1010.6	1012.9	1008.4			
Nov.	974.4	975.7	974.0	1016.7	1018.1	1014.6			
Dec.	976.1	977.4	975.3	1019.0	1020.4	1017.0			
Year	967.4	968.9	966.1	1008.4	1010.0	1005.9			
No. of years	10	30	28	10	30	28			

Source: Pakistan Meteorological Department.

Table 1.1.06-2 Normals of temperature, humidity and vapour pressure for 00, 03 and 12 GMT (Based on data 1931-60)
Station: Peshawar (PBO) (Estab: 1866)

LAT.	34°	01'N	LONG	31°	35'E	Height of bar. cistern a.m.s.l. = 1177 ft. (359 m)										
Month	T e m p e r a t u r e (°C)									Relative humidity (percent)			Vapour pressure (mbs.)			
	Dry bulb			Wet bulb			Dew point									
	00	03	12	00	03	12	00	03	12	00	03	12	00	03	12	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Jan.	6.3	6.1	14.8	4.5	4.2	9.3	1.6	1.8	4.6	74	73	49	7.0	6.9	8.2	
Feb.	8.7	9.1	18.2	6.6	7.0	11.4	3.3	4.2	4.4	70	71	41	8.0	8.1	8.4	
Mar.	12.8	14.7	22.1	10.7	11.6	14.4	8.4	9.1	8.2	76	70	41	11.2	11.7	10.8	
Apr.	17.2	21.6	28.1	13.6	16.1	17.7	10.1	12.1	10.6	66	56	34	12.5	14.4	13.0	
May.	22.4	28.8	35.0	15.9	19.0	20.1	10.0	12.7	10.0	48	37	22	13.0	14.8	12.5	
Jun.	26.9	31.9	38.7	18.5	21.5	22.3	11.8	15.3	12.4	41	37	21	14.6	17.5	14.3	
Jul.	27.4	30.3	36.9	23.4	24.7	25.6	21.1	22.0	21.2	70	62	40	25.6	26.5	25.1	
Aug.	26.8	28.7	34.6	23.9	24.7	25.7	22.4	23.1	22.2	77	71	49	27.4	27.9	27.2	
Sep.	24.0	26.2	33.1	20.8	21.3	22.8	18.8	18.6	18.1	72	63	41	22.0	21.3	20.8	
Oct.	17.8	20.3	28.2	13.9	15.1	18.0	10.1	11.4	12.8	63	55	39	12.8	13.0	14.9	
Nov.	11.2	12.3	21.4	8.1	8.3	13.4	3.8	3.1	7.6	62	54	41	8.3	7.8	10.5	
Dec.	7.3	7.2	16.4	5.1	4.6	10.3	1.5	1.1	5.6	68	65	48	7.0	6.0	8.8	
Year	17.4	19.7	27.3	13.7	14.8	17.6	10.2	11.2	11.5	66	59	39	14.1	14.7	14.5	
No. of Year	10	30	28	10	30	28	10	30	28	10	30	28	10	30	28	

Table 1.1.06-3 Normals of maximum temperatures
Station: Lahore (PBO) (Estab: 1866)

LAT.	34°	01'N	LONG	71°	35'E	Height of ground (plot of s.s.) a.m.s.l. = 1173 ft. (358 m)	
Month	Maximum temperature (°C)						
	Mean			Extremes			
	Daily	Monthly		Highest recorded		Lowest recorded	
	Maximum	Highest maximum	Lowest maximum	1931-60		1931-60	
				Value	Date & year	Value	Date & year
1	2	3	4	5	6	7	8
Jan.	17.3	21.7	9.9	24	21/46	07	9/45
Feb.	19.7	24.7	11.7	30	28/53	08	2/51
Mar.	23.8	29.8	14.9	34	31/31	11	3/36
Apr.	29.8	36.6	20.2	42	29/41	14	14/35
May.	36.4	42.4	27.6	48	31/41	19	18/59
Jun.	40.2	45.3	32.8	48	9/47	22	8/49
Jul.	38.3	43.6	31.4	46	6/47	28	4/59
Aug.	36.1	40.2	30.8	43	3/47	26	19/55
Sep.	35.2	38.3	29.4	41	4/40	23	29/40
Oct.	31.1	35.2	25.3	38	5/51	19	23/57
Nov.	25.5	29.7	19.3	33	2/33	14	29/38
Dec.	20.1	25.1	13.1	28	4/32	07	26/36
Year	29.4	45.7	9.0	48	May & June	07	Jan & Dec
No. of Years	30	30	26	30	—	—	—

Table 1.1.06-4 Normals of minimum temperatures
Station: Peshawar (PBO) (Estab: 1866)

LAT.	34°	01'N	LONG	71°	35'E	Height of ground (plot of s.s.) a.m.s.l. = 1173 ft (358 m)			
Month	Minimum temperature (°C)							Mean Temp. (X+N) 2 (°C)	Mean daily Range of Temp. (X-N) (°C)
	Mean			Extremes					
	Daily	Monthly		Highest recorded		Lowest recorded			
	Min.	Highest min.	Lowest min.	1931-60		1931-60			
				Value	Date & year	Value	Date & year		
1	2	3	4	5	6	7	8	9	10
Jan.	4.1	7.9	0.3	11	25/59	-03	22/34	10.7	13.2
Feb.	6.6	11.4	2.4	16	26/34	-01	12/50	13.1	13.1
Mar.	11.0	15.9	5.9	21	25/41	02	5/45	17.7	12.8
Apr.	15.9	21.3	10.6	27	29/41	07	9/36	22.9	13.9
May	21.8	28.1	15.8	35	18/38	12	7/60	29.1	14.6
Jun.	25.7	30.8	21.0	35	8/60	13	8/49	32.9	14.5
Jul.	26.9	30.8	22.8	33	3/53	21	10/55	32.6	11.4
Aug.	25.9	29.3	22.0	32	4/41	19	27/54	31.0	10.2
Sep.	22.7	26.7	18.4	29	9/59	14	29/40	28.9	12.5
Oct.	16.2	20.7	11.9	25	1/59	08	29/49	23.7	14.9
Nov.	9.3	13.7	5.1	16	2/51	01	34/49	17.4	16.2
Dec.	5.0	9.9	1.6	13	4/33	-02	13/37	12.5	15.1
Year	15.9	31.8	0.0	35	May, June & June	-03	22nd Jan 1934	22.7	13.5
No. of years	30	26	30	26		30		30	30

Table 1.1.06-5 Normals of cloud and wind speed (Based on data 1931-60)
Station: Peshawar (PBO) (Estab: 1866)

LAT. 34° 01'N LONG 71° 3'E					Height of anemometer above ground = 41 ft. (12 m)					
Month	Wind speed (Knots)				Cloud amount (Oktas)					
	00	03	12	Av. past 24 hrs.	All Clouds			Low Clouds		
					00	03	12	00	03	12
1	2	3	4	5	6	7	8	9	10	11
Jan.	2.7	2.2	2.1	2.0	2.8	4.6	4.2	0.5	0.9	1.2
Feb.	2.8	2.4	3.2	2.3	2.7	4.0	4.4	0.6	0.8	1.3
Mar.	2.8	2.1	3.9	2.5	3.7	4.2	4.9	1.2	1.2	2.1
Apr.	2.9	1.8	4.7	2.9	2.9	3.4	4.7	0.8	0.9	2.1
May	2.9	2.5	6.8	3.5	2.5	2.3	3.9	1.1	0.7	2.4
Jun.	2.7	2.5	7.6	3.5	1.7	1.6	3.0	0.7	0.6	2.0
Jul.	2.6	3.1	6.7	3.5	3.0	2.9	3.6	1.6	1.8	2.4
Aug.	2.7	2.9	5.7	3.2	3.1	3.3	3.5	1.6	1.8	2.5
Sep.	1.6	1.9	4.9	2.4	1.3	1.4	2.5	0.7	0.9	1.9
Oct.	1.9	1.0	2.7	2.0	0.6	0.9	1.9	0.3	0.2	1.0
Nov.	2.2	1.6	1.4	1.8	1.4	2.1	2.4	0.4	0.3	0.5
Dec.	2.3	1.9	1.3	1.9	2.3	3.4	3.8	0.3	0.6	0.8
Year	2.5	2.2	4.3	2.6	2.3	2.8	2.6	0.8	0.9	1.7
No. of years	10	17	17	30	10	30	28	10	17	17

Table 1.1.06-6 Normals of precipitation (Based on data 1931-60)

Station: Peshawar (PBO) (Estab: 1866)

LAT.	34°	01'N	LONG	71°	35'E	Height of anemometer above ground = 41 ft. (12 m)				
Month	PRECIPITATION (m.m.)									
	Mean Monthly total			Mean No. of rainy days	Total in month/year					
	03-12	12-03	03-03		Wettest		Driest		Heaviest fall in 24 hrs.	
					1931-60		1931-60		1931-60	
					Amt.	Year	Amt.	Year	Amt.	Date
1	2	3	4	5	6	7	8	9	10	11
Jan.	14.5	20.3	38.6	3.3	133.6	1942	0.8	1956	84.1	8/42
Feb.	8.9	22.6	41.1	3.6	129.8	1936	0.0	—	61.2	27/44
Mar.	23.1	41.1	64.8	5.4	197.1	1939	16.3	1942	50.3	26/34
Apr.	13.0	29.7	41.9	3.5	130.6	1957	0.0	—	54.4	2/50
May	7.9	10.4	14.5	1.6	59.2	1931	0.0	—	24.6	31/31
Jun.	2.8	5.1	6.6	0.7	46.0	1956	0.0	—	29.7	19/56
Jul.	13.2	27.4	33.8	2.3	212.9	1956	0.3	1952	76.2	17/56
Aug.	17.3	14.0	40.6	2.3	185.7	1944	0.0	—	72.9	60/45
Sep.	10.9	11.7	14.2	1.2	75.4	1959	0.5	1939	44.5	16/59
Oct.	0.0	16.5	9.9	0.9	70.6	1957	0.0	—	37.1	22/57
Nov.	6.6	12.4	9.9	0.7	111.5	1959	0.0	—	50.5	1/36
Dec.	10.4	11.9	15.2	1.3	97.5	1958	0.0	—	41.4	13/58
Year	128.8	223.3	331.2	27.0	678.9	1959	173.0	1952	84.1	8th Jan. 1942
No. of years	10	10	30	30	30		30		30	—

Table 1.1.07 Rainfall and Temperature at selected stations of Azad Jammu & Kashmir

Stations	1978	1979	1980	1981	1982	1983	1984	1985
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(a) Rainfall (Millimeters)

Muzaffarabad	1740.6	1338.0	1218.5	1664.9	1458.2	1312.2	1331.2	1376.9
Garhi Dupatta	1813.1	1231.7	1579.1	1434.4	1357.5	1660.1	1485.9	1229.6
Kotli	1624.9	1065.3	853.8	1139.9	1562.5	1350.4	1217.1	1217.3

(b) Temperature Variations ($^{\circ}\text{C}$)

Muzaffarabad

Mean of Max:	39.0	39.5	33.5	32.1	33.5	25.7	26.5	27.1
Mean of Min:	4.5	4.5	9.6	8.5	8.3	12.8	13.7	13.9

Kotli

Mean of Max:	39.5	38.5	35.0	34.2	35.2	27.5	28.4	29.3
Mean of Min:	6.5	7.5	12.3	10.6	9.5	15.0	15.4	14.8

Source:- Pakistan Meteorological Department.

Table 1.1.08 Land utilization

(Area in '000' hectares)

(Area in '000' hectares)											
Year	Total area	Area not reported	Area reported								Total area reported (Cols. 4+5 +6+9)
			Forest area	Not available for cultivation	Culturable waste	Cultivated area					
						Current fallows	Net area sown	Total area cultivated (Col. 7+8)	Area sown more than once	Total cropped area (Col. 8+10)	
1	2	3	4	5	6	7	8	9	10	11	12
1976-77	79,610	24,640	2,860	21,470	10,880	4,690	15,070	19,760	3,140	18,210	54,970
1977-78	79,610	24,650	2,890	20,920	11,050	4,880	15,220	20,100	3,270	18,490	54,960
1978-79	79,610	26,020	2,770	19,770	11,070	4,570	15,410	19,980	3,890	19,300	53,590
1979-80	79,610	25,900	2,760	18,840	11,880	4,620	15,610	20,230	3,610	19,220	53,710
1980-81	79,610	25,690	2,850	19,910	10,860	4,890	15,410	20,300	3,920	19,330	53,920
1981-82	79,610	21,700	2,810	21,960	12,720	4,890	15,530	20,400	4,250	19,780	57,910
1982-83*	79,610	21,650	2,870	21,920	12,810	4,590	15,770	20,360	4,360	20,130	57,960
1983-84*	79,610	21,580	2,890	21,990	12,720	4,670	15,760	20,430	4,320	20,000	58,030
Land utilization as a % of total area											
1983-84	100.00	27.1	3.6	27.6	16.0	5.9	19.8	25.7	5.4	25.2	72.9

Table 1.1.09 Area under agricultural crops

(000 hectares)

Year/Crops	Rice	Wheat	Bajra	Jowar	Maize	Barley	Gram	Masur	Mash	Mung
1976-77	1749.3	6390.1	648.0	446.9	624.0	174.3	1094.5	79.5	49.5	64.7
1977-78	1899.1	6360.0	641.0	519.5	656.1	166.7	1099.1	89.5	52.9	65.5
1978-79	2025.6	6687.1	658.6	469.2	650.2	177.7	1224.4	106.1	48.7	65.9
1979-80	2034.5	6923.7	561.3	423.4	701.1	159.3	1128.5	86.4	64.1	69.0
1980-81	1933.1	6983.7	405.9	393.5	769.0	259.4	842.9	72.7	68.2	67.0
1981-82	1976.0	7222.9	559.3	392.5	739.1	221.6	901.6	74.0	66.5	65.6
1982-83	1978.1	7397.9	438.1	389.7	789.8	263.1	892.9	82.3	73.8	79.0
1983-84	1998.5	7343.2	553.0	390.8	798.0	199.0	919.6	48.8	71.2	91.0
1984-85	1998.5	7258.5	605.7	394.8	808.8	190.0	1013.7	49.0	83.8	93.6
INDEX (1976-77=100)										
1976-77	100	100	100	100	100	100	100	100	100	100
1977-78	109	99	99	116	105	96	100	113	107	101
1978-79	116	105	101	105	104	102	112	133	98	102
1979-80	116	108	87	95	112	91	103	109	129	107
1980-81	110	109	63	88	123	149	77	91	138	104
1981-82	113	113	86	88	118	127	82	93	134	101
1982-83	113	116	68	87	127	151	82	104	149	122
1983-84	114	115	85	87	128	115	84	61	144	141
1984-85	114	114	94	88	130	109	93	62	169	145

Contd.

Table 1.1.09 Area under agricultural crops

(000 hectares)

Year/ Crops	Other pulses	Rapeseed & mustard	Sesamum	Cotton seed	Linseed	Ground Nut	Cotton	Jute	Sunn hemp
1976-77	245.1	518.8	30.3	1864.7	7.9	45.1	1864.7	0.8	10.2
1977-78	237.7	412.3	31.6	1843.2	10.3	50.7	1843.2	1.1	10.1
1978-79	231.6	433.0	45.9	1891.2	12.5	36.5	1891.2	1.6	7.7
1979-80	202.8	409.4	46.2	2081.0	10.3	40.8	2081.0	2.1	8.5
1980-81	201.8	417.0	44.1	2108.5	10.7	46.5	2108.5	1.3	10.5
1981-82	213.4	390.9	42.8	2214.1	9.8	59.7	2214.1	1.2	10.8
1982-83	207.4	385.5	28.5	2262.9	8.4	69.3	2262.9	1.2	10.2
1983-84	176.1	313.3	22.4	2220.7	8.7	72.6	2220.7	1.3	10.0
1984-85	175.1	346.9	34.2	2241.6	9.4	59.1	2241.6	1.1	9.2
INDEX (1976-77=100)									
1976-77	100	100	100	100	100	100	100	100	100
1977-78	97	79	104	99	130	112	99	137	99
1978-79	94	83	151	101	158	81	101	200	75
1979-80	83	79	152	112	130	90	112	262	83
1980-81	82	80	146	113	135	103	113	162	103
1981-82	87	75	141	119	124	132	119	150	106
1982-83	85	74	94	121	106	154	121	150	100
1983-84	72	60	74	119	110	161	119	162	98
1984-85	71	67	113	120	119	131	120	138	90

Table 1.1.09 Area under agricultural crops

Year/Crops	(000 hectares)							
	Sugarcane	Tobacco	Potato	Other vegetables	Garlic	Chillies	Onion	Citrus fruits
1976-77	787.8	50.5	25.7	108.0	2.0	50.1	30.2	74.4
1977-78	822.5	53.2	29.8	118.1	4.1	51.7	31.8	79.8
1978-79	752.5	47.7	37.7	127.0	4.9	61.5	38.7	72.2
1979-80	718.5	49.9	42.9	115.6	5.1	55.5	41.9	86.7
1980-81	824.7	42.9	38.0	123.3	4.9	64.0	43.2	94.5
1981-82	946.7	43.1	45.3	127.8	5.4	59.2	43.4	118.0
1982-83	911.7	41.3	51.5	144.3	6.4	63.3	45.3	124.7
1983-84	896.5	46.2	49.6	150.3	6.4	69.4	47.4	136.2
1984-85	903.6	50.2	54.5	150.2	6.6(p)	66.6(p)	48.2	144.1(p)
INDEX (1976-77=100)								
1976-77	100	100	100	100	100	100	100	100
1977-78	104	105	116	109	205	103	105	107
1978-79	95	94	147	118	241	123	128	97
1979-80	91	99	167	107	255	131	139	116
1980-81	105	85	148	114	245	128	143	127
1981-82	120	85	176	118	270	118	144	159
1982-83	116	82	200	134	320	126	150	168
1983-84	114	91	193	139	320	139	157	183
1984-85	115	99	212	139	330	133	160	194

Table 1.1.09 Area under agricultural crops

Year/Crops	(000 hectares)					
	Banana	Mango	Apple	Guava	Grapes	Dates
1976-77	12.4	57.2	8.8	15.2	2.4	24.3
1977-78	14.4	62.3	9.7	18.0	2.5	22.9
1978-79	15.2	59.3	10.3	17.5	2.5	22.6
1979-80	14.2	57.4	10.8	16.2	2.5	23.1
1980-81	14.8	57.2	11.4	17.3	2.5	24.2
1981-82	15.2	65.4	11.9	27.2	2.6	27.9
1982-83	15.2	67.8	12.9	34.3	2.7	30.5
1983-84	15.4	71.0	13.3	36.9	2.8	33.1
1984-85	15.7	73.0	14.8	38.6	2.8	33.1
INDEX (1976-77=100)						
1976-77	100	100	100	100	100	100
1977-78	116	109	110	118	104	94
1978-79	123	104	117	115	104	93
1979-80	114	100	123	107	104	95
1980-81	119	100	29	107	104	99
1981-82	123	114	135	179	108	115
1982-83	123	119	147	226	112	125
1983-84	124	124	151	243	117	137
1984-85	127	128	168	254	117	136

1.1.10 Production of agricultural crops

(000 tonnes)

Year/Crops	Rice	Wheat	Bajra	Jowar	Maize	Barley	Gram	Masur	Mash
1976-77	2737.4	9143.9	310.8	261.3	763.8	123.6	649.4	30.6	24.9
1977-78	2949.6	8367.2	318.3	284.1	820.9	120.6	613.5	33.5	27.2
1978-79	3272.0	9950.0	317.4	252.4	798.6	129.3	537.8	39.0	24.5
1979-80	3215.8	10,856.5	277.3	249.1	875.2	118.1	313.4	36.5	33.3
1980-81	3123.2	11,474.6	214.0	229.8	270.4	175.5	336.9	29.5	33.9
1981-82	3429.7	11,304.2	272.4	224.6	930.4	157.5	293.7	31.4	32.8
1982-83	3444.7	12,414.4	219.9	221.9	1005.4	185.3	491.0	29.9	36.3
1983-84	3339.5	10,881.9	256.2	222.1	1013.5	139.5	521.9	21.7	39.4
1984-85	3315.2	11,703.0	283.7	230.4	1027.6	131.6	523.7	25.9	47.3
INDEX (1976-77=100)									
1976-77	100	100	100	100	100	100	100	100	100
1977-78	108	91	102	109	107	98	94	109	109
1978-79	119	109	102	97	104	105	83	127	98
1979-80	117	119	89	95	115	95	48	119	134
1980-81	114	125	69	88	127	142	52	96	136
1981-82	125	124	88	86	122	127	45	103	132
1982-83	126	136	71	85	132	150	76	98	146
1983-84	122	119	82	85	133	113	80	71	158
1984-85	121	128	91	88	135	107	82	85	190

Contd.

1.1.10 Production of agricultural crops

(000 tonnes)

Year/Crops	Mung	Other pulses	Rapeseed & mustard	Sesamum	Cotton seed	Linseed	Ground nut	Cotton	Jute
1976-77	29.7	108.9	296.4	12.0	869.8	4.4	64.1	434.9	0.6
1977-78	30.8	106.6	236.1	12.6	1149.7	5.6	72.4	574.8	0.9
1978-79	30.0	104.5	248.2	18.7	946.5	6.6	45.5	473.2	1.5
1979-80	32.7	94.4	247.1	19.3	1456.5	6.3	50.3	728.2	2.0
1980-81	31.8	93.4	252.5	18.3	1428.9	6.5	57.4	714.5	1.0
1981-82	31.6	98.7	238.8	16.6	1496.0	5.9	72.2	748.0	1.0
1982-83	39.6	96.9	246.0	10.8	1647.6	5.1	84.1	823.9	1.0
1983-84	41.8	85.1	217.0	8.8	989.1	5.0	88.0	494.5	1.1
1984-85	44.6	83.9	234.8	13.5	2017.1	5.2	69.1	1008.6	1.0
INDEX (1976-77=100)									
1976-77	100	100	100	100	100	100	100	100	100
1977-78	104	98	80	105	132	127	113	132	150
1978-79	101	96	84	156	109	150	71	109	250
1979-80	110	87	83	161	167	143	78	167	333
1980-81	107	86	85	152	164	148	89	164	166
1981-82	106	91	80	138	172	134	113	172	166
1982-83	133	86	83	90	189	116	131	189	166
1983-84	141	78	73	73	114	114	137	114	183
1984-85	150	77	79	113	232	118	108	232	167

1.1.10 Production of agricultural crops

(000 tonnes)

Year/Corps	Sunn hemp	Sugarcane	Tobacco	Potato	Other vegetables	Garlic	Chillies	Onion	Citrus fruits
1976-77	7.0	29523.0	72.6	318.0	1325.4	18.0	78.1	331.5	711.3
1977-78	7.0	30076.6	74.4	293.5	1460.5	32.0	81.2	325.4	623.1
1978-79	5.5	27325.5	68.1	392.4	1586.7	38.4	98.4	389.7	737.1
1979-80	5.5	27497.7	77.8	448.5	1432.8	38.8	109.0	434.0	870.6
1980-81	6.9	32359.4	67.2	394.3	1549.3	38.9	106.2	447.6	926.2
1981-82	6.9	36579.7	69.2	476.6	1616.0	41.5	99.8	451.8	1159.8
1982-83	6.7	32533.5	64.7	518.1	1802.6	51.3	103.8	474.8	1245.1
1983-84	6.8	34287.3	79.6	509.8	1917.6	51.4	96.9	503.4	1300.3
1984-85	6.3	32139.6	87.2	543.4	1906.7	53.4(P)	950.0(P)	514.6	1372.9(P)
INDEX (1976-77-100)									
1976-77	100	100	100	100	100	100	100	100	100
1977-78	100	102	102	92	110	178	104	98	88
1978-79	79	92	94	123	120	213	126	117	104
1979-80	79	93	107	141	108	215	139	131	122
1980-81	99	110	92	124	117	205	136	135	130
1981-82	99	124	95	150	122	230	128	136	163
1982-83	96	110	89	163	136	285	133	143	175
1983-84	97	116	110	160	145	285	124	152	183
1984-85	90	109	120	171	144	297	122	155	198

1.1.10 Production of agricultural crops

Year/Crops	(000 tonnes)					
	Banana	Mango	Apple	Guava	Grapes	Dates
1976-77	116.6	578.9	74.8	100.2	28.5	202.0
1977-78	123.4	561.1	87.7	124.1	29.3	197.9
1978-79	130.5	538.4	93.7	124.1	28.7	197.8
1979-80	125.3	550.2	99.2	116.9	29.2	198.4
1980-81	130.8	546.6	107.4	123.6	26.2	194.1
1981-82	131.5	651.7	114.1	197.5	26.2	214.5
1982-83	134.4	682.6	128.6	252.5	26.1	223.7
1983-84	134.8	673.1	128.1	275.5	26.4	230.7
1984-85	136.7	691.9	142.6	288.0	26.9	234.2
INDEX (1976-77=100)						
1976-77	100	100	100	100	100	100
1977-78	106	97	117	124	103	98
1978-79	112	93	125	124	101	98
1979-80	107	95	133	117	102	98
1980-81	112	94	143	123	92	96
1981-82	113	113	152	197	92	106
1982-83	115	118	172	252	92	111
1983-84	116	116	171	275	93	114
1984-85	117	120	191	287	94	116

Source:- Food & Agriculture Division.

1.1.11 Yield of agricultural crops

Year/Crops	(Kilogram per hectare)								
	Rice	Wheat	Bajra	Jowar	Maize	Barley	Gram	Masur	Mash
1976-77	1,565	1,431	480	585	1,224	709	593	385	503
1977-78	1,553	1,316	497	547	1,251	724	558	374	515
1978-79	1,615	1,488	482	538	1,228	728	439	369	504
1979-80	1,581	1,568	494	588	1,248	741	278	422	518
1980-81	1,616	1,643	527	584	1,262	677	400	406	497
1981-82	1,736	1,565	487	572	1,259	711	326	424	492
1982-83	1,741	1,678	502	569	1,273	704	550	364	492
1983-84	1,671	1,482	463	568	1,270	698	568	445	553
1984-85	1,659	1,612	468	584	1,271	693	517	529	564

INDEX (1976-77=100)

1976-77	100	100	100	100	100	100	100	100	100
1977-78	99	92	103	93	102	102	94	97	102
1978-79	103	104	100	92	100	103	74	96	100
1979-80	101	110	103	100	102	104	46	110	103
1980-81	103	115	110	99	103	95	67	105	99
1981-82	111	109	101	98	103	100	55	110	98
1982-83	111	117	105	97	104	99	93	94	98
1983-84	107	104	96	97	104	98	96	116	110
1984-85	106	113	98	100	104	98	87	137	112

1.1.11 Yield of agricultural crops

(Kilogram per hectare)

Year/Crops	Mung	Other pulses	Rapeseed & mustard	Sesamun	Cotton seed	linseed	Ground nut	Cotton	Jute
1976-77	459	444	572	397	466	553	1,421	233	799
1977-78	470	448	573	399	624	547	1,428	312	793
1978-79	454	451	573	409	500	531	1,245	250	922
1979-80	473	465	604	419	700	609	1,233	350	970
1980-81	475	463	606	414	678	608	1,234	339	741
1981-82	482	463	611	388	676	602	1,208	338	838
1982-83	502	467	638	379	728	601	1,214	364	826
1983-84	459	483	693	394	446	571	1,213	223	871
1984-85	476	530	677	397	900	549	1,057	450	835

INDED (1976-77=100)

1976-77	100	100	100	100	100	100	100	100	100
1977-78	102	101	100	100	133	98	100	133	99
1978-79	99	101	100	103	107	96	87	107	115
1979-80	103	104	105	105	150	109	86	150	121
1980-81	103	104	105	104	145	109	86	145	92
1981-82	105	104	106	97	145	108	85	156	104
1982-83	109	105	111	95	156	108	85	156	103
1983-84	100	109	121	99	95	103	85	95	109
1984-85	104	119	118	100	193	99	74	193	105

Table 1.1.11 Yield of agricultural crops

Year/Crops	(Kilogram per hectare)								
	Sunnhemp	Sugarcane	Tobacco	Potato	Other vegetables	Garlic	Chillies	Onion	Citrus fruits
1976-77	690	37,475	1,437	12,373	12,272	9,000	1,559	10,977	9,560
1977-78	696	36,567	1,399	9,849	12,367	7,805	1,571	10,233	7,808
1978-79	723	36,313	1,429	10,408	12,494	7,837	1,600	10,070	10,209
1979-80	648	38,271	1,561	10,454	12,394	7,608	1,664	10,358	10,041
1980-81	654	39,238	1,567	10,376	12,565	7,531	1,659	10,361	9,801
1981-82	637	38,639	1,604	10,521	12,645	7,685	1,686	10,410	9,829
1982-83	654	35,684	1,565	10,060	12,492	8,016	1,640	10,481	9,985
1983-84	675	38,246	1,724	10,278	12,758	8,031	1,396	10,620	9,547
1984-85	640	35,568	1,737	9,971	—	—	—	10,676	—

INDEX (1976-77=100)

1976-77	100	100	100	100	100	100	100	100	100
1977-78	100	97	97	79	100	86	100	93	81
1978-79	104	96	99	84	101	87	102	91	106
1979-80	93	102	108	84	100	84	106	94	105
1980-81	94	104	109	83	102	83	106	94	102
1981-82	92	103	111	85	103	85	108	94	103
1982-83	94	95	108	81	101	89	105	95	104
1983-84	97	102	119	83	104	89	89	97	100
1984-85	93	95	121	81	—	—	—	97	—

Table 1.1.11 Yield of agricultural crops

Year/Crops	(Kilogram per hectare)					
	Banana	Mango	Apple	Guava	Grapes	Dates
1976-77	9,403	10,121	8,500	6,592	11,875	8,313
1977-78	8,569	9,006	9,041	6,894	11,720	8,642
1978-79	8,585	9,079	9,097	7,091	11,480	8,752
1979-80	8,824	9,585	9,185	7,216	11,680	8,589
1980-81	8,838	9,556	9,421	7,145	10,480	8,021
1981-82	8,651	9,965	9,588	7,261	10,077	7,688
1982-83	8,842	10,068	9,969	7,362	9,667	7,334
1983-84	8,753	9,480	9,632	7,466	9,424	7,120
1984-85	8,707	9,478	9,635	7,461	9,607	7,075

INDEX (1976-77=100)

1976-77	100	100	100	100	100	100
1977-78	91	89	106	105	99	104
1978-79	91	90	107	108	97	105
1979-80	94	95	108	109	98	103
1980-81	94	94	110	108	88	96
1981-82	92	98	113	110	85	92
1982-83	94	99	117	112	81	88
1983-84	93	94	113	113	79	86
1984-85	93	94	113	113	81	85

Source: Food & Agriculture Division.

Table 1.1.12 Crop production and plan targets

(Million tonnes)					
Crops	Computed benchmarks	1983-84	1984-85	Targets 1987-88	Percentage increase over computed benchmarks (overall)
Grains	16.72	15.85	16.69	21.80	30
Wheat	11.80	10.88	11.70	15.50	31
Rice	3.31	3.44	3.32	4.20	27
Maize	0.97	1.01	1.03	1.38	42
Others	0.64	0.62	0.66	0.72	12
Cotton	0.82	0.50	1.01	1.03	26
(Million bales)	(4.83)	2.91	5.93	6.07	
Sugarcane	35.00	34.29	32.14	40.94	17
Tobacco	0.07	0.08	0.09	0.10	43
Oilseeds	2.00	1.32	2.35	2.86	43
Cotton Seed	1.64	0.99	2.02	2.07	26
Traditional	0.33	0.32	0.32	0.44	33
Non-traditional	0.03	0.01	0.01	0.35	1066
Pulses	0.70	0.71	0.72	0.79	13
Gram	0.50	0.52	0.52	0.58	16
Others	0.20	0.19	0.20	0.21	5
Onion	0.45	0.50	0.52	0.80	77
Potato	0.46	0.51	0.54	0.85	85
Fruit	2.20	2.77	2.89	3.59	63

Source: (i) Planning Commission (Sixth Five Year Plan P.109).
(ii) Food and Agriculture Division.

Table 1.1.13 Crop production inputs: benchmarks and plan targets

Inputs	Unit	1983-84	1984-85	1987-88 target	Annual increase rate	
					Sixth plan (1983-88)	Fifth plan (1978-83)
Water availability	(MAF)	103.69	102.81	112.77	2.1	2.5
Fertilizer Off-take	(000 Nut. tonnes)	1,203	1,253	1,828	8.0	11.6
Improved seed distribution	(000 tonnes)	101	95	186	10.1	10.8
Plant protection coverage	(000 hectares)	1,105.5	1,384.7	3,253	15.0	19.7
Mechanization (Operational Tractors-cummulative)	(000 tractors)	162.9	184.9	337	19.7	22.1

Source: i) Planning Commission
(Sixth Five Year Plan-p.111
and the mid-plan review of the
Sixth Five Year Plan-p.104)
ii) Provincial Agriculture
Departments.

Table 1.1.14 Role of farm inputs in increased output

Inputs/Factors	(Percent)					
	Wheat	Rice	Maize	Sugarcane	Cotton	Average
Area due to water	11	27	15	—	—	16
Fertilizer	61	19	68	56	69	48
Plant Protection	—	14	4	18	17	7
Improved seed	2	5	3	—	6	3
Transfer of Technology:						
(a) Shift of area to improved varieties	16	17	—	—	—	16
(b) Cultural practices	10	18	10	26	8	10
Total	100	100	100	100	100	100

Source: Planning Commission (Sixth Five Year Plan; p.110)

Table 1.1.15 Crop production performance during fifth plan

C r o p s	(Million tonnes)						
	Achievements			Fifth plan targets 1982-83	Additional output in fifth plan		% age of additional output realised
	1977-78 Actual	1981-82 Actual	1982-83 Actual		Envisaged	Realised	
Grains	12.86	16.16	17.39	19.02	5.70	4.53	79
Wheat	8.37	11.14	12.34	13.01	4.16	3.97	95
Rice	2.95	3.43	3.44	3.96	1.01	0.49	48
Maize	0.82	0.93	0.01	1.22	0.41	0.19	46
Others	0.72	0.66	0.60	0.83	0.12	(-) 0.12	(-) 100
Cash crops	30.66	37.33	33.35	35.74	6.70	2.69	40
Cotton (lint)	0.58	0.75	0.82	0.89	0.30	0.24	80
Sugarcane	30.08	36.58	32.53	34.85	6.40	2.45	38
Oilseeds	1.48	1.86	2.08	2.51	0.94	0.60	64
Cotton seed	1.16	1.50	1.64	1.78	0.60	0.48	80
Traditional oilseeds	0.32	0.34	0.42	0.54	0.16	0.10	63
Non-traditional oilseeds	..	0.02	0.02	0.19	0.18	0.02	11
Pulses	0.81	0.48	0.71	1.14	0.30	(-) 0.10	(-) 33
Gram	0.61	0.29	0.50	0.84	0.18	(-) 0.11	(-) 61
Others	0.20	0.19	0.21	0.30	0.12	0.01	8
Vegetables and spices	2.21	2.67	2.73	3.38	0.98	0.52	53
Onion	0.33	0.45	0.48	0.52	0.19	0.15	79
Potato	0.29	0.48	0.52	0.70	0.31	0.23	74
Others	1.59	1.74	1.73	2.16	0.48	0.14	29
Fruits	2.09	2.78	2.68	2.98	0.73	0.59	81

Source: Planning Commission (Sixth Five Year Plan; p. 105)

Table 1.1.16 Change of cropping pattern during sixth plan

Crops	Percentage share in cropped area		Additional area	Percentage of additional area
	Benchmarks	1987-88	(000 hectares)	
Grains	55.79	54.67	498	38.0
Wheat	36.25	35.13	240	18.3
Rice	9.95	10.02	146	11.1
Other grains	9.59	9.52	112	8.6
Cotton	11.51	10.78	—	—
Oilseeds excluding cotton seed	2.85	4.56	393	30.0
Pulses	7.38	7.33	86	6.6
Vegetables, spices & fruits	2.68	3.69	248	18.9
Sugarcane	4.29	4.02	—	—
Others including fodder	15.50	14.95	85	6.5
	100.00	100.00	1,310	100.00

Source: Planning Commission (Sixth Five Year Plan; P. 08).

Table 1.1.17 Livestock population

Species	(Million numbers)							
	1975-76	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86 (Estimated)
Buffalo	10.6	11.6	11.6	12.2	12.5	12.8	13.1	13.4
Cattle	14.9	15.6	15.8	16.0	16.2	16.4	16.5	16.7
Goat	21.7	25.0	25.8	26.8	27.7	28.7	29.7	30.8
Sheep	18.9	21.4	22.1	22.8	23.5	24.3	25.0	25.8
Poultry	44.9	62.6	67.4	73.5	89.5	100.6	113.7	128.7
Camel	0.79	0.84	0.86	0.87	0.88	0.90	0.91	0.93
Donkey	2.16	2.41	2.48	2.55	2.63	2.70	2.78	2.86
Horse	0.44	0.44	0.45	0.45	0.45	0.45	0.45	0.45
Mule	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07

Table 1.1.18 Livestock products

Products	Unit	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86 (Estimated)
Milk production	Million tonnes	9.3	9.5	9.7	10.2	10.9	11.5
Milk available for consumption	Million tonnes	7.5	7.6	7.8	8.3	8.8	9.3
Beef	000 tonnes	434	448	464	488	513	539
Mutton	000 tonnes	370	389	408	436	467	500
Poultry meat	000 tonnes	52	57	75	86	99	114
Eggs	Million nos.	2,319	2,664	3,200	3,619	4,093	4,630
Hides	Million nos.	4.96	5.05	5.15	5.25	5.35	5.45
Skins	Millions nos.	26.95	27.86	28.81	29.78	30.80	31.83
Wool	000 tonnes	38.9	40.7	42.7	45.1	47.7	50.34
Hair	000 tonnes	5.3	5.5	5.8	6.2	6.6	7.0
Casings	Million nos.	3.1	3.1	3.2	3.3	3.3	3.4
Guts	Million nos.	16.0	16.6	17.1	17.7	18.3	18.9
Bones	000 tonnes	194.0	198.6	203.3	208.1	213.1	218.2
Fat	000 tonnes	68.3	71.4	74.7	79.3	84.1	89.2
Blood	000 tonnes	21.5	22.50	23.9	25.5	27.2	29.0

Note:- Estimates based on average growth rates of agricultural livestock censuses of 1945, 1955, 1960, 1972 and 1976.

Source: Livestock Division.

Table 1.1.19 Production targets for livestock products

Commodity	Unit	Benchmarks	1984-85	Production targets 1987-88	Percent increase over plan period	Percent annual increase
Milk	000 tonnes	9,660	10,900	12,900	34	6.0
Meat (beef/mutton)	000 tonnes	870	980	1,165	34	6.0
Poultry meat	000 tonnes	70	99	140	100	14.9
Eggs	Million nos.	3,200	4,093	5,900	84	13.0
Wool	000 tonnes	40	48.00	55	38	6.6

Source: Planning Commission (Sixth Five Year Plan; p. 133)

Table 1.1.20 Per capita availability of major livestock products

Products	Unit	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85 Estimates
Milk	Kg.	90	89	88	88	90	92
Meat (excluding fish)	Kg.	10.1	10.2	10.3	10.6	11.0	11.4
Eggs	Nos.	26	28	31	36	39	43

Source: Livestock Division

Table 1.1.21 Installed capacity of fertilizers production

Particulars	Product	(Nutrient Tonnes)	
		Nitrogen	Phosphorus
<u>Existing capacity:</u>			
1. Pak-American Fertilizer Ltd., Iskanderabad (Daudkhel)	A.S.	18,900	
2. Pak-Arab Fertilizers Ltd., Multan	Urea	27,324	
	CAN	117,000	
	NP.	70,035	70,035
3. Pak-Saudi Fertilizers Ltd., Mirpur Mathelo	Urea	256,200	
4. EXXON Chemicals Dharki	Urea	79,580	
5. Dawood Hercules Chemicals Ltd., Lahore	Urea	160,080	
6. Pak-China Fertilizers Ltd., Haripur (Hazara)	Urea	44,022	
7. Fauji Fertilizers Co., Sadiqabad	Urea	262,200	
8. Faisalabad Chemical and Fertilizers Ltd. Jaranwala/Faisalabad	Super Phosphate	—	18,000
	Total:	<u>1,035,341</u>	<u>88,035</u>
<u>Projected additional capacity by 1985-86:</u>			
1. Pak-American Fertilizers Ltd., Iskanderabad (additional capacity after revamping)	A.S.	1,050	
2. Pak-Arab Fertilizers Ltd., Multan (additional capacity after modernization and expansion)	Urea	<u>15,180</u>	
	Total:	<u>16,230</u>	
Total projected capacity by 1985-86:		<u>1,051,571</u>	

Source: Planning Commission (Sixth Five Year Plan; p.161)

Table 1.1.22 Production of chemical fertilizers in Pakistan

('000' tonnes)

Year	Urea	Ammonium-nitrate	Ammonium-sulphate	Super-phosphate	Nitro-phosphate	Total
1977-78	594.9	47.1	95.6	75.0	- -	812.6
1978-79	620.5	81.1	97.9	98.5	40.4	938.4
1979-80	640.5	199.0	98.9	101.2	137.2	1176.8
1980-81	962.9	272.7	96.6	101.8	171.2	1605.2
1981-82	1223.5	321.4	94.0	102.7	210.5	1952.1
1982-83	1831.8	339.4	61.2	104.2	238.4	2575.0
1983-84	1797.6	383.0	73.0	105.7	316.5	2675.8
1984-85	1814.7	406.4	79.0	105.8	308.3	2714.2

Source: Central Board of Revenue

Table 1.1.23 Crop-wise usage of fertilizers

Year	(000 nutrient tonnes)						Total
	Wheat	Rice	Maize	Cotton	Sugarcane	Others	
1977-78	345	81	50	115	79	42	712
1978-79	422	106	62	141	79	70	880
1979-80	502	125	73	167	94	83	1,044
1980-81	518	129	76	173	97	86	1,079
1981-82	539	108	75	162	86	108	1,078
1982-83	622	124	87	187	100	124	1,244
1983-84	602	120	84	181	96	120	1,203
1984-85	627	125	88	188	100	125	1,253

Source: National Fertilizer Development Centre.

Table 1.1.24 Total import of fertilizers

Year	Quantity '000' tonnes	Value (million rupees)
1976-77	527.0	793.0
1977-78	1,103.9	1,694.9
1978-79	1,444.7	2,713.9
1979-80	1,554.3	3,888.9
1980-81	1,090.5	2,951.5
1981-82	413.1	1,089.9
1982-83	705.5	2,291.5
1983-84	475.0	1,403.3
1984-85	564.7	1,393.8

Source: Food & Agriculture Division, Planning Unit.

Table 1.1.25 Area irrigated by different sources

Year	Total cultivated	Total irrigated	(Area in million hectares)					
			Canals		Tube-wells	Wells	Tanks	Others
			Government	Private				
1976-77	19.76	13.83	9.73	0.37	2.69	0.45	..	0.59
1977-78	20.10	14.22	10.06	0.37	2.79	0.35	..	0.65
1978-79	19.98	14.47	9.64	0.37	3.49	0.26	..	0.71
1979-80	20.23	14.74	10.39	0.35	2.74	0.34	0.05	0.87
1980-81	20.30	14.90	10.71	0.38	2.81	0.32	0.07	0.61
1981-82	20.42	15.39	11.02	0.41	2.99	0.31	0.06	0.60
1982-83*	20.36	15.45	11.04	0.37	3.01	0.32	0.06	0.65
1983-84	20.43	15.42	11.02	0.35	3.02	0.32	0.06	0.65

Source: Food & Agriculture Division.

Table 1.1.26 Area Covered by ground and aerial plant protection operations

(Million spray hectares)

Year	Punjab	Sind	N.W.F.P.	Baluchistan	Total
<u>Ground operation</u>					
1976-77	1.576	0.315	0.299	0.050	2.240
1977-78	1.414	0.401	0.338	0.060	2.213
1978-79	1.407	0.578	0.324	0.069	2.378
1979-80	1.113	0.398	0.487	0.081	2.079
1980-81	0.631	0.584	0.303	0.085	1.603
1981-82	1.066	0.945	0.615	0.066	2.692
1982-83	1.207	1.105	0.401	0.026	2.739
1983-84	1.660	0.809	0.179	0.055	2.703
1984-85	1.457	0.771	0.271	0.051	2.550
<u>Aerial operation</u>					
1976-77	1.291	0.603	0.292	0.010	2.196
1977-78	0.763	0.247	0.298	0.001	1.309
1978-79	0.415	0.178	0.274	0.045	0.912
1979-80	0.044	0.097	0.223	0.018	0.382
1980-81	0.032	--	0.145	0.066	0.243
1981-82	--	--	0.138	0.086	0.224
1982-83	--	--	0.183	0.090	0.273
1983-84	--	--	0.206	0.070	0.276
1984-85	--	--	0.222	0.091	0.313

Source: Provincial Agriculture Department,
Plant Protection Department.

Table 1.1.27 Number of tractors imported in Pakistan

Year	Number	Cumulative number
1976-77	15,554	75,949
1977-78	11,902	87,851
1978-79	15,178	103,029
1979-80	19,313	122,342
1980-81	16,137	138,479
1981-82	19,293	157,772
1982-83	22,913	180,685
1983-84	24,161	204,846
1984-85	20,554	234,400

Source: Ministry of Food, Agriculture and
Co-operatives, Government of
Pakistan, Islamabad.

Table 1.1.28 Commodity-wise storage capacity

Commodity	Fifth plan targets	Fifth plan achievements	Total capacity available by 1982-83	Total capacity available by 1984-85	Sixth plan targets	(Million tonnes)
						Total capacity available by 1987-88
Wheat	2.22	1.70	3.35	3.56	2.15	5.50
Rice	0.17	0.15	0.84	0.04	0.66	1.50
Cotton	0.07	0.05	0.05	0.03	0.25	0.30
Total	2.46	1.90	4.24	3.63	3.06	7.30

Source: Planning Commission. (Sixth Five Year Plan; p. 122)

Table 1.1.29 Total catch of fish

Year	Total	Inland	Marine	(Thousand metric tons)		
				Index 1976=100		
				Total	Inland	Marine
1976(a)	205.6	28.4	177.2	100.0	100.0	100.0
1977(a)	267.9	33.1	234.8	130.3	116.5	133.5
1978(a)	293.0	35.2	257.8	142.5	123.9	145.5
1979(a)	300.3	40.7	259.6	146.1	143.3	146.5
1980(a)	279.2	46.3	232.9	135.8	163.0	131.4
1981(a)	317.8	56.3	261.5	154.6	198.2	147.6
1982(a)	337.2	59.1	278.1	164.0	208.1	156.9
1983(a)	343.4	60.4	283.0	167.0	212.7	159.7
1984(a)	378.7	70.6	308.0	184.2	248.6	173.8
1985*	392.6	75.1	317.1	190.9	264.4	178.9

(a) Includes subsistence catch.

Source: Directorate of Marine Fisheries, Livestock Division.

Table 1.1.30 Fish production targets

Source	Production 1977-78	Targets 1982-83	Estimated production 1982-83	1983-84	1984-85	Targets 1987-88	(000 tonnes)	
							Percent Fifth plan	Increase Sixth plan
Marine	234	289	272	283	318	361	16.2	32.7
Inland	33	49	60	60	64	66	81.8	10.0
Total:	267	338	332	343	382	427	24.3	28.6

Source: Planning Commission (Sixth Five Year Plan p. 134)

Table 1.1.31 Fishermen engaged in marine and inland fisheries

Year				(Number)	
	Marine			Inland	Grand total
	Karachi and Sind coasts	Baluchistan coast	Total		
1957	32,938	12,588	45,526	34,000	79,526
1960	44,438	15,785	60,223	40,000	100,223
1965	52,153	17,961	70,114	44,000	114,114
1970	61,000	28,600	89,600	73,180	162,780
1975	73,500	25,200	98,700	108,597	207,297
1976	74,100	17,868	91,968	113,903	205,871
1977	75,200	17,636	92,836	124,337	217,173
1978	80,800	17,427	98,227	130,183	228,410
1979	86,400	16,964	103,364	135,725	239,089
1980	54,896	19,625	74,521	116,935	191,456
1981	60,771	21,034	81,805	118,098	199,903
1982	63,050	21,431	84,481	120,906	205,387
1983	63,525	21,531	85,056	124,375	209,431
1984	64,795	22,027	86,822	131,760	218,582
1985*	65,000	22,000	87,000	130,920	217,920

Source: Directorate of Marine Fisheries, Livestock Division.

Table 1.1.32 Fishing crafts

(Number)

Year	Marine										Inland	Total
	Karachi and Sind coasts					Baluchistan coast						
	Traw- lers	Gillnet- ter	Mecha- nized- cum sail- boats	Sail boats	Total	Traw- lers	Gillnet- ter	Mecha- nized- cum- sail- boats	Sail boats	Total	Sail boats	
1955	2	52	---	955	1,009	---	---	---	1,400	1,400	1,000	3,409
1960	86	146	---	1,100	1,332	---	14	---	1,961	1,975	1,700	5,007
1965	258	490	---	2,794	3,542	2	20	---	1,933	1,955	2,500	7,997
1970	443	659	---	3,339	4,441	---	48	---	2,004	2,052	4,933	11,426
1975	1,098	752	230	3,978	6,058	---	63	---	2,249	2,312	7,431	15,801
1976	1,130	825	250	4,000	6,205	---	40	158	2,070	2,268	7,972	16,445
1977	1,151	840	267	4,152	6,410	---	42	330	2,014	2,386	8,107	16,903
1978	1,270	859	327	4,191	6,647	---	42	677	1,673	2,392	8,487	17,526
1979	1,280	863	377	4,247	6,676	---	42	758	1,661	2,461	8,908	18,136
1980	1,296	888	487	4,220	6,891	---	21	846	1,639	2,506	16,391	25,788
1981	1,315	904	637	4,270	7,126	---	14	1,307	1,208	2,529	9,954	19,609
1982	1,380	933	1,736	2,754	6,794	---	18	1,895	652	2,565	10,185	15,544
1983	1,431	1,019	1,770	2,769	6,989	---	106	2,020	473	2,599	16,189	25,777
1984	1,539	1,047	2,000	2,539	7,125	---	136	2,163	343	2,642	11,572	21,339

Source: Directorate of Marine Fisheries, Livestock Division.

Table 1.1.33 Utilization of Capacities of Fish Processing Plant

Type of Plant	Plant Installed in				Installed Capacity per 24 hours M. T.			
	1981	1982	1983	1984	1981	1982	1983	1984
A: Freezing	17	20	20	21	180.85	265.75	265.75	273.75
B: Canning	11	11	11	11	87.29	106.29	106.29	106.29
C: Fish-meal	11	11	11	11	163.00	163.00	163.00	163.00
D: Oil Extracton	01	01	—	01	05.00	05.00	—	05.00
E: Dehydration	01	01	—	01	05.00	05.00	—	05.00
Total	41	44	42	45	441.14	545.04	534.04	553.04

Ttpe of plant	Plant in Operation				Operational Capacity 24 Hours (Metric Tons)			
	1981	1982	1983	1984	1981	1982	1983	1984
A: Freezing	13	16	16	17	140.35	225.25	225.25	233.25
B: Canning	9	4	4	4	78.26	52.07	52.07	52.07
C: Fish Meal	8	8	8	8	107.00	107.00	107.00	107.00
D: Oil Extraction	—	—	—	—	—	—	—	—
E: Dehydration	—	—	—	—	—	—	—	—
Total :-	30	28	28	29	325.61	384.32	384.32	392.32

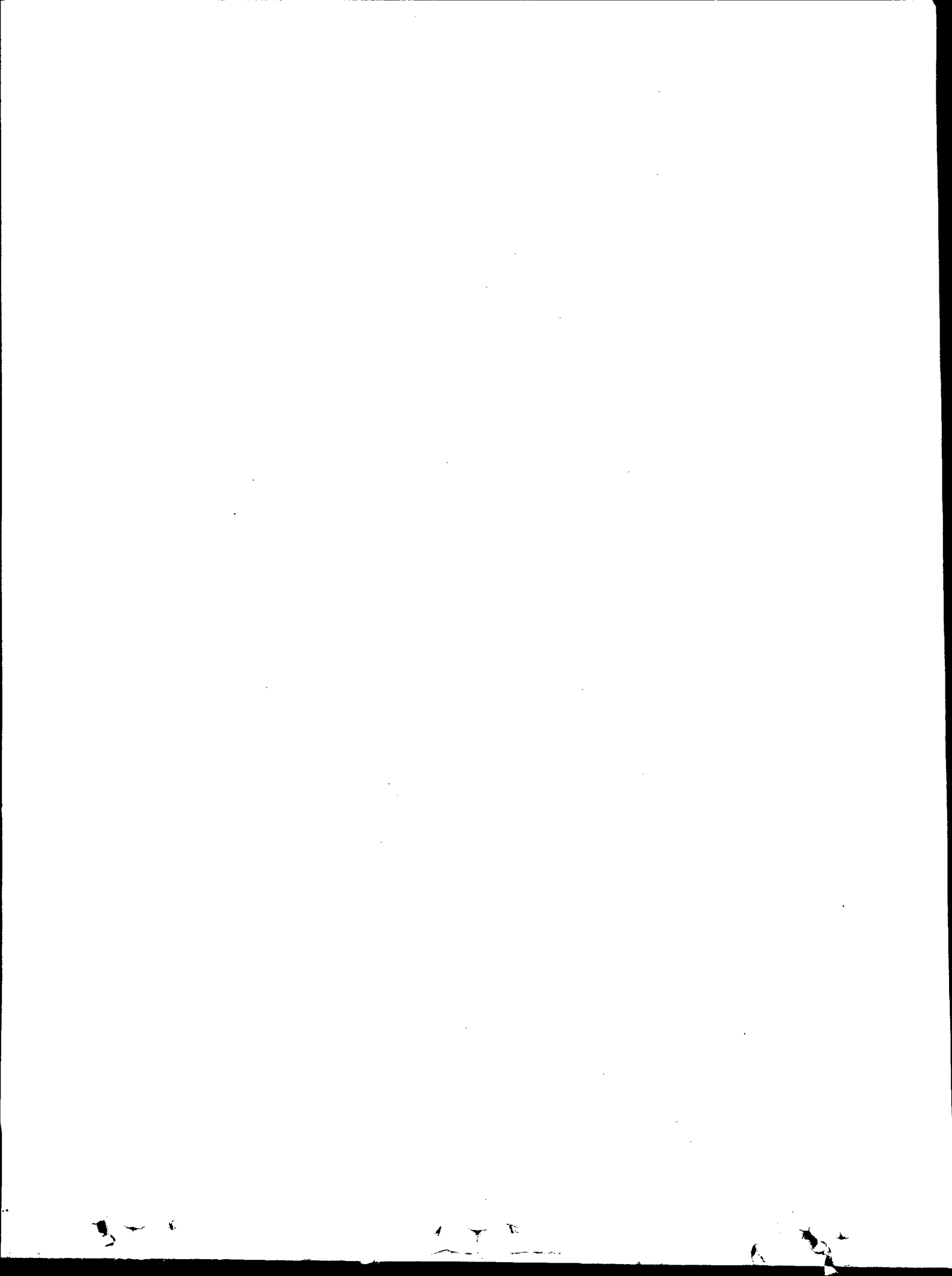
Table 1.1.34 Fish stocks, their assessments & yields

S.No.	Fish	Stocks in Pakistan	Potential Pakistan	Yields for Baluchistan	(In metric tons)	
					Yields (1982) Baluchistan	Capacity of potential increase for Baluchistan
1.	<u>Cartilaginous fish</u> Sharks (Carcharidae) several species, Sting rays (Dasyatidae, several species, Skates (Rajidae)	130,000	65,000	32,500	13,473.83 (Valued at Rs 13418611.00)	Approx. 19,500.00
2.	<u>Small pelagic fish</u> (Outside 15 metre isobath) several species of Sardines, Shads & Herring like fish of Clupeidae. Pomfrets (Stromateidae) & Cobias.	580,000	250,000	125,000	10,221.43 (Valued at Rs 18449521.00)	1,14,780.00
3.	<u>Large Pelagic fish</u> (Outside 15m isobath). Tunas, Mackerals and Marlines. Several species (Scombridae).	20,000	10,000	7,000	14,933.45 (Valued at Rs 42044284.00)	Estimates not considered rational. Further yields possible subject to further investigations & assessments.
4.	<u>Demersal fish.</u> Croakers & Jew-fish (Sciaenidae) Catfishes (Ariidae) Groupers & Rock cods (Serranidae) Snappers (Lutjanidae) Grunters (Pomadasyidae) Breams (Sparidae etc). Several species in each case.	430,000	163,000	114,000	27,282.69 (Valued at Rs 65226572.00).	86,700.00
5.	<u>Crustaceans.</u> Prawns (Penaeidae) Spiny lobsters. MSY already attained	52,000	26,000	7,800	1073.888 (Valued at Rs 34759116.00)	Not possible.Requires conservation.

Table 1.1.34 Fish stocks, their assessments & yields

(In metric tons)						
S.No.	Fish	Stocks in Pakistan	Potential Pakistan	Yields for Baluchistan	Yields (1982) Baluchistan	Capacity of potential increase for Baluchistan
6.	<u>Within 15 m isobath.</u> (Allowance of 25% of estimated mean figures	252,000	—	—	—	—
7.	Estimated subsistence catch for Baluchistan during 1982.	—	—	—	3,349.26 (Valued at Rs. 13397056.00)	—
	OVERALL ESTIMATES:	14,64,000	514,000	286,300	70,334.55 (Valued at Rs. 187295160.00)	Figures in this column do not account for fish taken by Sind Province. Capacity estimated at approx. 139,500 mt.

- Source:
1. Annual Fisheries statistical records of the Directorate of Fisheries, Government of Baluchistan.
 2. Results of research cruises made by Fridtjoff Nansen during 1977.
 3. Assessments as made in T.A. 397 Baluchistan Fisheries Development Project by Asian Development Bank.



1.2 FORESTRY RESOURCES

Table 1.2.01 Area of forests and rangelands under the control of forest departments by vegetation type, June, 1983

Vegetation Type	(Thousand hectares)						
	N.W. F. P.	Punjab	Sind	Baluchistan	Northern Area	Azad Kashmir	Total
Coniferous	1.022	68	—	116	285	379	1,870
Irrigated Plantations	0.3	127	70	1	2	—	200.3
Riverain	0.3	56	232	2	—	—	290.3
Scrub	115	283	6	595	658	26	1,683
Coastal	—	—	281	2	—	—	283
Mazrilands	24	—	—	—	—	—	24
Linear Plantations	2	14	—	0.4	—	—	16.4
Rangelands	150	2857	489	372	2,104	148	6,120
	1313.6	3,405	1,078	1088.4	3,049	553	10,487

Source: Pakistan Forest Institute Peshawar.

Table No.1.2.02 Area afforested, 1972-73 to 1982-83

Year	N.W.F.P	Punjab	Sind	Baluchistan	Northern Areas	Azad Kashmir	Total
1972-73	0.6	8.9	9.9	-	-	2.7	22.1
1973-74	0.6	8.4	1.1	-	0.2	3.4	13.7
1974-75	2.1	2.4	6.3	-	0.4	2.9	14.1
1975-76	1.9	4.4	1.9	1.6	0.1	2.9	12.8
1976-77	1.0	4.6	1.6	-	0.1	3.4	10.7
1977-78	4.6	1.8	0.6	0.1	0.2	0.1	7.4
1978-79	0.7	11.5	5.4	0.4	0.4	-	18.4
1979-80	10.8	3.3	17.4	0.1	0.2	0.2	32.0
1980-81	10.2	4.3	1.0	0.1	0.3	0.2	15.9
1981-82	12.7	4.9	1.6	0.2	0.3	0.2	19.9
1982-83	18.2	5.1	0.8	0.1	0.3	0.7	25.2

Source: Pakistan Forest Institute,
Peshawar.

Table No1.2.03 Area regenerated & nursery plants raised during 1982-83

Province/territory	Area regenerated (ha)	Number of nursery plants raised (million)
N.W.F.P.	3,200	43.00
Punjab	1,900	20.70
Sind	25,800	17.10
Baluchistan	--	0.77
Northern Areas	100	0.53
Azad Kashmir	3,100	2.59
Total	34,100	84.69

Source: Pakistan Forest Institute Peshawar.

Table 1.2.04 Uses of forest resources (Estimated wood Consumption in Various and-uses)

Year	Pulp & Paper Industry(-a)	Construction	Furniture	Fuel Wood	Others	Total
1980	32	506	164	16,850	1308	18,860
1981	36	521	169	17,360	1344	19,430
1982	42	537	174	17,880	1387	20,020
1983	60	533	179	18,420	1408	20,620
1984	80	570	184	18,970	1436	21,240
1985	81	587	190	19,540	1472	21,870

(a)The local paper Industry is based on non-woody raw materials, however, it uses imported wood pulp. The figures are the round wood equivalent of the wood pulp imports.

Source:- Pakistan Forest Institute Peshawar.

Table 1.2.05 Uses of forest (Production of Chipboard & Hardboard)

(Tonnes)		
Year	Chipboard	Hardboard
1973-74	14,388	6,745
1974-75	13,199	7,700
1975-76	11,355	7,790
1976-77	11,568	6,768
1977-78	10,216	6,408
1978-79	25,921	5,799
1979-80	26,009	3,708
1980-81	31,930	...
1981-82	31,133	...
1982-83	30,033	...

Source: Pakistan Forest Institute
Peshawar.

Table 1.2.06 Availability & uses of forest resources in the province of Baluchistan

Availability of forest resources	Uses of Forest Resources	Sixth plan targets & achievements made
<p>a) <u>Stocks by type and area:</u></p> <p>1. Conifereous. 1,15,734.39 Hectares</p> <p>2. Hill land plateau. 5,57,384.75 "</p> <p>3. River Bela Forest. 2,102.33 "</p> <p>4. Plantation. 43.00 Miles. 1,406.05 Acres 5,244.75 Hectares</p> <p>5. Range lands. 3,71,897.32 Hectares</p> <p>b) <u>Rate of Cutting/Deforestation/Soil Erosion:</u></p> <p>No specific data is available, however, it may be assumed that the rate of cutting/deforestation is dangerously high causing soil erosion at increasing rate.</p> <p>c) <u>Forest development/growth programmes, type and area:</u></p> <p>Over the past 15 years following achievements have been made in various fields through forestry development programme.</p> <p>1. Block plantation 1,500 Acres.</p> <p>2. Roadside plantation. 88 Miles.</p> <p>3. Canal side plantation. 250 "</p> <p>4. Watershed management/afforestation. Approx. 5,00,000 Acres.</p> <p>5. Soil Conservation. 3,040 Acres.</p> <p>6. Sand dune stablization. 2,000 "</p> <p>7. Wildlife management & establishment of National Park. 1,05,000 Acres.</p>	<p>a) <u>Public and paper industry:</u> Nil</p> <p>b) <u>Construction, fuel & furniture:</u> Mainly fuel wood and nominally for construction.</p> <p>c) <u>Recreational uses/Forest resources:</u> Forest areas are a source of attraction for recreation purposes. Ziarat Juniper Forest, Hanna lake, Bund Khudil Khan and Hazarganji National, Hub Dam plantation, Kech Kaur plantation in Turbat, Sand dune plantations in Pasni, Gawadar, Ormara, Pishukan, Jiwani and Bolan River plantation are sources of recreation.</p>	<p><u>Targets.</u></p> <p>1. Raising of energy plantation 3,400 Acres</p> <p>2. Raising of Canal side plantation. 350 Av: Miles</p> <p>3. Soil Conservation. 3,916 Acres</p> <p>4. Improvement of Range lands 50,000 "</p> <p>5. Sand dune stablization. 1,300 "</p> <p>6. Watershed management work. 22,800 "</p> <p>7. Raising of forest nurseries, 14 Million under Massive tree planting plants campaign.</p> <p>8. Establishment of National Parks. 80,000 Acres</p> <p>The achievements to be made during 1984-85 is as under:-</p> <p>1. Raising of canal side plantation 35 Miles.</p> <p>2. Raising of block plantation. 137 Acres.</p> <p>3. Sand dune stablization in Mekran. 130 "</p> <p>4. Raising of potted nursery plants. 2,52,500 Plants.</p> <p>5. Afforestation at Dureji National park. 70 Acres.</p> <p>6. Making of a coloured film for the Wildlife. One.</p> <p>7. Estab. of Harboi National park. 20,000 Acres.</p> <p>8. Develop. of Recreational park at Hub. One No.</p> <p>9. Development of Sericulture:-</p> <p>1. Nursery 7 Acres</p> <p>2. Farms 10 Acres</p> <p>10. Soil Conservation. 3,126 Acres.</p>

Source: Agriculture & Cooperation Department,
Govt. of Baluchistan, Quetta.

Table 1.2.07 Out - turn of forest

Y e a r	Forest products					
	Major (Million Cub. ft.)			Minor (Million rupees)		
	Total	Timber	Firewood	Total	Grazing & fodder grass	Others
1976-77	27.4	8.4	19.4	14.5	(a)	14.5
1977-78	20.8	4.6	16.2	15.1	(a)	15.1
1978-79	28.4	8.1	20.3	14.3	(a)	14.3
1979-80	23.4	8.2	15.2	1 20	(a)	14.2
1980-81	22.1	6.4	15.7	14 0	(a)	14.0
1981-82	22.1	5.1	17.0	24.5	1.5	23.0
1982-83	24.2	7.4	16.8	25.8	1.7	24.1
1983-84	18.2	6.0	12.2	27.4	2.9	24.5
1984-85	24.3	11.3	13.0	26.9	2.0	24.9

(a) = included in others

Source:- Food and Agriculture Division.

Table 1.2.08 Sixth plan targets in forestry sector

I t e m	Unit	1982-83	1983-84	1984-85	Sixth plan targets			
					1987-88	Cumulative		
Wood production (Govt. forests)								
Timber	000 m ³	200	266	282	497	1785		
Fuelwood	000 m ³	480	345	413	1,193	4285		
Total ..	000 m ³	680	611	695	1,690	6070		
Afforestation	000 Hectare	8.5	19.1	28.8	17.4	80		
Distribution of plants ..	Million plants	35.1	36.6	37.1	51.6	226		
Linear plantation	000 Av. Kms.	2.7	0.835	1.233	5.5	25.5		
Nursery raising	Hectare	289	296	23.7	450	1928		

Source:- Planning Commission
(Sixth Five Year Plan p.130)

1.3 WATER RESOURCES

Table 1.3.01 River flow availability (Kharif and Rabi)

(Million Acre Feet)

Year	Kharif				Rabi				Total			
	Jhelum (at Mangla)	Chenab (at Marala)	Indus (at Kalabagh)	Total	Jhelum (at Mangla)	Chenab (at Marala)	Indus (at Kalabagh)	Total	Jhelum (at Mangla)	Chenab (at Marala)	Indus (at Kalabagh)	Total
1	2	3	4	5	6	7	8	9	10	11	12	13
1940-41	13.50	16.36	77.62	107.48	3.04	2.29	10.49	15.82	16.54	18.65	88.11	123.30
1950-51	25.26	30.70	95.31	151.27	4.92	4.43	11.03	20.38	30.18	35.13	106.34	171.65
1960-61	13.00	20.98	90.99	124.97	3.26	3.96	13.52	20.74	16.26	24.94	104.51	145.71
1970-71	12.33	16.58	61.29	90.20	3.02	2.72	10.40	16.14	15.35	19.30	71.69	106.34
1975-76	20.30	27.76	58.98	107.04	5.09	5.08	13.99	24.16	25.39	32.84	72.97	131.20
1976-77	20.62	25.44	74.23	120.29	4.03	3.74	18.38	26.15	24.65	29.18	92.61	146.44
1977-78	14.54	21.62	55.61	91.77	5.09	4.98	18.55	28.62	19.63	26.60	74.16	120.39
1978-79	19.73	26.91	75.97	122.61	4.89	5.36	17.03	27.28	24.62	32.27	93.00	149.89
1979-80	15.51	20.32	67.20	103.03	5.20	3.96	19.27	28.43	20.71	24.28	86.47	131.46
1980-81	17.73	20.48	66.59	104.80	5.71	5.71	19.39	30.81	23.44	26.19	85.98	135.61
1981-82	18.36	23.45	67.61	109.42	4.22	4.64	18.60	27.46	22.58	28.09	86.21	136.88
1982-83	15.65	22.88	49.36	87.89	5.68	4.92	14.88	25.48	21.33	27.80	64.24	113.37
1983-84	22.72	26.21	66.42	115.35	3.50	3.62	15.16	22.28	26.22	29.83	81.58	137.63
1984-85	15.66	21.28	67.78	104.72	3.01	2.80	15.66	21.47	18.67	24.08	83.44	126.19

Source:- WAPDA.

Table 1.3.02 Rivers in-flow at rim stations in Pakistan

Rivers/rim station	1980-81			1981-82			(Million Acre Feet) 1982-83		
	Kharif	Rabi	Total	Kharif	Rabi	Total	Kharif	Rabi	Total
Indus at Tarbela U/S.	47.84	8.33	56.17	50.09	7.86	57.95	41.03	7.72	48.75
Jhelum at Mangla U/S.	17.73	5.71	23.44	18.36	4.22	22.58	15.65	5.68	21.33
Chenab at Marala U/S.	20.48	5.71	26.19	23.45	4.64	28.09	22.88	4.92	27.80
Ravi at Balloki U/S.	5.05	1.96	7.01	4.81	1.75	6.56	3.50	1.59	5.09
Sutlej at Sulemanki U/S.	1.72	0.12	1.84	0.47	0.20	0.67	0.66	0.21	0.87

Table 1.3.02 Rivers in-flow at rim stations in Pakistan

(Million Acre Feet)

Rivers/rim station	1983-84			1984-85		
	Kharif	Rabi	Total	Kharif	Rabi	Total
Indus at Tarbela U/S.	51.51	8.49	60.00	54.75	7.38	62.13
Jhelum at Mangla U/S.	22.72	3.50	26.22	15.66	3.01	18.67
Chenab at Marala U/S.	26.21	3.62	29.83	21.28	2.80	24.08
Ravi at Balloki U/S.	12.62	5.13	17.75	11.77	5.14	16.91
Sutlej at Sulemanki U/S.	5.58	3.05	8.63	4.78	2.41	7.19

Source: WAPDA.

1.3.03 Groundwater availability (i.e. tubewell pumpage)

AND

Areas within different range of average T.D.S.

Region	Pumpage 1982-83 (MAF)			G. A. (Million Acres)	Percent of the area with T.D.S. ranges in P.P.M			
	Public T/Ws	Private T/Ws	Total		Upto 1000	1000-1500	1500-3000	Over 3000
<u>PUNJAB</u>								
Chaj Doab	2.076	1.262	3.338	2.474	62.7	9.7	9.6	18.7
Rechna Doab	2.181	7.659	9.840	5.729	62.5	14.4	15.4	7.7
Bari Doab	Nil	9.308	9.308	7.004	62.6	17.0	12.7	7.7
Thal Doab	1.532	1.254	2.786	3.977	59.8	13.3	15.2	12.2
Sutlej L.Bank	0.486	1.532	2.018	4.178	32.8	8.7	12.9	45.6
Indus R.Bank	Nil	0.226	0.226	0.957	31.4	21.8	15.1	31.7
Total:-	6.275	21.241	27.516	24.319	55.7	13.8	13.5	17.0
<u>SIND & BALUCHISTAN</u>								
Gudu R.Bank	0.008	0.063	0.071	2.252	6.6	12.9	11.9	68.6
Gudu L.Bank	0.114	0.344	0.458	0.960	22.3	6.7	19.6	51.4
Sukkur R.Bank	0.145	0.092	0.237	2.437	6.3	4.5	15.2	74.0
Rohri, Khp. Fdrs.	1.079	0.887	1.966	3.948	25.2	8.9	13.7	52.2
Nara	Nil	Nil	Nil	2.514	Nil	Nil	Nil	100
Kotri	Nil	Nil	Nil	3.316	Nil	Nil	Nil	100
Total:-	1.346	1.386	2.732	15.427	9.8	5.3	8.8	76.1
<u>N.W.F.P.</u>								
Upper, L.Swat				0.606	84.9	5.0	10.1	Nil
Warsak, Kabul	Detail not available			0.273	84.9	4.8	10.3	Nil
Paharpur				0.109	61.5	7.3	31.2	Nil
Total:-	0.049	0.289	0.338	0.988	82.4	5.2	12.4	Nil
G.TOTAL:-	7.670	22.916	30.586	40.734	38.90	10.4	11.90	38.9

Source: i) Revised Action Programme 1979.

ii) Monitoring & Evaluation Directorate, WAPDA, Lahore.

Note : Pumpage by tubewells is generally in fresh groundwater areas.

Table 1.3.04 Quality of ground water at Lahore

Area	Colour	Taste	Smell	Temperature	Oxygen content	Dissolved salts and their percentage	Average depth of water (In feet)
Misri shah	Colourless	Tasteless	Unobjectionable	25 °C	4 PPM	500 PPM	500 to 600
Gulberg	"	"	"	25 °C	3.5 PPM	900 PPM	500 to 600
Ichhra	"	"	"	25 °C	3.8 PPM	800 PPM	500 to 600
Bilal Gunj	"	"	"	25 °C	4.0 PPM	700 PPM	500 to 600
Garhi Shahu	"	"	"	25 °C	3.8 PPM	800 PPM	500 to 600
Allama Iqbal Town	"	"	"	25 °C	3.6 PPM	900 PPM	500 to 600
Upper Mall	"	"	"	25 °C	3.9 PPM	1000 PPM	500 to 600
Samanabad	"	"	"	26 °C	3.5 PPM	350 PPM	500 to 600
City Bund Road	"	"	"	26 °C	3.5 PPM	300 PPM	500 to 600

Source: Lahore Development Authority

Table 1.3.05 Quality of ground water at Islamabad

Name of City	Colour	Taste	Smell	Temperature	Oxygen content	Dissolved salts and their percentage	Average depth of water (in feet)
Islamabad	Colourless	Tasteless	Un-objectionable	15°-35°c	7PPM	Chloride = 30PPM Carbonates = 100PPM (Ca, Mg, Na,K, Fe, Etc.) Nitrates = 0.5PPM Sulphates = 50 PPM (Ca, Mg, K, Na, Etc.)	200

Source: Capital Development Authority.

Table 1.3.06 Quality of ground water at Peshawar

Name of City/area	Colour	Taste	Smell	Temperature	Oxygen content	Dissolved salts and their percentage	Average depth of water (in feet)
Hyderabad Township Peshawar	Colourless	Tasteless	Un-objectionable	...	...	Total dissolved solids 310PPM Total hardness as Ca Co 3 188PPM Calcium hardness as Ca Co 3 80PPM Magnesium hardness as Ca Co 3 108PPM Carbonates as Ca Co 3 Nil Bio carbonates as Ca Co 3 176PPM Chlorides as cl 16PPM Sulphates as So4 58PPM Nitrates as No 2 Nil Sodium as Na + 14PPM Potassium as K + 1.5PPM	150-193

Source: Peshawar development authority.

Table 1.3.07 Quality of ground water at Faisalabad

Name of City/Area	Colour	Taste	Smell	Temp- rature-	Oxygen content	Dissolved Salts		Average depth of W. L. in feet
						Name	Percen- tage	
Antiwater logging T/W No. 24, Gulistan Colony, Faisalabad.	Colourless	Saltish	Odourless	Calcium	1.08	13-15
						Magnesium	1.7	
						Sodium	34.8	
						Potassium	0.6	
						Carbonate	Nil	
						Bicarbonate	Nil	
						Chloride	20.6	

Source: Faisalabad Development Authority.

Table 1.3.08 Quality of ground water at various urban centres of Sind Province

Name of City Urban centre	Colour	Taste	Smell	Temperature	Oxygen content	Dissolved salts and their Per- centage	Average depth of water (in feet)
Tando Allah Yar W/S	Colourless	Tasteless	Odourless	26°C	...	920 PPM	—
Kotri W/S	Colourless	Tasteless	Odourless	25°C	...	900 PPM	—
Umer Kot Ph-11 W/S	Colourless	Brackish	Odourless	28°C	...	5450 PPM	—
Rohri W/S	Colourless	Tasteless	Odourless	30°C	...	340 PPM	—
Thull W/S	Colourless	Tasteless	Odourless	25°C	...	1240 PPM	—

Source: Public Health Engineering Department,
Government of Sind, Hyderabad.

Table 1.3.09 Quality of ground water at various places in Baluchistan

Name of City/Area	Colour	Taste	Smell	Temperature	Oxygen content	Dissolved salts		Average depth of water in feet.
						Name	Percentage	
Quetta	Colourless	Tasteless	Odourless	58F ^o	Not determined	Calcium	10.65	104
						Magnesium	16.40	
						Sodium	22.15	
						Carbonate	0.37	
						Bicarbonate	19.21	
						Chloride	11.82	
						Sulphate	19.40	
Kalat	Colourless	Tasteless	Odourless	52F ^o	Not determined	Calcium	10.26	100
						Magnesium	20.12	
						Sodium	19.61	
						Carbonate	-	
						Bicarbonate	20.58	
						Chloride	17.21	
						Sulphate	12.22	
Khuzdar	Colourless	Tasteless	Odourless	...	Not determined	Calcium	13.05	52
						Magnesium	16.30	
						Sodium	20.64	
						Carbonate	-	
						Bicarbonate	26.89	
						Chloride	8.72	
						Sulphate	14.40	
Panjgur	Colourless	Tasteless	Odourless	...	Not determined	Calcium	2.49	19
						Magnesium	6.49	
						Sodium	33.72	
						Carbonate	--	
						Bicarbonate	8.53	
						Chloride	22.93	
						Sulphate	25.83	

Contd.

Table 1.3.10 Fresh water demand/availability

A r e a	In million gallons					
	Municipal		Commercial		Industrial	
	Demand per day	Availability	Demand	Availability	/ Demand	Availability
Peshawar (Hayatabad Town Ship scheme)						
Advance Demand)	12.50	4.0435	—	—	—	—
(Peak Demand)	37.50	More tubewells will be drilled as and when the population increases.	—	—	—	—
Islamabad						
(Annual Average)	17.2	17.2	4.0	4.0	1.7	1.7
(Peak Summer)	21.5	15.5	5.0	3.6	2.1	1.5
Faisalabad	45	22	3	1	6	2

Source: 1) Peshawar Development Authority.
 2) Capital Development Authority.
 3) Faisalabad Development Authority.

Table 1.3.11 Fresh water supply in selected cities

Particulars	Unit	Lahore			Karachi		
		1981-82	1982-83	1983-84	1981-82	1982-83	1983-84
1. Total population (Approx)	Thousand	2901	2950	3000	6000	6300	6600
2. Population served with piped water supply	Thousand persons	2101	2180	2350	3400	3600	3800
(Percentage to total population)		72%	73%	78%	57%	57%	58%
3. Quantum of water supply	Million gallons daily	144	144	144	230	285	324
4. Population served with sewerage and drain-age facilities	Thousand persons	1900	2000	2050	1300	1800	2200
(Percentage to total population)		65%	68%	68%	22%	28%	33%

Contd.

Table 1.3.11 Fresh water supply in selected cities

Particulars	Unit	Hyderabad			Faisalabad		
		1981-82	1982-83	1983-84	1981-82	1982-83	1983-84
1. Total population (Approx)	Thousand	...	...	...	...	...	...
2. Population served with piped water supply	Thousand persons	1000	1000	1000	650	760	800
(Percentage to total population)		...	...	...	...	...	...
3. Quantum of water supply	Million gallons daily	19	19	19	19	20	22
4. Population served with sewerage and drain-age facilities	Thousand persons	280	300	320	800	850	950
(Percentage to total population)		...	...	...	...	...	...

Source: Lahore Development Authority, Karachi Water and Sewerage Board & Hyderabad Development Authority.

Table 1.3.12 Population covered by water supply by province urban/rural

Province/Area	Urban water supply					Rural water supply				
	Population in 1981 (Million)	Population coverage in 1978 (Million)	Additional population covered (1978-81) (Million)	Total coverage (1981) (Million)	Percent coverage	Population in 1981 (Million)	Population coverage in 1978 (Million)	Additional population covered (1978-81) (Million)	Total coverage (1981) (Million)	Percent coverage
Punjab	12.97	6.51	1.63	8.14	62.76	34.15	4.79	1.44	6.23	18.24
Sind	8.23	5.00	2.10	7.10	86.27	10.74	0.92	1.12	2.04	18.99
N.W.F.P.	1.66	0.68	0.33	1.01	60.84	9.23	1.39	1.01	2.40	26.00
Baluchistan	0.67	0.45	0.01	0.46	68.67	3.64	0.26	0.06	0.32	8.79
F.A.T.A.	—	—	—	—	—	2.18	0.31	0.65	0.96	44.04
Total	23.53	12.64	4.07	16.71	71.02	59.94	7.67	4.28	11.95	19.94

Source: Biological Research Centre, University of Karachi.

Table 1.3.13 Tubewells installed, and water availability at farm gate

Year	Tubewells installed	Tractors imported (nos)	Water availability at farm gate (Million acre feet)
1976-77	8,767	15,554	84.57
1977-78	8,820	11,902	89.44
1978-79	8,642	15,178	87.39
1979-80	8,783	19,313	91.14
1980-81	6,160	16,137	97.79
1981-82	6,200	19,293	96.45
1982-83	4,383	22,913	101.49
1983-84	4,240	27,840	103.69
1984-85	5,422	24,746	102.81
1985-86 (Estimated)	5,573	28,500	103.36

1/ July-Feb.

Source: Planning and Development Division,
and Ministry of Production
(Economic Survey 1985-86 p.31
Stat. annex)

Table i.3.14 Water resources development sixth plan physical targets

Sub-Sector	Unit	Punjab	Sind	N.W.F.P.	Baluchistan	A.K.	F.A.T.A.	N.A.	Total
Production									
1. Tarbela	—	—	—	—	—	—	—	—	—
2. Drainage & Reclamation									5.3
i) Area Protected	M.A.	3.1	2.0	0.1	0.1	Neg	—	—	
ii) Disastrous area protected	M.A.	1.3	1.7	0.1	Neg	—	—	—	3.1
iii) FGW Tubewells	No.	—	1,279	—	—	—	—	—	1,279
iv) SGW Tubewells	No.	785	699	—	—	—	—	—	1,484
v) Surface drains	Mile	807	1,451	179	23	—	—	—	2,460
vi) Tile drains	Mile	4,797	570	2,160	—	—	—	—	7,527
3. Flood protection									1,600
i) Earth work	Mcf	600	500	150	50	AK+FATA=100 Federal =200	—	—	
ii) Stone work	Mcf	15	15	15	5	AK+FATA+FED=10	—	—	60
iii) Embankment	Mile	300	250	100	50	AK+FATA+FED=200	—	—	900
4. Replacement of T.Ws	No.	750	60	—	—	—	—	—	810
Improvement									
1. Canal remodelling	Mile	1,776	2,270	664	—	—	—	—	4,710
2. Rehabilitation	Mile	2,500	920	110	50	—	—	—	3,580
3. Command water Mgt.	M.A.	0.30	0.15	0.15	0.02	—	—	—	0.62
4. On farm water Mgt.									1,700
i) Regular on new	No.	1,090	238	349	23	—	—	—	8,000
ii) Regular on crash	No.	8,000	—	—	—	—	—	—	20,000
iii) Crash	No.	18,100	900	500	500	—	—	—	920
5. Drain remodelling	Mile	800	100	20	—	—	—	—	—
Extension									
1. New canals	Mile	174	403	75	—	30	—	—	682
2. Reservoirs	—	—	—	—	—	—	—	—	13
3. Small Dams	No.	10	1	2	—	—	—	—	30
4. Check Dams	No.	—	—	—	30	—	—	—	392
5. Small irrg. Schemes	No.	11	40	16	176	4	138	38	680
6. Tubewells(Public)	No.	—	—	200	260	5	274	—	25,000
7. Tubewells(Private)	No.	20,710	2,980	780	530	—	—	—	8,195
8. Tubewells(Subsidized)	No.	7,450	—	215	530	—	—	—	—
Water Availability and new Cropped area.									
1. Water availability	MAF	—	—	—	—	—	—	—	11.28
2. New cropped area	N.A.	—	—	—	—	—	—	—	3.24

Table 1.4.01 Reserves of principal minerals

Sl. No.	Minerals	Reserves(a)
1.	Marble (Argonite/onyx)	Fairly large deposits
2.	China clay	4.9 million tonnes
3.	Chromite	Fairly large deposits
4.	Coal	796 million tonnes
5.	Crude oil	Fairly large deposits
6.	Fire clay	Over 100 million tonnes
7.	Fuller's earth	Fairly large deposits
8.	Gypsum/Anhydrite	350 million tonnes
9.	Iron ore	Over 430 million tonnes
10.	Limestone	Unlimited
11.	Rock salt	Over 100 million tonnes
12.	Silica sand	Very large deposits
13.	Copper	412 million tonnes
14.	Dolomite	Very large deposits
15.	Bauxite/Laterite	74 million tonnes
16.	Barytes	7.5 million tonnes
17.	Sulphur	Over one million tonnes
18.	Soapstone	0.6 million tonnes
19.	Ochres	Over 100 million tonnes
20.	Magnesite	0.13 million tonnes
21.	Celestite	0.32 million tonnes
22.	Bentonite	0.10 million tonnes
23.	Antimony ore	0.021 million tonnes
24.	Rock Phosphate	Over 30 million tonnes
25.	Gravel	Very large deposits
26.	Ordinary sand (Bajri)	Large deposits

(a) Provisional, revised from time to time.

Table 1.4.02 Status and scope of some workable mineral deposits

Mineral/Location	Reserves Tons	Production 1982-83	Production 1983-84	Estimated Production 1984-85	Status and scope
Coal-Punjab, Sind & Baluchistan	1 billion tonnes inferred and 406 mt indicated and 102 mt proven reserves.	1.855 mt	1.437 mt	2.2 mt	Being explored and mined by public and private sector to meet the energy requirement of the country.
Copper-Saindak-Baluchistan	412 mt.inferred reserves containing 0.3 percent to 0.5 percent copper content & 70mt.proven reserves	—	—	—	Resource Development Corporation and foreign company will undertake the implementation of the project.
Rock Phosphate-Kakul & Lagarban, NWFP.	12.2mt.reserves containing 3.2mt proven 2.97mt. indicated & 5.9mt inferred reserves ranging in P ₂ O ₅ content from 27 to 29%.	...	...	0.077mt	Mining consultants have submitted the report and phosphate rock will be used for manufacturing phosphate fertilizers.
Iron ore-Nokundi, Baluchistan	100 mt.inferred & 30mt. proven reserves with Iron content 45 to 50%	—	—	—	Exploration continuing Laboratory studies have established its use for Pak Steel and gaseous direct production process.
Gypsum-All Province.	5.5 billion tons	0.31 mt	0.232 mt.	0.400 mt	Private and public sector engaged in its mining. Production will be increased to meet its demand for construction and reclamation of sodic soils.
Gem Stones-NWFP.	Not evaluated	...	150.0 (a)	200.0 (a)	GEMCP is exploring and mining emeralds and rubies mainly for export.
Marble(ordinary & onyx) NWFP and Baluchistan.	Large deposits of ordinary marble and about 100 cubic feet onyx marble.	0.121 mt	0.106 mt.	...	Being mined and processed both by private & public sector. Modern mining methods would be applied for the production of exportable products.

mt=Million tons
(a) = In million rupees.

Table 1.4.03 Mineral production

Y e a r	('000' tonnes)					
	Aragonite/ marble	Clay other than china and fire clay	Coal	Gravel	Gypsum	Lime stone
1976-77	46	...	1,147	40	282	3,888
1977-78	71	...	1,279	106	356	4,029
1978-79	199	123	1,261	113	234	3,298
1979-80	92	108	1,504	114	368	2,798
1980-81	114	92	1,597	26	554	3,464
1981-82	95	105	1,765	14	303	3,682
1982-83	121	140	1,855	418	341	4,232
1983-84	101	100	1,926	85	339	4,696
1984-85	52	184	2,162	45*	400	4,634

Year	Ordinary stone (000 tonnes)	Rock salt (000 tonnes)	Silica sand (000 tonnes)	Crude petroleum (000 barrels)	Natural gas (M.C.M.)	Antimony (Tonnes)
1976-77	...	336	51	3,576	5,574	93
1977-78	...	435	93	3,578	5,826	103
1978-79	160	486	84	3,752	6,300	69
1979-80	1,002	495	104	3,649	7,537	—
1980-81	1,020	514	84	3,583	8,623	39
1981-82	3,025	534	99	3,963	9,301	51
1982-83	426	548	141	4,738	9,826	—
1983-84	488	581	99	4,884	9,811	—
1984-85	385	573	111	9,525	10,250	6

Contd.

Table 1.4.03 Mineral production

(Tonnes)

Year	Bauxite	Barytes	Bentonite	Celestite	China clay	Chalk	Chromite	Dolomite	Ebry stone	Feldspar
1976-77	90	16,692	...	300	3,507	...	10,015	...	733	...
1977-78	880	19,320	...	213	12,548	...	9,847	...	1,738	...
1978-79	1,726	31,566	1,468	548	15,702	1,304	4,885	15,356	734	17,289
1979-80	2,044	18,799	1,461	357	15,333	2,533	3,835	15,760	1,682	12,056
1980-81	1,754	21,188	893	295	40,022	1,442	1,108	24,244	681	11,071
1981-82	2,755	29,924	836	272	41,279	1,633	3,028	93,488	858	9,215
1982-83	2,772	20,088	1,308	406	23,583	1,805	4,487	100,300	912	5,490
1983-84	4,173	35,965	1,400	302	21,191	1,888	4,180	98,891	1,877	5,992
1984-85	2,035	20,827	1,790	680	816	1,894	3,090	120,867	2,670	5,661

(Tonnes)

Year	Fire clay	Flourite	Fuller's earth	Magnesite	Manganese	Ochres	Ordinary Sand/bajri	Soap stone	Sulphur
1976-77	47,013	—	13,891	1,575	81	12,910	...	12,134	1,167
1977-78	62,177	147	17,837	2,344	121	7,554	...	27,313	1,075
1978-79	52,357	753	34,295	3,042	93	790	3,330	33,088	1,068
1979-80	56,503	829	27,210	1,635	168	267	53,273	31,068	294
1980-81	60,485	355	21,285	397	84	445	62,427	27,724	403
1981-82	68,197	819	15,302	1,688	80	1,460	11,220	22,568	650
1982-83	69,443	336	20,781	1,687	—	558	202,633	19,089	824
1983-84	83,676	—	18,973	3,338	—	1,086	261,707	15,606	570
1984-85	76,551	5,736	12,722	3,137	138	697	282,968	17,192	884

Source: Provincial Directorates of Industries.
Pakistan Mineral Development Corp.
Petroleum & Natural Resource
Division.

Table 1.4.04 P.M.D.C'S three year (1985 to 88) rolling plan for exploration and evaluation of coal, salt and other minerals

		(Rs. Million)	
S. No.	Name of the project	Cost	Production targets (Tonnes)
<u>A-Coal</u>			
1.	Expansion of makerwal collieries, Punjab	30.000	300,000
2.	Expansion of degari collieries, Baluchistan	25.888	90,000
3.	Development of lakhra coal mines, Sind	42.731	200,000
4.	Development of sharigh collieries, Baluchistan	32.506	100,000
5.	Development of main lakhra coal field, Sind	3,965.000	1,400,000
6.	Expansion of jhimpir/meting coal field, Sind	10.000	30,000
7.	Expansion of sor-range collieries	35.000	90,000
8.	Expansion of northern block of lakhra coalfield, Sind	47.740	—
9.	Reconnaissance drilling at good hope area, degari, Baluchistan	6.000	—
10.	Detailed exploration of good hope area	60.000	—
11.	Feasibility study for production of smokeless coal briquettes	3.000	—
12.	Smokeless coal briquetting plant	80.000	100,000
13.	Development of pir jahanian coal mines	10.000	30,000
<u>B-Salt</u>			
1.	Development of new rock salt mines in the Punjab	71.209	230,000
2.	Feasibility study for salt solution mining project	40.000	—
3.	Salt iodization plant	8.267	60,000
4.	Expansion of salt quarries in N.W.F.P.	5.000	60,000
5.	Development of salt solution mining project	120.000	300,000
6.	Salt grinding and packing plant at Khewra	5.000	15,000
7.	Development of nari panoos salt quarries	0.613	26,000
<u>C-Other Minerals</u>			
1.	Feasibility study of Nagar parker China clay mining and elutriation plant	5.000	—
2.	Development of Nagar parker China clay mines and elutriation plant, Sind	40.000	5,000
3.	Development of gypsum at various locations	8.612	150,000
4.	Exploration and detailed feasibility studies of various minerals	251.800	—
5.	Development of graphite	8.000	15,000

Source: Pakistan Mineral Development Corporation.

SECTION 2
ENERGY

SECTION 2. ENERGY-EXPLANATORY NOTES

2.01. Energy statistics may be divided into five divisions according to the types of commodities: (a) solid energy sources, (b) liquid energy sources, (c) gaseous energy sources, (d) electricity, and (e) non-commercial energy sources. Within each division a distinction is made between 'primary' and 'secondary' commodities (i.e. commodities which are used without transformation or which must undergo transformation prior to use, respectively). Examples of primary commodities are coal, lignite, crude oil, natural gas, peat or fuelwood, compared with such secondary commodities as cokes, kerosene, mel oils, charcoal or thermal electricity (electricity generated by the combustion of such fuels as coal, fuel, oil or gas, as distinct from the primary forms hydro and nuclear). Traditional energy classification has been made i.e. by commodities and by transactions. In an environmental context, the main focus is on the impact of energy activities. Thus the most feasible approach to classification is to analyse each form of energy according to (a) the resource base, and (b) the activities with which it is associated. (2).

2.02. The environmental concerns relating to (a) resource base are the assessment of reserves/resources available: questions of availability, assessment of role of non-commercial fuels and of future impacts of non-conventional fuels; (b) energy extraction are the assessment of impact of mining, drilling, hydroelectric sites, nuclear power plants: impact of wastes, leaching, tailings, deforestation, noise, smell destruction of fauna and flora, impact on hydrological systems and ecosystems; (c) energy conversion are the assessment of impact of disposal of solid wastes, heat wastes, emission of harmful gases and substances, dangers of toxic chemicals, explosions, accidents, storage and other processing problems in the conversion industries; process input/output and generation of residuals; (d) energy transportation are the assessment of impact of spills/leakage from transport media, danger of explosions/accidents; energy application at end use are the assessment of impact of different types of device for each category of end-use application: e.g. industrial steam boiler, domestic light/heat, transport by type of device e.g. gas turbine, diesel/electric motor, steam locomotive, etc. assessment of waste/residuals generated at end-use e.g. heat (2).

2.03. The term reserve usually refers to material whose location is known (proved reserves) or inferred from reliable geological evidence (probable reserves) and which can be extracted with known commercial technology under present economic conditions (i.e. at/near prevailing prices). Resources include reserves and the material whose location and quantity is less well established or which cannot be extracted under prevailing technological and economic conditions. Ultimately recoverable resources describe an estimate of how much material will ever be found and extracted (under certain future economic and technological assumptions). A useful assessment of depletion is to divide ultimately recoverable resources by a level of consumption higher than the present. (2)

2.04. The impact of solid, liquid and gaseous fuels on the environment is extensive and is of three main types: (a) biological harm to fauna/flora, (b) nuisances, (c) aesthetic. Each use of petroleum products and gases creates noxious emissions (esp. SO_2 , HO , CO), - (2)

2.05. Non-commercial fuels present a series of particular problems with regard to environment. The principal commodities

in question comprise the following:- (6)

- | | | |
|------------|---------------|----------------------------------|
| - fuelwood | - dung | - vegetal wastes |
| - charcoal | - tar | - pulp and paper industry wastes |
| - bagasse | - wood wastes | - municipal and other wastes |

2.06. Fuelwood comprises the total solid volume of all wood (coniferous and non-coniferous) in the rough use directly as fuel for such purposes as cooking, heating, or power production, including bark and the bye-product of logging, milling and cutting operations. Wood for charcoal production and for use in pit kilns and portable ovens included. In environmental terms reliability of current data on firewood is crucial in view of the direct impact of deforestation on soil erosion, drainage and loss of agricultural land.

2.07. Charcoal is the solid residue, consisting mainly of carbon, obtained by the destructive distillation of wood in the absence of air. It is used mainly as a cooking fuel, although it has a wide variety of other applications. The principal environmental impact of charcoal comprises the gases emitted in its production and, to a lesser extent than fuelwood, in its use for cooking/heating.

2.08. Bagasse is the fibrous residue remaining after the extraction of sugar from cane in the process of sugar refining. The largest use of this residue (80%) is a fuel for steam generation in sugar mills producing the sugar and bagasse. Environmentally, its use offers a local alternative to commercial energy sources (2)

2.09. Pulp and paper industry wastes are the bye-products of the processes of production of pulp and paper, mainly comprising sulphate and sulphite lyes, pulping and black liquors. In some cases, paper and rags are included as a fuel source. Environmentally, the use of these wastes has two effects- removal of toxic substances, and reduction of demand for commercial energy.

2.10. Dung (animal wastes) are used in the form of dried cakes as a domestic fuel for cooking or heating. In environmental terms, two aspects are relevant- the competing uses for fuel or fertilizer, and the local replacement of commercial energy sources.

2.11 Vegetal wastes include all types of biodegradable vegetal material except fuelwood, bagasse, bark and associated wood products. For example, coffee residues, maize cobs and residues, nut husks and residues, paddy husk and residues are used locally. Their environmental significance is their loss for fertilizer applications and their role in replacing local commercial energy sources.

2.12. Municipal wastes comprise refuse, garbage or rubbish, generated mainly by households and enterprises, which is collected by municipal or private services. Environmentally they are important because they reduce solid waste disposal problems and local demand for fuels for electricity generation.

2.13. Assessment of non-commercial fuels is especially important in reviewing rural energy use. For non-commercial forms household surveys are the best tool of sampling.

2.14. Non-conventional energy sources are of interest with respect to environment, namely the so called new sources or

non-conventional sources. These sources are either actual sources or new conversion/storage-techniques:-

- | | |
|-------------------|------------------------------|
| - ocean gradients | - fuel cells |
| - solar | - photovoltaics |
| - tidal | - gober gas (biogas) |
| - wind | - magnetohydrodynamics (MHD) |

Their importance is that they are seen to be cleaner energy sources for the future, and capable of small-scale application. In terms of their impact on the environment, little is known. An assessment of the replacement value of the sources against conventional fuels would be useful in environmental terms (2).

2.15 Tables 2.1.01 to 06 provide information on energy resource base in respect of oil, gas, coal and electricity. Tables 2.2.01 to 32 provide information on energy extraction/conversion/trade/consumption in respect of oil, gas, coal and electricity.

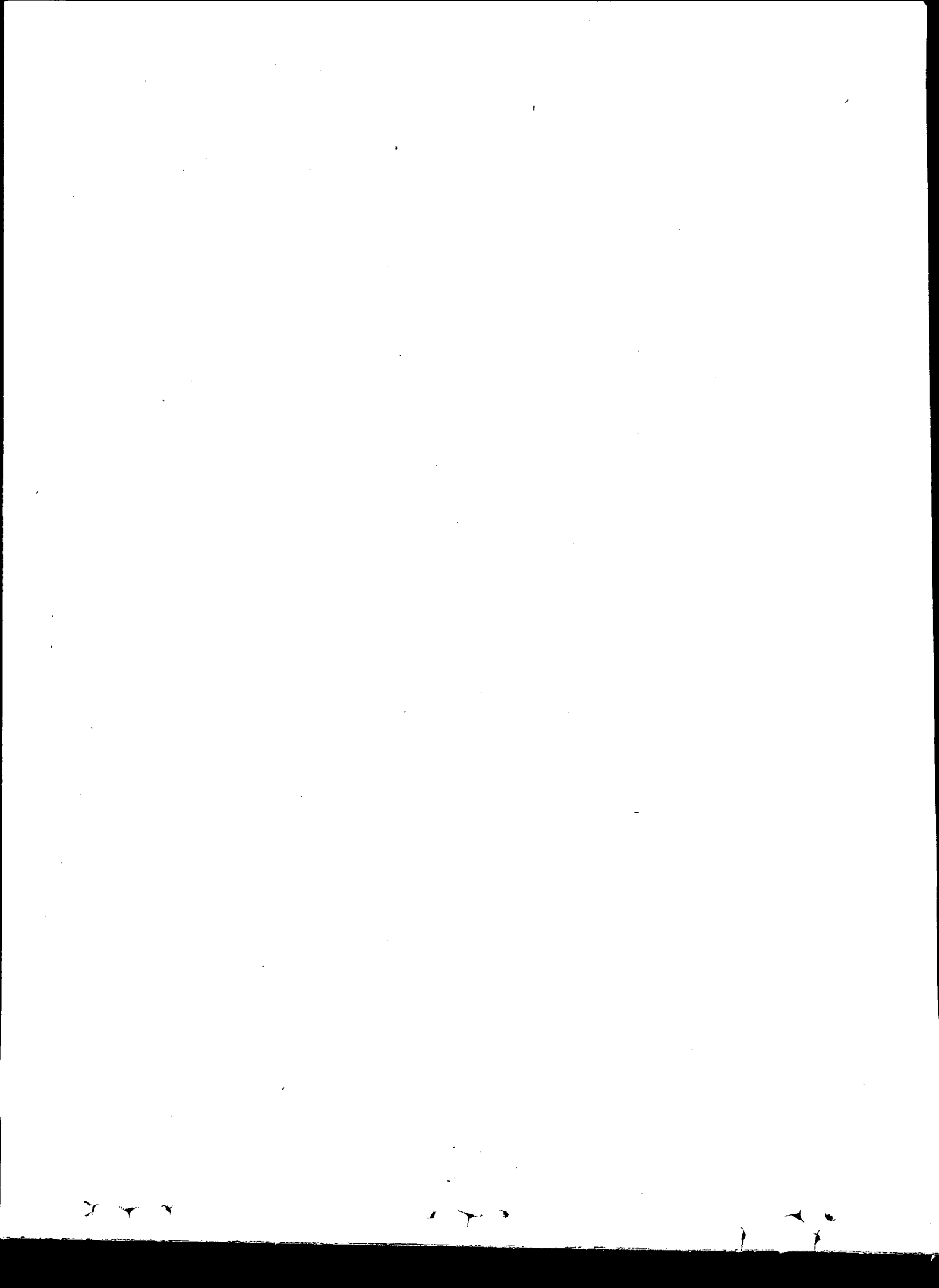
2.16 WIND: Table 2.3.01 provides information on mean monthly wind velocity at selected centres, which is one of the non-conventional energy sources. It is planned to install 100 small wind mills for water lifting during the next three years. Pakistan is also installing 2 wind mills in wind region areas of Baluchistan and lower Hind for power generation with the financial assistance of UNDP one wind mill has already been installed in village Mohra Fatima, Chakwal.

2.17 BIO-GAS: According to Energy Yearbook 1984 (issued by the Directorate General Energy Resources) the potential for bio-gas generation has two priorities: one is the area where cattle graze locally and the lesser potential sources are where cattle are taken away from the villages for grazing purposes. The first category which is 60% of the total availability of cattle waste is the top priority because of its higher potential. Average minimum availability of cattle waste per cattle has been estimated at 10 kg. per day. In this connection nationwide programme is underway in the country. The first bio-gas demonstration unit was installed during the year 1974. According to Energy year book 1985, 3858 family bio-gas units have been installed in the country including the remote areas of the country.

2.18 SOLAR: The first largest solar system was set up in 1981. It provides 10,000 gallons storage of drinking water per day, electricity for community use and for domestic use. The locations of villages being commissioned with solar PV electric system capacity varying from 10 KWp to 100 KWp are given below:-

- i. Kankoi (Swat) 36 KWp; ii. Nawagai (Swat) 20 KWp, iii. Miropadiar (Sialkot) 28 KWp;
- iv. Khaliqabad (Lahore) 5 KWp, v. Ludhawala (Kasur) 20 KWp, vi. Bhakkar (Thal) 20 KWp,
- vii. Dittal Leghari (Mirpur Khas) 15 KWp, viii. Angara (Sind) 25 KWp, ix. Patkin 15 KWp, x. Khurkera (Lasbela) 10 KWp, xi. Kharan 120 KWp, xii. Baiker (Bughti Area) 25 KWp, xiii. Mir Rahmet Khan Kala Pani) 20 KWp; xiv. Gilgit 30 KWp; xv. Sakardu 30 KWp, xvi. D.G. Khan 50 KWp, xvii. Makran 75 KWp,

Till 1978-88, 200 villages in remote areas shall be commissioned. This shall improve the living conditions in otherwise less developed and energy deficit areas achieving a decline in migration from rural to urban areas.



2. TABLES ON ENERGY ASPECT OF ENVIRONMENT

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Table 2.1.05 Installed generating capacity of power stations national grid WAPDA

		(Megawatts)								
Type/Power station	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
WAPDA National Grid-(i+ii+iii+iv)	2635	2635	2685	2685	3225	3254	3954	3954	4339	
i) Hydro Pricipal	1460(r)	1460	1460	1460	1740	1740	2440	2440	2790	
1. Warsak	160	160	160	160	240(a)	240	240	240	240	
2. Mangla	600	600	600	600	800(b)	800	800	800	800	
3. Tarbela	700	700	700	700	700	700	1400(e)	1400(e)	1750	
ii) Small Hydro	107	107	107	107	107	107	107	107	107	
1. Rasul	22	22	22	22	22	22	22	22	22	
2. Chichoki Malian	13	13	13	13	13	13	13	13	13	
3. Nandipur	14	14	14	14	14	14	14	14	14	
4. Shadiwal	13	13	13	13	13	13	13	13	13	
5. Malakand	20	20	20	20	20	20	20	20	20	
6. Dargai	20	20	20	20	20	20	20	20	20	
7. Kuram-Garhi	4	4	4	4	4	4	4	4	4	
8. Renala	1	1	1	1	1	1	1	1	1	
iii) Thermal	720	720	720	720	930	959	959	959	959	
1. Multan	260	260	260	260	260	260	260	260	260	
2. Faisalabad (New)	132	132	132	132	132	132	132	132	132	

Table 2.1.05 Installed generating capacity of power stations national grid WAPDA

Type/Power station	(Megawatts)								
	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
3. Faisalabad (Old)	---	---	---	---	---	---	---	---	---
4. Guddu	220	220	220	220	430	430	430	430	430
5. Sukkur	50	50	50	50	50	50	50	50	50
6. Hyderabad	43	43	43	43	43	43	43	43	43
7. Quetta (Coal)	15	15	15	15	15	15	15	15	15
8. Mesco	--	--	--	--	--	20	20	20	20
9. Repco	--	--	--	--	--	9	9	9	9
iv) Gas & Diesel	348	348	398	398	448	448	448	448	483
1. Shahdara	85	85	85	85	85	85	85	85	85
2. Multan	--	--	--	--	--	--	--	--	--
3. Faisalabad (Gas)	200	200	200	200	200	200	200	200	200
4. Kotri (Gas)	30	30	80(d)	80	130(d)	130	130	130	130
5. Quetta (Gas)	33	33	33	33	33	33	33	33	68

Source: WAPDA

- Note: (a) Two new units of 40 M.W. each were added in the system at Warsak.
 (b) Two new units of 100 M.W. each were added in the system at Mangla.
 (c) One new unit of 210 M.W. was added in the system at Guddu.
 (d) Two new units of 25 M.W. each were added in the system at Kotri.
 (e) Four new units of 175 M.W. each were added in the system at Tarbela.

Table 2.1.06 Electricity generation installed capacity
additions during Sixth plan (1983-88)

Particulars	1982-83		1983-84		1984-85		Additions during sixth plan (1983-88)		1987-88	
	MW	%	MW	%	MW	%	MW	%	MW	%
Hydel	2,547	53.0	2,547	49.3	2,897	51.8	630	16.6	3,177	36.9
Steam	1,436	29.9	1,789	34.7	1,837	32.8	2,440	64.3	3,876	45.1
Gas Turbines	689	14.3	689	13.3	723	12.9	725	19.1	1,414	16.4
Nuclear	137	2.8	137	2.7	137	2.5	—	—	137	1.6
Total:	4,809	100.0	5,162	100.0	5,594	100.0	3,795	100.0	8,604	100.0

Source: Planning Commission.

Table 2.2.01 Energy balance sheet

Source	(TOE)						A.C.G.R %
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1979-80 to 1984-85
A. OIL							
(a) Production from domestic crude by ARL	421,611	406,255	420,503	396,480	360,940	628,548	8.31
(b) Production from Imp crude by PRL & NRL (1)	3,613,590	3,631,096	4,092,156	3,926,283	4,047,565	4,106,793	2.59
(c) Imported Petroleum products	1,632,558	1,611,083	1,633,746	1,924,940	2,210,336	2,339,092	7.46
(d) Opening Stock	310,335	320,207	214,558	169,816	158,795	153,158	- 13.17
(e) Gross Supply	5,978,094	5,968,641	6,360,963	6,917,519	6,777,636	7,227,591	3.87
(f) Exports	1,455,962	1,077,946	1,205,228	562,084	341,371	294,365	- 27.36
(g) Net Supply	4,522,632	4,890,695	5,155,735	5,855,435	6,436,265	6,933,226	8.92
(h) Closing Stock/Losses	272,386	485,658	202,645	230,062	231,908	213,202	- 4.78
(i) Consumption	4,250,246	4,405,037	4,953,090	5,625,373	6,204,357	6,720,025	9.60
B. GAS							
(a) Gas processed	4,813,740	5,490,364	5,808,841	6,064,608	5,715,639	6,133,696	4.97
(b) Raw Gas	361,793	484,712	606,877	564,658	627,879	593,652	10.41
(c) Associated Gas	406,781	366,826	396,615	500,708	407,934	451,373	2.10
(d) Gross Supply	5,582,314	6,341,902	6,812,333	7,129,974	6,751,452	7,178,721	5.16
(e) Less Feed Stock	590,699	795,422	1,084,913	1,124,806	1,137,737	1,157,503	14.40
(f) Net Supply	4,991,615	5,546,480	5,727,420	6,005,168	5,613,715	6,021,218	3.82
(g) Less Losses	365,822	386,907	221,567	498,054	110,664	152,869	- 16.01
(h) Consumption	4,625,793	5,159,573	5,505,853	5,507,114	5,503,051	5,868,344	4.87
C. L.P.G.							
Gross Supply (1)	40,285	42,085	50,227	49,666	72,072	75,203	13.30
D. COAL							
Gross Supply (1)	701,968	705,515	783,079	719,718	836,145	1,001,164	7.36

Contd.

Table 2.2.01 Energy balance sheet

Source	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	A.C.G.P % 1979-80 to 1984-85
E. <u>ELECTRICITY</u>							
(a) Hydle Generation	2,073,932	2,125,234	2,266,236	2,704,870	3,052,588	2,913,358	7.03
(b) Thermal Generation	1,489,404	1,634,822	1,899,954	1,928,752	2,076,074	2,479,008	10.73
(c) Nuclear Generation	476	35,700	43,554	54,264	77,112	82,348	180.29
(d) Gross generation	3,563,812	3,822,756	4,209,744	4,687,886	5,205,774	5,474,714	8.97
(e) Less Units Consumed in Auxillary	64,787	126,944	140,896	144,456	163,987	179,053	22.55
(f) Net Supply	3,499,025	3,695,812	4,068,848	4,543,430	5,041,767	5,295,661	8.64
(g) Less Lossess	1,036,439	986,182	1,046,724	1,175,730	1,352,549	1,110,669	1.39
(h) Consumption	2,462,586	2,709,630	3,022,124	3,367,700	3,689,218	4,184,992	11.19
TOTAL AVAILABILITY (GROSS)	15,866,471	16,880,899	18,216,346	19,004,763	19,643,079	20,957,393	5.72
TOTAL CONSUMPTION (GROSS)	12,080,876	13,021,840	14,314,373	15,269,521	16,359,365	17,849,732	8.12
NET SUPPLY	12,328,601	13,326,814	14,010,543	15,374,206	16,070,111	17,009,283	6.65
Losses	1,674,647	1,858,747	1,470,936	1,903,847	1,640,619	1,476,740	-2.48
NET CONSUMPTION	10,653,954	11,468,067	12,539,607	13,470,360	14,429,492	15,532,543	7.83

1. **NRL is also processing Domestic Crude oil Since 1983-84.
2. *All supplies are assumed as Consumption.
3. Total availability (Ae+Bd+C+De+Ed).
4. Net supply = Total availability (Gross)-(Export + Feed Stock+ Auxillary of Hydel/Nuclear + Thermal Generation).
5. Net Consumption = Total Consumption (Gross)-(Thermal Generation) (excluding auxillary).

Source: Directorate General of Energy Resources.
(Energy Year Book 1985, pages 3 and 4)

Table 2.2.02 Oil production in sixth plan

				(Barrels/day)			
Name of Field				Production			
				1982-83	1983-84	1984-85	1987-88 (Projection)
Meyal	..	..	..	5,803	5,052.00	3,823	6,294
Balkassar	...	..	..	555	524.00	515	345
Joya Mair	..	..	..	302	232.00	237	400
Dhulian	..	..	..	104	33.00	32	—
Toot	..	..	..	2,169	2,250.00	2,535	5,700
Dhodak	..	..	..	—	—	—	3,648
Khaskheli	..	..	..	3,647	3,732.00	3,188	3,000
Adhi	..	..	..	394	470.58	1,092	1,446
Khaur	..	..	..	7	6.99	—	—
Tando Alam	..	..	..	—	—	2,725	—
Laghari	..	..	..	—	957.00	6,010	—
Dhurnal	..	..	..	—	86.31	5,934	—
Fimkassor	..	..	..	—	7.00	27	—
Total:				12,981	13,350.88	26,118	20,833

Source: Planning Commission

Table 2.2.03 Field-wise production of crude oil

Field	US Barel						A.C.G.R % 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Khaur	6,792	3,948	2,889	2,518	2,554	2,991	-15.13
Dhulian	123,380	104,104	81,555	38,128	9,450	8,620	-41.27
Joya Mair	180,500	180,280	159,978	110,175	85,053	86,590	-13.66
Balkassar	279,841	233,543	220,186	202,446	191,887	183,967	- 8.05
Toot	514,645	639,214	550,789	791,670	823,347	925,085	12.44
Meyal	2,403,731	2,270,898	2,573,408	2,118,229	1,849,202	1,395,364	-10.31
Adhi	57,453	122,159	114,102	143,824	171,763	398,633	47.32
Khaskheli	--	--	261,604	1,331,081	1,365,892	1,161,414	--
Leghari	--	--	--	--	350,415	2,188,353	--
Dhurnal	--	--	--	--	31,505	2,165,717	--
Fim Kassar	--	--	--	--	2,446	9,772	--
Tando Alam	--	--	--	--	--	994,810	--
Total	3,566,342	3,554,146	3,964,511	4,738,071	4,883,514	9,521,316	21.71
Annual growth rate %	..	(-)0.34	11.55	19.51	3.07	94.97	

Source:- Directorate General of Energy Resources (Energy year Book 1985, p. 17)

Table 2-2-04-Import of Crude oil

(Quantity in metric tons
value in million dollars)

Product	1979-80		1980-81		1981-82	
	Quantity	Value	Quantity	Value	Quantity	Value
PRL	2,227,480	434.46	1,150,003	544.42	2,398,223	636.27
NRL	1,682,945	315.68	1,890,614	450.32	1,997,481	503.03
Total:	3,910,425	750.14	3,040,617	994.74	4,395,704	1139.30

Product	1982-83		1983-84		1984-85	
	Quantity	Value	Quantity	Value	Quantity	Value
PRL	2,161,533	513.57	2,285,801	488.52	1,959,343	414.59
NRL.	2,024,521	475.66	2,008,126	427.89	2,058,211	428.03
Total	4,186,054	989.23	4,293,927	916.41	4,017,554	842.62

Source: Directorate General of Energy Resources
(Energy Year Book 1985 p.41)

Table 2.2.05 Import of POL Products.(Quantity in metric tons
value in million dollars)

Products	1979-80		1980-81		1981-82	
	Quantity	Value	Quantity	Value	Quantity	Value
AV. Fuel	3,991 (3,847)	3	2,014 (2,098)	1	4,107 (4,281)	2
HOBC.	77,404) (82,296)	27	67,257) (71,508)	30	78,429) (83,386)	29
SK	519,902 (536,331)	161	377,410 (389,336)	155	352,420 (363,556)	124
HSD	897,987 (923,939)	258	1,115,892 (1,148,141)	409	1,149,308 (1,182,523)	373
LDO	83,725 (86,145)	22	-	-	-	-
LUBES(Non Energy)	31,895	14	21,187	12	20,156	12
FO	-	-	-	-	-	-
Total	1,614,904 (1,032,558)	485	1,583,760 (1,611,083)	607	1,604,420 (1,633,746)	450

Contd.

TRable 2.2.05 Import of POL products(Quantity in metric tons
value in million dollars)

Proudcts	1982-83		1983-84		1984-85	
	Quantity	Value	Quantity	Value	Quantity	Value
Av. Fuel	2,070 (2,157)	1	-	-	2,070 (2,157)	1
HOBC	112,352 (119,453)	37	117,168 (124,573)	35	120,277 (127,879)	31
SK	390,039 (402,364)	124	411,199 (424,193)	111	488,956 (504,407)	125
HSD	1,361,615 (1,400,966)	399	1,399,576 (1,440,024)	346	1,262,133 (1,298,609)	297
LDO	-	-	-	-	-	-
LUBES (Non Energy)	30,688 -	13	30,281 -	13	24,737 -	11
FO	-	-	227,530 (221,546)	42	417,007 (406,040)	73
Total:	1,896,744 (1,924,940)	574	2,185,754 (2,210,336)	547	2,315,180 (2,339,092)	538

Source: Directorate General of Energy Resources
(Energy Year Book 1985 p.40)

Table 2.2 06 POL exports(Quantity in metric tons/(Toc)
value in million dollars)

Products	1979-80		1980-81		1981-82	
	Quantity	Value	Quantity	Value	Quantity	Value
FO	788,626 (767,885)	121.33	606,269 (590,324)	115.04	756,161 (734,274)	123.30
NAPHTHA	210,831 (225,252)	65.25	144,951 (154,866)	43.68	211,497 (225,963)	62.15
BTX	9,797 (993,137)	3.92	3,651	1.54	3,661	1.54
Total	1,009,254 (1,986,247)	190.50	754,871 (745,190)	160.26	971,319 (962,190)	186.99

Products	1982-83		1983-84		1984-85	
	Quantity	Value	Quantity	Value	Quantity	Value
PO	182,602 (177,800)	30.51	74,062 (72,114)	12.75	-	-
NAPHTHA	179,661 (191,950)	48.58	91,111 (79,343)	22.92	144,511 (154,396)	33.36
BTX	-	-	-	-	-	-
Total	362,263 (369,750)	79.09	165,173 (169,457)	35.67	144,511 (154,396)	33.36

Table 2.2.07 Bunkers (Exports)(Quantity in metric tons
value in million dollars)

Products	1979-80		1980-81		1981-82	
	Quantity	Value	Quantity	Value	Quantity	Value
100/130	0.00	0.00	0.00	0.00	0.00	0.00
JP - 1	205,831	84.72	217,639	114.40	186,774	99.55
HSD	18,159	6.07	10,180	3.43	87,95	3.67
LDO	9,924	3.29	4,183	1.74	2,321	0.99
F.O.	131,045	20.55	103,049	21.26	45,990	9.96
LUBES	0.00	0.00	0.00	0.00	0.00	0.00
GREASES	0.00	0.00	0.00	0.00	0.00	0.00
Total	364,959	114.63	364,959	140.83	243,880	114.17

Contd.

Table 2.2.07 Bunkers (Exports)(Quantity in metric tons
value in million dollars)

Products	1982-83		1983-84		1984-85	
	Quantity	Value	Quantity	Value	Quantity	Value
100/130	0.00	0.00	0.00	0.00	2	0.00
JP - 1	143,355	76.51	124,528	85.91	112,810	59.45
HSD	5,939	2.48	3,802	1.53	2,480	0.99
LDO	2,079	0.83	2,664	0.95	1,927	0.68
F.O.	41,829	7.60	41,833	7.67	23,233	4.47
LUBES	0.00	0.00	0.00	0.00	0.28	0.21
GREASES	0.00	0.00	0.00	0.00	2	0.01
Total	193,202	87.42	172,827	96.06	140,482	65.81

Source: Directorate General of Energy Resources
(Energy Year Book 1985, P.45).

Table 2.2.08 Distribution of petroleum consumption by province

Province	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	Unit (TOE)
							A.C.G.R % 1979-80 to 1984-85
PUNJAB	2,078,371	2,100,322	2,367,082	2,643,710	2,792,672	3,140,771	8.61
SIND	1,729,850	1,836,019	2,056,028	2,371,862	2,699,423	2,810,558	10.19
N.W.F.P.	323,018	330,378	389,009	486,264	523,989	528,682	10.27
BALUCHISTAN	119,007	138,318	160,975	173,537	184,273	242,043	15.26
Total	4,250,246	4,405,037	4,953,090	5,625,373	6,204,357	6,720,024	9.60

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.39)

Table 2.2.09 Production of petroleum Mix products by refineries
A Energy product

Products	1979-80	1980-81	1981-82	1982-83	1983-84	Metric tons/(TOE)	
						1984-85	A.C.G.R% 1979-80 to 1984-85
Motor spirit	422,594 (451,500)	473,405 (505,785)	531,615 (567,977)	542,103 (579,184)	612,393 (654,281)	628,371 (671,351)	8.26
S.K	171,166 (179,697)	169,055 (174,398)	211,443 (218,125)	240,321 (247,915)	257,671 (265,813)	307,140 (316,846)	12.40
HOBC	45,069 (47,918)	37,860 (40,252)	41,816 (44,458)	27,581 (29,324)	29,791 (31,674)	47,409 (50,405)	1.02
HSD	948,595 (976,009)	944,030 (971,313)	1,164,959 (1,198,626)	1,171,758 (1,205,622)	1,162,680 (1,196,282)	1,312,761 (1,350,700)	6.71
LDO	203,659 (209,545)	171,446 (176,401)	118,351 (121,771)	170,065 (174,980)	177,918 (183,060)	224,555 (231,045)	1.97
FO	1,438,015 (1,400,196)	1,493,203 (1,453,931)	1,669,150 (1,625,251)	1,459,116 (1,420,741)	1,534,398 (1,494,043)	1,538,803 (1,498,332)	1.36
AVIATION FUELS	543,860 (542,830)	540,435 (539,510)	512,391 (511,622)	468,460 (467,286)	474,442 (473,086)	463,625 (461,722)	-3.14
NAPTHA	212,941 (227,506)	164,509 (175,761)	210,435 (224,829)	185,053 (197,711)	103,206 (110,265)	145,021 (154,940)	-7.40
LPG	37,235 (40,285)	38,899 (42,085)	46,425 (50,227)	45,906 (49,666)	66,616 (72,072)	69,510 (75,203)	13.30
Total:	4,023,134 4,075,486	4,032,842 4,079,436	4,506,585 4,562,886	4,310,363 4,374,429	4,419,115 4,480,576	4,737,195 4,810,544	3.32
A.G.R. %	0.00	0.24	11.75	4.35	2.52		

Table 2.2.09 Production of petroleum mix products by refineries
B.Non-Energy product

Products	(Metric ton)					
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Lube oil	96,316	103,289	92,653	102,793	106,195	124,618
Bitumen	8,212	6,559	6,631	4,719	6,080	1,912
Asphalt	112,461	117,567	115,429	119,324	120,843	153,350
Solvent oil	5,842	5,700	4,487	5,374	5,476	7,083
M.T.T.	2,536	3,498	3,295	4,257	6,508	4,378
J.B.O.	--	2,967	3,120	3,383	4,393	3,211
Greases	104	72	8	--	--	--
White Wax	507	304	173	313	312	546
Process oil	--	301	--	357	383	481
Carbon oil	--	--	22,088	11,735	- 1,044	9,086
Others	16,864	14,946	41,796	3,089	3,269	5,005
	--	--	--	--	--	309,670
Total:	242,842	255,203	289,680	255,344	252,415	

Source: Directorate General Of
 Energy Resources (Energy
 Year Book 1985, P 22&23)

Table 2.2.10 Consumption of petroleum (Mix) energy products

Petroleum mix products	(Metric ton)						TOE
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Aviation fuel	345,696 (344,529)	316,149 (315,120)	319,573 (318,518)	330,652 (329,600)	340,860 (339,528)	345,711 (343,891)	0.00
M.S.	426,271 (455,428)	473,917 (506,333)	518,136 (533,577)	552,211 (589,211)	601,897 (643,067)	616,055 (658,193)	7.64
HOBC	115,983 (123,313)	115,100 (122,374)	126,781 (134,794)	138,003 (146,724)	152,828 (162,487)	167,752 (178,354)	7.66
HSD	1,775,300 (1,826,606)	1,955,806 (2,012,329)	2,286,837 (2,352,927)	2,521,266 (2,594,131)	2,472,868 (2,544,334)	2,559,622 (2,633,594)	7.59
LDO	262,559 (270,146)	187,943 (193,374)	131,743 (135,551)	172,880 (177,876)	179,873 (185,071)	224,295 (230,777)	-3.10
F.O.	588,245 (572,774)	729,331 (710,150)	910,687 (886,736)	1,195,292 (1,163,856)	1,661,733 (1,618,029)	1,942,753 (1,891,658)	26.99
S.K.	637,311 (657,450)	528,652 (545,357)	553,496 (570,987)	604,114 (623,204)	690,036 (711,841)	759,555 (783,557)	3.57
Total	4,151,365 (4,250,246)	4,306,898 (4,411,329)	4,847,253 (4,933,090)	5,514,418 (5,625,373)	6,100,095 (6,204,357)	6,615,743 (6,720,024)	9.77
Annual growth rate %	0.0	3.75	12.55	13.76	10.62	8.45	

Source: Directorate General of Energy Resources
(Energy Year Book 1985, P. 30).

Table 2.2.11 Sectoral consumption of petroleum mix products

Sectors	(Metric ton) TOE						A.C.G.R.% 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Domestic	625,861 645,638	516,958 533,294	543,720 560,902	593,887 612,654	678,897 700,350	748,426 772,076	3.64
Industry	227,606 224,698	261,028 257,305	303,886 299,969	391,652 385,244	689,038 672,738	814,713 795,253	29.05
Agriculture	252,712 260,015	173,317 184,499	124,235 127,825	161,324 165,986	173,254 173,261	218,887 225,213	-2.83
Transport	2,291,922 2,368,431	2,487,451 2,571,103	2,745,302 2,836,153	2,890,159 2,985,856	3,066,952 3,170,600	3,240,202 3,349,706	7.17
Power	50,490 50,057	182,972 179,822	442,063 440,212	754,177 752,319	766,274 758,093	944,468 929,268	79.64
Other Govt.	702,774 701,407	679,172 679,014	688,047 688,029	723,219 723,314	725,680 724,315	649,047 648,508	-1.58
Total	4,151,365 4,250,246	4,300,898 4,405,037	4,847,253 4,953,090	5,514,418 5,625,373	6,100,095 6,199,357	6,615,743 6,720,024	9.77
Annual growth rate %	0.00	3.75	12.55	13.76	10.62	8.45	

Source: Directorate General of Energy Resources
(Energy Year Book 1985, P. 31).

Table 2.2.12 Fuel consumption (mix) for thermal power generation

Source	(TOE)						A.C.G.R% 1979-80to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Fuel oil	33,371	148,824	258,001	417,237	534,939	749,586	86.33
Diesel oil	16,686	30,998	182,211	335,082	223,154	179,682	60.85
Coal	8,486	13,692	797	14,644	10,534	14,368	11.11
Gas	1,863,547	1,959,072	1,830,540	1,738,503	1,823,491	2,051,428	1.94
Total	1,922,088	2,152,586	2,271,549	2,505,466	2,592,118	2,995,064	9.28
A.G.R. %	0.00	11.99	5.53	10.30	3.46	15.55	

Source: Directorate General of Energy Resources
(Energy Year Book 1985,p,83)

Table 2.2.13 Projection of petroleum balances

(Million/M.tons)									
Year	Production (Crude oil)	Consumption by major sectors				Institu- tional residen- tial	Total	Gross consump- tion	Deficit
		Transport	Industry	Agriculture	Power				
1980-81	0.51	2.670	0.212	0.767	0.080	0.791	4.52	4.75	4.24
1981-82	0.68	2.767	0.226	0.815	0.155	0.827	4.79	5.03	4.35
1982-83	0.72	2.876	0.244	0.860	0.221	0.869	5.07	5.32	4.60
1983-84	0.76	2.982	0.248	0.907	0.308	0.905	5.35	5.62	4.86
1984-85	0.80	3.096	0.243	0.960	0.370	0.941	5.61	5.89	5.09
1985-86	1.01	3.218	0.247	1.009	0.439	0.977	5.89	5.97	4.96
1986-87	1.05	3.344	0.239	1.055	0.552	1.010	6.20	6.51	5.46
1987-88	1.10	3.473	0.234	1.095	0.666	1.042	6.51	6.84	5.74
1988-89	1.28	3.606	0.227	1.130	0.766	1.071	6.80	7.14	5.86
1989-90	1.34	3.742	0.221	1 161	0.887	1.099	7.10	7.45	6.11

Source: Directorate General of Energy Resources
(Energy Year Book 1983,p.87)

Table 2.2.14 Production of gas by agencies

Agencies	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	MMCF/TOE
							A.C.G.R. % 1979-80 to 1984-85
PPL	224,652 (5,009,739)	247,652 (5,522,640)	260,064 (5,799,427)	262,248 (5,848,130)	263,104 (5,867,219)	263,479 (5,875,582)	3.24
ESSO	16,146 (277,711)	34,971 (601,501)	45,633 (784,888)	63,896 (1,099,011)	65,297 (1,123,108)	66,576 (1,145,107)	42.75
OGDC	3,392 (68,857)	3,179 (64,534)	3,133 (68,583)	4,312 (102,952)	5,516 (129,902)	18,186 397,812	39.91
POL	15,526 (406,781)	14,001 (366,826)	14,506 (380,057)	16,655 (436,361)	12,761 (334,338)	9,507 (249,084)	-9.34
OCCIDENTAL	—	—	—	—	—	4,102 107,472	—
Total	259,716 (5,763,988)	299,803 (6,555,501)	323,336 (7,052,955)	347,111 (7,486,454)	346,678 (7,454,567)	361,850 (7,775,057)	6.86 —
A.G.R. %	—	15.43	7.85	7.35	-0.12	(7,775,057)	—

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.61)

Table 2.2.15 Production of gas by type

Type	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	MMCF/TOE A.C.G.R % 1979-80 to 1984-85
NATURAL GAS	244,190 (5,356,307)	285,802 (6,188,675)	308,198 (6,636,339)	328,000 (6,985,746)	331,108 (7,046,633)	344,622 (7,323,683)	7.13
ASSOCIATED GAS	15,526 (406,781)	14,001 (366,826)	15,138 (396,616)	19,111 (500,708)	15,570 (407,934)	17,228 (451,374)	2.10
Total	259,716 (5,763,088)	299,803 (6,555,501)	323,336 (7,032,955)	347,111 (7,486,454)	346,678 (7,454,567)	361,850 (7,775,057)	6.86
Annual growth rate%	—	15.43	7.85	7.35	-0.12	4.38	

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.63).

Table 2.2.16 Production of natural gas by fields

Fields	MMCFT/TOE						A.C.G.R % 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
SUI	224,652 (5,009,739)	247,652 (5,522,640)	260,064 (5,799,427)	262,248 (5,848,130)	263,104 (5,867,219)	263,479 (5,875,582)	3.24
MARI	16,146 (277,711)	34,971 (601,501)	45,633 (784,888)	63,896 (1,099,011)	65,297 (1,123,108)	66,576 (1,145,107)	32.75
SARI/HUNDI	3,392 (68,857)	3,179 (64,534)	2,501 (52,024)	1,856 (38,605)	701 (14,581)	—	—
PIR KOH	—	—	—	—	-2,006 (41,725)	14,567 (302,994)	—
TOTAL	244,190 (5,356,307)	285,802 (6,188,675)	308,198 (6,636,339)	328,000 (6,985,746)	331,108 (7,046,633)	344,622 (7,323,683)	7.13
Annual growth rate%	—	17.04	7.84	6.43	0.95	4.08	—

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.64)

Table 2.2.17 Production of associated gas by fields

Fields	MMCF · TOE						A.C.G.R. % 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
TOOT	—	—	632 (16,559)	2,456 (64,347)	2,809 (73,596)	3,619 (94,818)	—
DHULIAN	2,884 (75,561)	2,321 (60,810)	2,000 (52,400)	2,400 (62,880)	242 (6,340)	—	—
MEYAL	12,642 (311,220)	11,680 (306,016)	12,506 (327,657)	14,255 (373,481)	12,519 (327,998)	9,507 (249,084)	- 5.54
DHURNAL	—	—	—	—	—	4,102 (107,472)	—
TOTAL	15,526 (386,781)	14,001 (366,826)	15,138 (396,616)	19,111 (500,708)	15,570 (407,934)	17,228 (451,374)	2.10
Annual growth rate %	0.00	— 9.81	— 8.12	26.25	— 18.53	10.65	

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.66)

Table: 2.2.18 Cumulative number of Gas consumers province wise

Province	(In Number)					
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
PUNJAB	299,791	347,603	390,795	417,617	439,250	471,699
S I N D	316,855	369,129	425,187	454,111	481,812	512,985
N.W.F.P.	18,546	23,540	29,321	32,198	34,397	36,520
BALUCHISTAN	—	—	—	6,449	11,687	16,528
TOTAL	635,192	740,272	845,303	919,375	967,146	1,037,732
A.G.R. (%)	—	—	—	—	—	—

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p.69.)

Table 2.2.19 Sectoral consumption of natural gas

Sector	MMCFT/TOE						A.C.G.R. %
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1979-80 to 1984-85
Domestic	14,283 (334,163)	17,738 (415,079)	24,037 (562,266)	28,357 (663,544)	32,246 (754,556)	37,372 (874,506)	21.21 8.50
Commercial	6,543 (153,063)	7,540 (176,435)	8,337 (195,086)	8,905 (208,377)	9,122 (213,455)	9,838 (230,209)	8.50
Cement	25,738 (602,157)	26,085 (610,393)	26,319 (615,865)	21,222 (496,595)	10,305 (241,137)	8,300 (194,220)	-20.26
Fertilizer	46,315 (984,499)	65,920 (1,325,703)	77,273 (1,808,188)	97,308	98,335 (1,896,228)	100,083 (1,929,171)	16.66
Power	80,431 (1,863,547)	84,743 (1,959,072)	82,087 (1,830,540)	74,295 (1,874,476)	77,927 (1,823,491)	88,906 (2,051,428)	2.02 —
G-Industry	54,671 (1,279,063)	62,748 (1,468,313)	67,471 (1,578,821)	70,522 (1,738,503)	73,159 (1,711,921)	74,629 1,746,319	6.42 —
Total	227,981 (5,216,492)	264,774 (5,959,995)	285,524 (6,590,766)	300,609 (6,631,920)	301,094 6,640,788	319,128 7,025,852	6.96 —
A.G.R. (%)	—	16.14	7.84	5.28	0.16	5.99	—

Source: Directorate General of Energy Resources
(Energy Year Book 1985, p. 68.)

Table 2.2.20 Demand supply position of gas

(MMCFD)

Year	SNGPL System			SGTC System			Total		
	Demand	Supply	Surplus (+) Shortfall (-)	Demand	Supply	Surplus (+) Shortfall (-)	Demand	Supply	Surplus (+) Shortfall (-)
Maximum Day									
1982-83	591	426	(-) 165	388	266	(-) 122	979	692	(-) 287
1983-84	616	449	(-) 167	397	315	(-) 81	1013	764	(-) 248
1984-85	580	425	(-) 155	401	310	(-) 91	981	735	(-) 246
1987-88	668	499	(-) 169	453	417	(-) 36	1221	916	(-) 205
Average per Day:									
1982-83	366	366	--	336	256	(-) 80	702	622	(-) 80
1983-84	386	386	--	346	300	(-) 46	732	686	(-) 46
1987-88	436	436	--	403	389	(-) 14	839	825	(-) 14

Source: Planning Commission.

Table 2.2.21 Break-up of private investment and corresponding share of public investment
in oil and gas

(Rs. Million)				
	Private	Public	Total	Remarks
Exploration				
1. Contribution in new Joint Ventures.	4,250	750	5,000	15% estimated GOP share
2. Union Texas (Khashkheli area)	390	263	653	40% GOP share
3. Pakistan Petroleum Ltd (Chak-Balikhan)	257	—	257	
4. Joint Ventures with OGDC	1,190	210	1,400	15% GOP share
Development				
Oil:				
1. Union Texas (Khashkheli)	540	360	900	40% GOP share
2. POL (Meyal)	600	—	600	
3. PPL (Adhi)	614	—	614	
Gas:				
1. PPL (Well-head compression)	1,713	—	1,713	
2. PPL (Sui Development)	546	—	546	
3. PPL (Khandkot)	769	—	769	
4. Pak Stanvac (Mari)	554	532	1,086	49% GOP share
Refining				
1. Hydrocracker	1,310	2,430	3,740	
2. PARCO mid-country Refinery Multan	1,400	2,200	3,600	
Storage				
1. Development of new storage	500	50	550	
2. Filling up existing storage	1,073	—	1,073	
Total:	15,711	6,795	22,501	

Source: Planning commission
Sixth Five Year Plan
P. 234

Table 2.2.22 Primary energy consumption

Particulars	1982-83		1983-84		1984-85		1987-88		Annual Growth Rate%
	Energy consumption MTOE	% Share	Energy consumption MTOE	% Share	Energy consumption MTOE	% Share	Energy consumption MTOE	% Share	
1. Oil (excluding bunkers and non-energy use)	5.85	39.0	6.200	33.42	6.61	36.99	10.0	42.2	11.3
of which: Domestic	(0.65)	(4.3)	(0.360)	(1.94)	--	--	(1.04)	(4.4)	(9.9)
2. Gas (excluding feed stock)	5.81	38.7	5.500	29.64	6.23	34.86	8.32	35.0	7.4
3. Coal 	0.76	5.1	1.216	6.55	0.98	5.48	1.16	4.9(a)	8.8
4. Hydro 	2.49	16.6	5.128	27.64	3.21	17.96	4.01	16.9	10.0
5. LPG 	0.07	0.5	0.072	0.38	0.78	4.37	0.22	0.9	25.7
6. Nuclear	0.02	0.1	0.077	0.41	0.06	0.34	0.02	0.1	--
Total:	15.00	100	18.553	100	17.87	--	23.74	100	9.6

a. The share will increase significantly in later years as a result of investments made in the Sixth Plan.

Source: Planning Commission. i

Table 2.2.23 Coal production

Province	Metric ton/(ToE)						A.C.G.R% 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Baluchistan	855,639 (382,813)	824,198 (368,746)	859,897 (384,318)	781,140 (349,482)	966,609 (432,461)	1,168,927 (522,978)	- 6.44
Punjab	483,351 (216,251)	426,249 (190,704)	533,556 (238,713)	449,932 (201,300)	473,452 (211,822)	471,223 (210,825)	- 0.51
Sind	188,565 (84,364)	271,114 (121,296)	315,723 (141,254)	335,322 (150,023)	397,130 (177,676)	563,783 (252,237)	24.49
N.W.F.P.	41,434 (18,538)	55,361 (24,769)	41,112 (18,394)	42,297 (18,913)	31,707 (14,186)	33,805 (15,124)	3.99
Total	1,568,989 (701,966)	1,576,922 (705,515)	1,750,288 (783,079)	1,608,668 (719,718)	1,868,898 (836,145)	2,237,738 (1,001,164)	7.36
Annual Growth Rate%		0.51	10.99	- 8.09	16.18	19.74	

Source: Directorate General of
Energy Resources (Energy
Year Book 1985, P.94)

Table 2.2.24 Coal production fieldwise

Province	Field	Metric ton/(% TOE)						A.C.G.R % 1979-80 to 1984-85
		1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Baluchistan	Sor-range	243,257 (108,833)	155,606 (69,618)	165,834 (74,194)	157,255 (70,350)	193,605 (86,619)	207,010 (192,616)	3.18
	Degari	103,964 (46,513)	105,550 (47,223)	92,762 (41,502)	68,118 (30,476)	116,621 (52,176)	147,459 (65,973)	7.24
	Sharigh	28,478 (12,741)	36,814 (16,471)	35,483 (15,875)	32,837 (14,691)	43,765 (19,586)	59,026 (26,408)	15.69
	Sinjidi	127,203 (50,911)	172,147 (77,019)	138,894 (62,141)	139,084 (62,226)	179,943 (80,500)	204,180 (91,550)	9.93
	Mach	54,247 (24,270)	76,761 (34,343)	70,004 (31,250)	65,473 (29,293)	91,017 (40,721)	92,500 (42,420)	11.28
	Harnai	9,847 (4,406)	11,925 (5,335)	11,328 (5,068)	13,498 (60,039)	18,459 (8,259)	42,614 (19,066)	34.04
	Duki	132,992 (59,501)	114,016 (51,011)	223,591 (1000,035)	198,426 (88,776)	201,688 (90,235)	218,697 (97,845)	10.46
	Pir Ismail	145,263	135,254	65,409	89,838	84,702	163,082	2.34
	Ziarat	(64,991)	(4,513)	(29,264)	(40,194)	(37,896)	(72,963)	
	Abgum	10,388 (4,648)	16,125 (7,214)	56,592 (25,319)	16,611 (7,432)	36,809 (16,468)	34,279 (15,336)	26.79
Punjab	Makerwal, SRA	403,351 (216,251)	426,249 (690,704)	533,555 (238,713)	449,932 (201,300)	473,452 (211,822)	971,223 (210,825)	-0.51
Sind	Lakhra	153,909 (168,859)	236,089 (105,626)	287,620 (128,681)	309,890 (138,645)	366,011 (163,753)	533,462 (238,671)	28.22
	Jhampir	34,654 (15,505)	35,025 (15,670)	28,103 (12,573)	25,432 (1,378)	31,119 (13,923)	30,321 (13,566)	-2.64
N.W.F.P.	Makerwal/Kohat	41,434 (18,538)	55,361 (24,769)	41,112 (18,394)	42,274 (118,913)	31,707 (14,186)	33,805 (15,124)	-3.99
Total		1,568,987 (701,966)	1,576,922 (750,515)	1,750,287 (783,079)	1,608,668 (719,718)	1,868,898 (836,145)	2,237,738 (1,001,164)	7.36
A.G.R (%)		0.00	0.51	10.99	-8.09	16.18	19.74	

Source: Directorate General of
Energy Resources (Energy-
Year Book 1985 P. 95).

Table 2.2.25 Sectoral consumption of coal in Pakistan

Sectors	Metric ton(% T.E)						A.C.G.R.% 1979-80 to 1984-85
	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	
Power	18,967 (8,484)	30,603 (13,962)	1,782 (797)	32,732 (14,644)	23,544 (10,534)	32,114 (14,368)	11.11
Brick Kilns	1,511,512 (676,250)	1,517,386 (678,878)	1,715,357 (767,451)	1,546,122 (691,735)	1,810,740 (810,125)	2,174,427 (972,839)	7.54
Domestic	26,450 (11,834)	7,787 (3,484)	22,699 (10,156)	22,245 (9,952)	21,607 (9,667)	16,035 (7,174)	9.52
Other Govt.	12,065 (5,398)	21,146 (9,461)	10,450 (4,675)	7,569 (3,386)	13,007 (5,819)	15,162 (6,783)	4.68
Total	1,568,989 (701,966)	1,576,922 (705,515)	1,750,288 (783,079)	1,608,668 (719,718)	1,868,898 (836,145)	2,237,738 (1,001,164)	7.36
Annual Growth Rate %	—	0.51	10.99	-8.09	16.18	19.74	

Source: Directorate General of Energy Resources
(Energy Year Book 1985, P.98).

Table 2.2.26 Import of coal

Unit/Period	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	A.C.G.R% 1979-80 to 1984-85
M.Ton	98,432	311,508	539,655	520,077	491,079	715,578	48.70
TOE	64,758	204,941	355,039	342,159	323,081	323,081	470,779
A.G.R (%)	—	216.47	73.24	-3.63	- 5.58	- 5.58	45.72

Note:-Meteorological Coal Only.

Source: Directorate General of Energy
Resources (Energy Year Book 1985-
P. 100).

Table 2.2.27 Generation of electricity by source (Public utility)

Source	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	GW/ (% share)
							A. C. G. R. (%) 1979-80 to 1984-85
HYDEL	8,714 (2,073,932)	9,043 (2,152,234)	9,522 (2,266,236)	11,365 (2,704,870)	12,826 (3,052,588)	12,241 (2,913,358)	7.03
THERMAL	6,258 (1,489,404)	6,869 (1,634,822)	7,983 (1,899,954)	8,104 (1,928,752)	8,723 (2,076,074)	10,416 (2,479,008)	10.73
NUCLEAR	2 (476)	150 (35,700)	183 (43,554)	228 (54,264)	324 (77,112)	346 (82,348)	180.38
TOTAL	14,974 (3,563,812)	16,062 (3,822,756)	17,688 (4,209,744)	19,697 (4,607,886)	21,873 (5,205,744)	23,003 (5,474,714)	8.97
Annual Growth rate%	0.00	7.27	10.12	11.36	11.05	5.17	

Source: Directorate General of Energy Resources
(Energy Year Book of 1985, P. 80)

Table 2.2.28 Generation of electricity WAPDA (Hydel) 1984-85

Power House	Units generated (GHW)	Maximum load (MW)	Minimum load (MW)	Load factor %	Capacity factor (%)	Plant utilization factor (%)
Tarbela	7225.070	1575.000	--	52.500	96.000	47.32
Mangla	3879.004	960.000	50.000	64.190	120.000	55.43
Warsak	622.408	180.000	--	58.500	31.250	54.80
Dargai	86.670	17.000	--	58.200	85.000	49.49
Malakand	108.741	17.600	0.500	82.560	64.610	78.45
Rasul	55.565	16.000	--	40.350	72.730	29.35
Shadiwal	60.011	10.000	16.000	63.550	74.070	42.07
Chichoki Malian	45.681	10.500	1.000	50.200	79.500	40.00
Nandipur	52.373	9.700	1.200	61.650	70.290	43.33
Kurram Garhi	26.690	4.000	--	80.280	78.960	97.50
Renala	6.992	0.920	0.200	91.260	83.636	70.33
Chitral	2.846	0.824	--	44.040	39.340	68.20

Source: Directorate General of Energy
Resources (Energy Year Book 1985 P.77)

Table 2.2.29 Generation of electricity WAPDA "Thermal" 1983-84

Station	Total units generated (GWH)	Maximum load (MW)	Minimum load (MW)	Load factor %	Capacity factor (%)	Plant utilization factor (%)
1. GTPS Shahdara	177.582	73.5	2.00	17.930	86.47	18.590
2. SPS Faisalabad	671.420	120.00	30.00	63.872	90.91	58.065
3. GTPS Faisalabad	558.884	165.00	1.00	38.660	32.41	76.750
4. OTPS Faisalabad	3.503	5.00	2.00	7.990	55.23	4.418
5. NGPS Multan	1296.776	240.00	100.00	61.000	90.32	55.710
6. TPS Guddu	2247.173	370.00	30.00	69.420	84.28	58.510
7. TPS Sukkur	259.608	43.00	3.00	68.910	86.00	59.270
8. NTPS Hyderabad	143.142	27.05	1.05	78.200	49.30	37.180
9. GTPS Kotri	255.833	103.00	3.00	28.350	79.23	22.460
10. TPS Quetta	192.296	60.08	2.00	32.360	71.86	23.250
11. TPS MESCO	66.135	10.00	1.07	75.700	50.00	37.800
12. TPS REPCO	15.767	3.07	0.07	47.740	40.66	19.410

Source: Directorate General of Energy Resources (Energy Year Book 1985, P.79).

Table 2.2.32 Villages electrified upto June 1985

Province	. Total . number . of villages	Villages electri- fied from 1959-60 to 1979-80	Villages electrified during					Villages electri- fied from 1959-60 to June 1985	Villages electrified prior WAPDA	Total villages electrified
			1980-81	1981-82	1982-83	1983-84	1984-85			
Punjab	24,872	4,761	550	925	1,399	1,355	681	9,671	100	9,771
N.W.F.P. & F.A.T.A.	6,818	2,305	344	415	445	380	517	4,406	509	4,915
Sind	5,840	2,218	247	297	303	408	280	3,753	---	3,753
Baluchistan	5,714	276	40	64	41	182	227	830	---	830
Total	43,244	9,560	1,181	1,701	2,188	2,325	1,705	18,660	609	19,269

Source: Directorate General of Energy Resources
(Energy Year Book 1985 P. 87).

Table 2.2.33 Distribution of electricity by sectors (public utilities only)

Sector	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	GWH (% TOE)
							A.C.G.R.(%) 1979-80 to 1984-85
Domestic	2,357 (560,966)	2,696 (641,648)	3,223 (767,074)	3,752 (892,976)	4,535 (1,079,330)	5,076 (1,208,088)	10.58
Commercial	883 (210,154)	954 (227,052)	1,047 (249,662)	1,049 (249,662)	1,287 (306,306)	1,413 (336,294)	9.86
Industrial	4,108 (977,404)	4,526 (1,077,188)	5,002 (1,190,476)	5,572 (1,326,136)	5,884 (14,003,927)	6,249 (1,487,262)	8.75
Agriculture	2,066 (491,708)	2,135 (508,130)	2,369 (563,822)	2,559 (609,042)	2,673 (636,174)	2,798 (665,924)	6.25
Street light	108 (25,704)	137 (32,606)	105 (24,900)	109 (25,942)	101 (24,038)	105 (24,990)	-.56
Other Govt.	825 (96,350)	937 (223,006)	952 (226,576)	1,109 (263,942)	1,250 (297,500)	1,943 (462,434)	18.69
Total:	10,347 (2,462,586)	11,385 (2,709,392)	12,698 (3,022,124)	14,150 (3,367,700)	15,730 (3,743,740)	17,584 (4,184,902)	17.19
Annual growth rate %	—	10.03	11.54	11.43	11.17	11.79	

Source: Directorate General of Energy Resources
(Energy Year Book of 1984, P. 84).

SECTION - 3: LAND - EXPLANATORY NOTES

3.01 Land is a special category of resource: accordingly, other sections investigate the natural resources that lie beneath the land (notably energy and minerals) or that occur on the land surface (water or forests). Another section focusses on the perspective of pollution in its many manifestations, the physical, chemical and biological despoilation of land being one of them. Yet another section addresses the environmental dimensions of the human occupation of the surface of the earth from the viewpoint of the activities involved, i.e. human settlements and their associated phenomena. The main consideration which is followed in this section is that land as an environmental concern reflects numerous inter-relationships from a variety of points of view: it will help to provide a framework for the orderly organisation of data about the land surface of the earth, the human activities which take place on it and the processes of change which it is undergoing in terms of both natural ecosystems and human activities (4).

3.02 The land area of the earth is defined as the total area including the water bodies they contain: Land surface is the total land area of the earth excluding water bodies. The most basic environmental question concerning the classification of land centres on how much land exists, its location with respect to climatic or physiographic phenomena, and its suitability for human use. The earth's land area is 149 million square kilometres (occupied in 1975 at an average density of about 27 people per square kilometre), but when the land covered by lakes, streams and glaciers is subtracted from the category of land area, the global land surface amounts to approximately 133 million square kilometres. A very rough classification of global land potential indicates that only about 30% is potentially arable (i.e. suitable for raising crops). Some 20% is uncultivable mountainous terrain, 20% is desert or steppe, 20% is covered by glaciers, tundra and permafrost and 10% comprises other land with unsuitable soils. Thus land is a resource in terms of the occupation and use of its surface only as its specific local or regional characteristics enable it to serve a human need. Most of the land that is uncultivable is also sparsely inhabited-the polar regions, steep slopes, swamps, deserts, etc. People concentrate in those land areas that are most hospitable for settlement and cultivation and, at the same time, offer the best combinations of environmental elements (4).

3.03 Among the topics of environmental concern with regard to land are: the spread of deserts; the quality, uses and abuses of land, as they are shown by the specific problems of soil degradation (erosion, salinisation, chemical degradation, etc.), aridity and growth of deserts, deforestation and multiple use choices (4).

3.04 Soil degradation: It has many causes and consequences, but those of most immediate concern are erosion, salinisation and chemical degradation. Erosion is the washing or blowing away of surface soil. It occurs naturally but it is often accelerated when human activities remove the protective cover of natural vegetation. Soil may be washed or blown away faster than it can regenerate, resulting in the net loss of the surface horizons of the soil. Erosion of soil is an important environmental concern in the context of land management. Equally serious is salinisation, the accumulation of salts to the extent that they have a deleterious effect on soil productivity and crop yields. Salinity limits the ability of plants to absorb water and nutrients, retards their metabolism and causes their physiological deterioration. Alkalinisation, a particular type of salinisation, refers to a higher saturation of the soil with sodium. The main factors affecting salinisation are the aridity of the climate local topography and hydrological features, the physical properties of the soil, and farming practices (4).

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3.01 AREA AND DENSITY BY DISTRICTS

Districts	Population 1981	Area in Sq. Km.	Density per Sq. Km.	Districts	Population 1981	Area in Sq. Km.	Density per Sq. Km.
<u>PAKISTAN</u>	84,253,644	796,095	105.8	20. Tribal Area Adjoining Peshawar	37,061	261	142.0
<u>N.W.F.P.</u>	11,061,328	74,521	148.4	21. Tribal Area Adjoining Kohat	57,245	446	128.4
1. Chitral	208,560	14,850	14.0	22. Tribal Area Adjoining Bannu	79,362	877	90.5
2. Dir	767,409	5,282	145.3	23. Tribal Area Adjoining D.I. Khan	86,007	3,229	26.6
3. Swat	1,233,001	8,788	140.3				
4. Malakand (Protected-area)	257,797	952	270.8	<u>PUNJAB</u>	47,292,441	205,344	230.3
5. Kohistan	465,237	7,581	61.4	24. Attock	1,144,059	9,789	116.9
6. Mansehra	1,066,588	5,957	179.0	25. Rawalpindi	2,121,450	5,286	401.3
7. Abbottabad	1,169,432	3,565	328.0	26. Jhelum	1,167,220	7,179	162.6
8. Mardan	1,506,500	3,137	480.2	27. Gujrat	2,254,699	5,865	384.4
9. Peshawar	2,281,752	4,001	570.3	28. Mianwali	1,377,413	13,993	98.4
10. Kohat	758,772	7,012	108.2	29. Sargodha	2,553,215	12,367	206.5
11. Bannu	710,786	4,391	161.9	30. Faisalabad	4,689,162	9,108	514.8
12. D.I. Khan	635,494	9,005	70.6	31. Jhang	1,978,263	8,809	224.6
<u>F A T A</u>	2,198,547	27,220	80.8	32. Sialkot	2,711,482	5,353	506.5
13. Bajaur Agency	289,206	1,290	224.2	33. Gujranwala	2,675,937	5,988	446.9
14. Mohmand Agency	163,933	2,296	71.4	34. Sheikhpura	2,110,428	5,960	354.1
15. Khyber Agency	284,256	2,576	110.3	35. Lahore	3,544,942	1,772	2,000.5
16. Kurram Agency	294,362	3,380	87.1	36. Kasur	1,528,002	3,995	382.5
17. Orakzai Agency	358,751	1,538	233.3	37. D.G. Khan	1,582,584	24,240	65.3
18. North Waziristan Agency	238,910	4,707	50.8	38. Muzaffargarh	2,164,253	14,538	148.9
19. South Waziristan Agency	309,454	6,620	46.7	39. Multan	4,079,753	10,847	376.1
				40. Vehari	1,328,808	4,364	304.5
				41. Sahiwal	3,612,135	10,303	350.6

Table 3.03 Number and area of farms by size, 1972 (Excluding Malakand Division & Tribal Areas of N.W.F.P.)

Size of farm	Farms		Farm area		Cultivated area		Average size of	
	Number	Percent	Total	Percent	Total	Percent	Farm Area	Cultivated Area
All farms	3,761,940	x	49,206,552	x	40,750,255	x	x	x
Government farms	252	x	146,010	x	53,840	x	x	x
Private farms total	3,761,688	100	49,060,542	100	40,696,415	100	13.0	10.8
under 1.0 acres	156,462	4	77,139	(a)	71,118	(a)	0.5	0.5
1.0 to under 2.5 acres	364,155	10	584,253	1	531,158	1	1.6	1.5
2.5 to under 5.0 acres	538,421	14	1,901,342	4	1,744,991	4	3.5	3.2
5.0 to under 7.5 acres	579,924	15	3,429,045	7	3,197,170	8	5.9	5.5
7.5 to under 12.5 acres	920,848	24	8,908,584	18	8,322,859	20	9.7	9.0
12.5 to under 25.0 acres	793,928	21	13,061,022	27	11,784,083	29	16.5	14.8
25.0 to under 50.0 acres	289,146	8	9,215,260	19	7,736,099	19	31.9	26.8
50.0 to under 150.0 acres	102,641	3	7,402,094	15	5,240,157	13	72.1	51.1
150 acres and above	16,163	(a)	4,481,803	9	2,068,780	5	277.3	128.0

(x) Not applicable

(a) Percentage less than 0.5

Source: Agriculture Census Organisation.

Table 3.04-01 Water logged area (0-10 Depth to water table)

(000 acres)

Area	Area under DIW observation (a)	June 1979		June 1980		June 1981		June 1982	
		S	N	S	N	S	N	S	N
<u>Pakistan</u>	<u>40,500</u>	<u>3,803</u>	<u>18,152</u>	<u>3,075</u>	<u>18,054</u>	<u>4,636</u>	<u>17,596</u>	<u>7,990</u>	<u>15,013</u>
<u>Punjab</u>	<u>24,620</u>	<u>2,721</u>	<u>7,921</u>	<u>2,308</u>	<u>7,212</u>	<u>3,498</u>	<u>6,821</u>	<u>3,563</u>	<u>7,376</u>
Rechna Doab	5,994	693	1,753	501	1,209	788	1,744	823	1,926
Chaj Doab	2,451	991	621	788	608	1,445	—	1,569	—
Thal Doab	3,935	1,037	1,463	1,019	1,328	1,038	1,289	967	1,294
Bari Doab	6,909	—	845	—	733	—	717	—	863
Bahawalpur	4,322	—	2,658	—	2,758	227	2,486	204	2,698
D.G. Khan	1,009	—	581	—	576	—	585	—	595
<u>Sind and Baluchistan</u>	<u>14,547</u>	<u>734</u>	<u>10,182</u>	<u>674</u>	<u>10,571</u>	<u>940</u>	<u>10,515</u>	<u>4,217</u>	<u>7,383</u>
<u>N.W. F. P.</u>	<u>1,333</u>	<u>348</u>	<u>49</u>	<u>93</u>	<u>271</u>	<u>198</u>	<u>260</u>	<u>210</u>	<u>254</u>

Contd.

Table 3.04 Water logged area

(000 acres)					
Area	Area under D. T. W. observation (a)	June 1983		June 1984	
		S	N	S	N
0-10' Depth to water table					
<u>PAKISTAN</u>	<u>40,500</u>	<u>7,721</u>	<u>14,728</u>	<u>7,546</u>	<u>14,427</u>
<u>Punjab</u>	<u>24,620</u>	<u>3,556</u>	<u>6,941</u>	<u>2,960</u>	<u>6,676</u>
Rechna Doab	5,994	759	1,794	467	1,292
Chaj Doab	2,451	1,656	—	1,473	—
Tahal Doab	3,935	956	1,295	840	1,317
Bari Doab	6,909	—	778	—	820
Bahawalpur	4,322	185	2,612	180	2,716
D. G. Khan	1,009	—	462	—	531
<u>Sind and Baluchistan</u>	<u>14,547</u>	<u>3,946</u>	<u>7,507</u>	<u>4,385</u>	<u>7,528</u>
<u>N. W. F. P.</u>	<u>1,333</u>	<u>219</u>	<u>280</u>	<u>201</u>	<u>223</u>

S = SCARP Areas

N = Non-SCARP areas

(a) DTW = Area under depth to watertable have been generally changing with the passage of time.

Contd.

Table 3.04 Water logged area

(000 acres)

Area	Area under D.T.W. observation (a)	1982		1983	
		October		June	
		S	N	S	N

0-5' Depth to watertable

<u>PAKISTAN</u>	<u>40,500</u>	<u>3,991</u>	<u>7,170</u>	<u>2,143</u>	<u>3,338</u>
<u>Punjab</u>	<u>24,620</u>	<u>1,209</u>	<u>2,136</u>	<u>894</u>	<u>1,723</u>
Rechna Doab	5,994	160	374	79	289
Chaj Doab	2,451	578	—	504	—
Thal Doab	3,935	395	303	259	314
Bari Doab	6,909	—	203	—	173
Bahawalpur	4,332	76	848	52	744
D.G. Khan	1,009	—	408	—	203
<u>Sind and Baluchistan</u>	<u>14,547</u>	<u>2,691</u>	<u>5,000</u>	<u>1,164</u>	<u>1,572</u>
<u>N.W.F.P.</u>	<u>1,333</u>	<u>91</u>	<u>34</u>	<u>85</u>	<u>43</u>

3.06 Surface salinity by districts in canal commanded areas in Pakistan

District	Survey period	Surveyed Area	Salt free	Slightly saline	Moderately saline	(Thousand Hectare)	
						Strongly saline	Misc. land type
1	2	3	4	5	6	7	8
Peshawar	1977-79	196	155	5	3	2	31
Bannu	"	77	51	14	6	1	5
D.I. Khan	"	154	118	23	1	4	8
Total	"	613	480	49	13	10	61
<u>Sind</u>	"	5,579	2,795	1,039	578	999	168
Jacobabad	"	455	219	80	49	103	4
Shikarpur	"	203	109	22	9	62	1
Sukkur	"	417	291	27	30	66	3
Larkara	"	468	206	95	45	115	7
Nawabshah	"	534	398	79	31	19	7
Khairpur	"	305	230	50	10	3	12
Dadu	"	277	130	77	33	28	9
Sanghar	"	544	350	82	29	69	14
Hyderabad	"	463	350	72	23	13	5
Tharparkar	"	582	281	161	45	92	3
Badin	"	644	149	121	177	157	40
Thatta	"	687	82	173	97	272	63
Total	"	5579	2795	1039	578	999	168
<u>Baluchistan</u>	"	353	262	60	16	14	1
Kohlu	"	3	3	—	—	—	—
Kachhi	"	57	53	4	—	—	—
Naseerabad	"	293	206	56	16	14	1
Total	"	353	262	60	16	14	1
Pakistan	"	16,710	12,059	1,860	1,041	1,322	428

Table 3.07 Disastrous area with water table within 5 ft.

(Million acres)

Province				Summer	Winter
Punjab	..	..	..	0.558	1.090
Sind and Baluchistan	..	..	..	0.149	0.443
N.W.F.P.	..	..	..	0.039	0.049
TOTAL				0.746	1.582

Source:- Planning Commission (Sixth Five Year Plan p.299)

1

Section 4: HUMAN SETTLEMENTS-EXPLANATORY NOTES

4.01 Human settlements refer to those natural and man-made elements that constitute man's territorial habitat: where he lives, works, seeks recreation and well-being, and where he raises his family. Although shelter is the most obvious physical component of human settlements, it is not only the one: transport, communications, energy and water supplies networks, sewage and garbage disposal services, all are important. Data for environmental assessment in human settlements include established statistics in such fields of study as housing, construction, energy, transport and industry (5).

4.02 The wide range of problems affecting the environment of human settlements relates to urbanization, marginal settlements, infrastructure & services, rural degradation, architectural dullness. Population is one aspect of urban environmental concern. Even though cities are growing rapidly, this growth is mostly residential and not very permanent. The environmental consequences of increasing number of people living in urban and rural settlements include: pollution of streams; wastage of land; erosion of hillsides; overcrowding; lack of rudimentary public services; destruction of trees and vegetation; widespread sickness; disease and high mortality rates. The concentration of buildings produces such climatological consequences as changes in aerodynamics, temperature, precipitation and relative humidity, and the chemical composition of the atmosphere. Roads and highways generate noise and pollution in varying degrees, impairing a nearby residential environment. A nearby industrial plant can be as disrupting to a residential area as a major highway, since noise and smoke are by-product of many industrial processes (5).

4.03 Marginal settlements are slums or squatter settlements. Slums refer to areas of older housing, which are deteriorating in the sense of being underserviced overcrowded and dilapidated. Squatter settlements refer to areas where groups of housing units have been constructed on land to which the occupants have no legal claim. In many cases, housing units located in squatter settlements are shelters or structures built of waste materials and without a predetermined plan. Squatter settlements are usually found in urban and suburban areas, particularly at the peripheries of principal cities. The growth of slums and squatter settlements is related to the massive migration of people from rural to urban areas. Migration from rural areas accounts for 50% of the total urban growth and the majority of urban population consists of migrants or their children. The environmental conditions of these inhabitants are very poor as the benefits of industrialization tends to be poorly distributed not only between city and countryside but also among the urban population.

4.04 The supply of adequate infrastructure and services is at present a major concern among the environmental conditions of human settlements. The quality of life is determined by the availability and quality of infrastructure (community water supply, sewage disposal/sewage facilities, solid waste disposal, transport) and services (health, education, culture and recreations). The problems encountered in rural areas can be attributed to the fact that these areas are socially and economically underdeveloped when compared with the levels of development reached in urban areas (5).

4.05 Tables 4.1.01 to 4.1.15 provide information on the household and its dwelling i.e. housing units by tenure, period of construction, number of rooms, household size, materials used in walls/roofs, source of drinking water, lighting, cooking fuel used, facilities like kitchen/bath/latrine; population of urban areas; area population and density selected

demographic parameters of Pakistan's population and per capita income. Tables 4.2.01 to 4.2.43 provide information on the immediate environmental community i.e. roads, motor vehicles, railways, air traffic, post and telecommunications, television and radio licenses issued, daily employment in mines, industrial accidents, registered factories, labour force, employment, wholesale and retail trade; services like health, education, rural development. Tables 4.3.01 to 4.3.04 provide information on the wider societal context like physical planning and housing, physical achievements/targets on water supply, sanitation, sewerage, drainage and housing; and subsidies.

4.06 The gaps in data in the area of human settlements relate to:-

- data on housing costs as against income or consumption: these relate to the importance of surplus resources beyond expenditures for food and shelter;
- availability and/or accessibility of various functions and services like: renovation (waste and pollution), work and vacation (composition of work opportunities), areas and institutions for children's activities (playgrounds, day-care centres, nursery schools, etc.), goods and services (all kinds of shops and services), recreation (organisations, entertainment, creative activities, public places, etc.), noise and degree of pollution;
- data on the structure of housing market as revealed in the degree of choice available to the single household.

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ASPECT OF ENVIRONMENT

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Table 4.1.01 Percentage of housing units by tenure, 1980

Locality	Housing units	Owned	Rented	Rent free
<u>PAKISTAN</u>				
Total	100	78	8	14
Rural	100	83	2	15
Urban	100	68	22	10
<u>ISLAMABAD</u>				
Total	100	57	34	9
Rural	100	88	6	6
Urban	100	39	50	11
<u>N. W. F. P.</u>				
Total	100	75	10	15
Rural	100	78	6	16
Urban	100	56	32	12
<u>PUNJAB</u>				
Total	100	79	6	15
Rural	100	82	2	16
Urban	100	71	19	10
<u>SIND</u>				
Total	100	77	11	12
Rural	100	85	1	14
Urban	100	66	23	11
<u>BALUCHISTAN</u>				
Total	100	84	5	11
Rural	100	88	1	11
Urban	100	63	24	13

Table 4.1.02 Housing units by tenure-1980
(PAKISTAN)

Tenure	Total	Percent	Rural	Percent	Urban	Percent
1	2	3	4	5	6	7
Owned	9,866,737	78	7,461,357	83	2,405,380	68
Rented	972,685	8	195,507	2	777,178	22
Rent free	1,748,226	14	1,376,611	15	371,615	10
Total	12,587,648	100	9,033,475	100	3,554,173	100

Table 4.1.03 Housing units by period of construction-1980
(PAKISTAN)

Period of construction	Total	Percent	Rural	Percent	Urban	Percent
1	2	3	4	5	6	7
0-4 Years	2,511,464	20	1,835,652	20	675,812	19
5-10 "	3,003,893	24	2,245,178	25	758,715	21
11-33 "	4,601,278	37	3,193,968	35	1,407,310	40
34 years & more	2,471,013	19	1,758,677	20	712,336	20
Total	12,587,648	100	9,033,475	100	3,554,173	100

Source: Housing Census of Pakistan (1980)

Table 4.1.04 Housing units by number of rooms and household size-1980
(PAKISTAN)

Housing unit/ Household size	Housing units by number of rooms					Housing units		Rooms per h. unit
	1 Room	2 Rooms	3 Rooms	4 Rooms	5& More	Total	Percent	
1 Person	285,617	74,598	22,036	8,554	7,658	398,463	3.17	1.5
2 Persons	555,434	178,753	43,969	15,666	11,244	805,066	6.40	1.5
3 "	661,339	239,872	66,835	21,985	14,416	1,004,447	7.98	1.5
4 "	848,900	357,523	100,065	37,743	22,943	1,367,174	10.86	1.6
5 "	868,286	434,804	132,411	47,772	32,823	1,516,096	12.04	1.7
6 "	903,225	517,810	168,219	63,388	43,589	1,696,231	13.48	1.8
7 "	695,037	472,274	164,689	63,518	43,263	1,438,778	11.43	1.9
8 "	641,756	464,104	169,299	67,065	45,100	1,387,324	11.02	1.9
9 "	333,123	296,095	120,459	49,142	34,672	833,491	6.62	2.1
10 "	300,880	264,686	114,665	50,197	44,390	774,818	6.16	2.6
11-14 Persons	304,668	330,577	182,412	90,565	77,470	985,692	7.83	2.5
15 Persons & more	89,196	90,143	71,631	49,659	79,439	380,068	3.02	4.3
Total	6,487,461	3,721,239	1,356,690	565,251	457,007	12,587,648	100.00	1.9
Percent	51.54	29.56	10.78	4.49	3.63	100.00		
Persons per h. unit	5.9	7.0	7.9	8.6	9.7	6.7		
Persons per room	5.9	3.5	2.6	2.1	1.5	3.5		

Source: Housing Census of Pakistan (1980)

Table 4.1.05 Housing units by material used in "Outer-walls" and "Roofs" - 1980

(PAKISTAN)

1. Construction material used in outerwalls

Particulars	Total	Percent	Rural	Percent	Urban	Percent
Baked bricks/concrete/stone with cement finish	1,951,862	15	439,852	5	1,512,010	43
Baked bricks/stone with mud finish	3,529,275	28	2,247,395	25	1,281,880	36
Unbaked bricks with mud finish	5,989,287	48	5,342,410	59	646,877	18
Wood	280,803	2	240,060	3	40,743	1
Others	836,421	7	763,758	8	72,663	2
Total	12,587,648	100	9,033,475	100	3,554,173	100

2. Construction material used in roofs

Particulars	Total	Percent	Rural	Percent	Urban	Percent
R.C.C/R.B.C	1,076,748	9	135,125	1	941,623	26
Girder/beam, wood baked bricks, etc.	9,842,487	78	7,641,091	85	2,201,396	62
Others	1,668,413	13	1,257,259	14	411,154	12
Total	12,587,648	100	9,033,475	100	3,554,173	100

Table: 4.1.06 Housing units by source of drinking water-inside and outside 1980

1. Source of drinking water inside

Housing facility	Total	Percent	Urban	Percent	Rural	Percent
Pipe	1,588,606	13	228,896	3	1,359,710	38
Hand-pump	4,317,289	34	3,347,182	37	970,107	27
Well	594,410	5	477,313	5	117,097	3

2. Source of drinking water outside

Housing facility	Total	Percent	Urban	Percent	Rural	Percent
Pipe	971,932	8	259,766	3	712,166	20
Hand-pump	1,544,992	12	1,344,384	15	200,608	6
Well	1,577,009	13	1,443,541	16	133,468	4
Pond	416,857	3	400,687	4	16,170	—
Spring/river/stream etc.	1,576,553	13	1,531,706	17	44,847	1
Total (1 & 2)	12,587,648	100	9,033,475	100	3,554,173	100

Table 4.1.07 Housing units by source of lighting and by cooking fuel used 1980

1. By source of lighting

Source of lighting	Total	Percent	Urban	Percent	Rural	Percent
Electricity	3,849,127	31	1,324,378	15	2,524,749	71
Kerosene oil	8,463,462	67	7,473,775	83	989,687	28
Other lighting sources	275,059	2	235,322	3	39,737	1
Total	12,587,648	100	9,033,475	100	3,554,173	100

2. By cooking fuel used

Cooking fuel used	Total	Percent	Urban	Percent	Rural	Percent
Wood	8,810,121	70	7,096,182	79	1,713,939	48
Coal	86,832	1	40,896	—	45,936	1
Kerosene oil	780,835	6	66,496	1	714,339	20
Gas	812,867	6	27,063	—	785,804	22
Electricity	10,521	—	6,951	—	3,570	—
Cow-dung etc.	2,086,472	17	1,795,887	20	290,585	8
Total	12,587,648	100	9,033,475	100	3,554,173	100

Source: Housing Census of Pakistan (1980).

Table 4.1.08 - Housing units by kitchen and bath room, latrine separate/shared 1980

1. By kitchen

Type of kitchen	Pakistan	Percent
Separate	1,580,253	44
Shared	156,405	4
None	1,817,515	51
Total	3,554,173	100

2. By bathroom

Type of bathroom	Pakistan	Percent
Separate	1,678,744	47
Shared	227,027	6
None	1,648,402	46
Total	3,554,173	100

Contd.

Table 4.1.08 Housing units by Kitchen, bath room and latrine sepearte/shared-1980

3. By latrine - separate

Separate latrine	Pakistan	Percent
With flush	794, 471	22
Without flush	1, 463, 350	41

4. By latrine - shared

Shared latrine	Pakistan	Percent
With flush	95, 912	3
Without flush	237, 085	7
No latrine	963, 355	27
Total (3+4)	3, 554, 173	100

Source: Housing Census of Pakistan (1980)

Table 4.1.09 Sanitation facilities urban/rural by Province

Province/Area	Urban sanitation					Rural sanitation				
	Population in 1981 (Million)	Population coverage in 1978 (Million)	Additional population covered (1978-81) (Million)	Total coverage (1981) (Million)	Percent coverage	Population in 1981 (Million)	Population coverage in 1978 (Million)	Additional population covered (1978-81) (Million)	Total coverage (1981) (Million)	Percent coverage
Punjab	12.97	3.86	1.89	5.75	44.33	34.15	0.53	0.20	0.73	2.14
Sind	8.23	3.22	0.75	3.97	48.23	10.74	0.08	0.26	0.34	3.17
N.W.F.P.	1.66	0.13	—	0.13	7.83	9.23	—	—	—	—
Baluchistan	0.67	0.01	—	0.01	1.49	3.64	—	—	—	—
FATA	—	—	—	—	—	2.18	—	—	—	—
Total	23.53	7.22	2.64	9.86	41.90	59.94	0.61	0.46	1.07	1.79

Source: Biological Research Centre,
Karachi University.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
BALUCHISTAN								
Quetta	84,343	106,633	158,026	285,719	100	126	187	339
Turbat	3,549	4,578	27,671	52,337	100	129	780	1,475
Zhob	6,001	8,058	17,291	31,931	100	134	288	532
Khuzdar	---	---	3,362	30,887	---	---	100	919
Chaman	7,161	12,208	20,702	29,793	100	170	289	416
Sibi	11,842	13,327	19,989	23,043	100	113	169	195
Pasni	---	7,483	15,737	17,988	---	100	210	241
Mastung	2,792	5,962	10,397	16,450	100	214	372	589
Pishin	3,106	2,906	10,068	14,715	100	94	324	474
Loralai	4,437	5,519	7,157	13,900	100	124	161	313
Usta Mohammad	---	3,341	6,605	12,016	---	100	198	360
Nushki	2,142	3,153	5,329	11,300	100	147	249	528
Kalat	2,009	5,321	6,481	11,037	100	265	323	549
Bela	3,063	3,139	6,728	11,172	100	102	220	365
Kharan	2,589	2,692	6,093	10,472	100	104	235	404
Chitkan	---	---	---	9,495	---	---	---	---
Gawadar	---	8,146	15,794	17,000	---	100	194	209
Bhag	---	4,316	7,500	8,589	---	100	174	199
Dera Murad Jamali	---	---	---	9,133	---	---	---	---
Mach	3,211	4,921	7,273	8,419	100	153	227	262
Jhatpat	---	1,497	12,332	6,730	---	100	823	450
Ormara	---	---	---	8,265	---	---	---	---
Gaddani	---	---	---	6,730	---	---	---	---
Dhadar	---	4,099	4,561	5,852	---	100	111	143
Harnai	---	1,940	2,503	4,802	---	100	129	248
Sinjai	---	565	1,126	5,327	---	100	199	943
Hub	---	---	---	4,249	---	---	---	---
Uthal	---	---	2,296	9,404	---	---	100	410

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
<u>N.W.F.P</u>								
Peshawar	151,776	217,885	272,697	566,248	100	144	180	373
Mardan	48,863	77,932	115,194	147,977	100	159	236	303
Mingora	---	---	51,117	88,078	---	---	100	172
Kohat	40,841	49,854	65,202	77,604	100	122	160	190
Nowshera	41,406	43,757	55,916	74,913	100	106	135	181
D.I. Khan	41,663	46,140	58,778	68,145	100	111	141	164
Abbottabad	27,617	31,036	46,719	65,996	100	112	169	239
Charsadda	27,239	37,396	45,555	62,530	100	137	167	230
Swabi	---	17,542	37,292	46,344	---	100	213	264
Bannu	27,516	31,623	43,757	43,210	100	115	159	157
Haripur	8,065	10,217	14,358	31,117	100	127	178	386
Shabqadar	---	11,046	25,630	30,881	---	100	232	280
Mansehra	6,513	11,848	19,865	27,843	100	182	305	427
Tank	6,899	10,582	14,306	25,003	100	153	207	362
Khalabat	---	---	---	23,892	---	---	---	---
Risalpur	9,983	11,291	12,136	20,386	100	113	122	204
Laki-marwat	8,754	9,451	14,359	18,755	100	108	164	214

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Takhat Bhai	---	3,181	12,069	18,325	---	100	379	576
Tangi	12,065	14,706	18,022	19,492	100	122	149	162
Tall	5,757	11,747	14,082	18,901	100	204	245	328
Utmanzai	10,287	12,610	15,857	18,931	100	123	154	184
Jehangira	---	3,501	3,564	18,076	---	100	102	516
Havelian	---	4,671	7,803	16,305	---	100	167	349
Hangu	6,977	9,737	13,800	15,526	100	140	198	223
Kulachi	6,981	7,190	9,315	14,785	100	103	133	212
Nawanshehr	5,668	8,507	13,644	14,504	100	150	241	256
Akorakhattak	---	7,954	11,191	13,788	---	100	141	173
Karak	---	---	---	13,679	---	---	---	---
Pabbi	---	7,184	10,905	13,331	---	100	152	186
Nawankilli	---	7,139	9,873	11,957	---	100	138	167
Baffa	5,702	6,791	8,515	9,593	100	119	149	168
Lachi	---	---	---	10,215	---	---	---	---
Amangarh	---	11,946	8,234	9,258	---	100	69	77
Pharapur	---	4,532	6,841	8,665	---	100	151	191
Cherat	1,123	2,336	989	1,239	100	208	88	110

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality		Population of urban areas in number								(Index)	
		1951	1961	1972	1981	1951	1961	1972	1981	1972	1981
PUNJAB											
Lahore	85	811	849,476	1,296,477	2,169,742	2,952,689	100	258.52	153	255	348
Faisalabad	80A	802	179,144	425,248	823,343	1,104,209	100	219.41	237	460	616
Rawalpindi	81	80	237,219	340,175	614,809	794,843	100	210.02	143	259	335
Multan	87	151	190,122	358,201	538,949	732,070	100	270.02	188	283	385
Gujranwala	80	801	120,860	196,154	360,478	658,753	100	212.32	162	298	545
Sialkot	87	801	167,543	167,294	230,650	320,009	100	219.72	100	122	180
Sargodha	87	802	78,463	129,291	200,460	291,362	100	238.21	165	255	371
Islamabad	80S	811	---	---	76,641	204,364	---	---	---	100	262
Jhang	87	801	73,402	94,971	131,843	195,558	100	271.81	129	180	266
Bahawalpur	80	101	141,646	84,377	133,782	180,263	100	222.21	60	94	127
Kasur	80S	801	63,086	74,546	101,295	155,523	100	200.21	118	161	247
Gujrat	80S	801	46,986	59,608	100,333	155,058	100	200.71	127	214	330
Okara	87	811	35,358	68,299	101,052	153,483	100	232.45	193	286	434
Sahiwal	80S	801	50,185	75,180	106,648	150,954	100	204.05	150	213	301
Sheikhpura	80	87	29,768	41,635	80,560	141,168	100	222.2	140	271	474

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Wah Cantt:	32,823	37,035	107,510	122,335	100	113	328	373
Rahim Yar Khan	14,919	43,548	74,262	119,036	100	292	498	798
Jehlum	56,617	52,685	70,157	106,462	100	93	124	188
Chiniot	39,070	47,099	70,108	105,559	100	121	179	270
Dera Ghazi Khan	36,239	47,105	72,243	102,007	100	130	199	281
Khanewal	37,915	49,093	67,746	89,090	100	129	179	235
Burewala	15,383	34,237	57,741	86,311	100	223	375	561
Hafizabad	30,082	34,576	61,597	83,464	100	115	205	277
Bahawalnagar	18,373	36,290	50,991	74,533	100	198	278	406
Kamoke	15,558	25,124	50,257	71,097	100	161	323	457
Khanpur	16,964	31,465	49,235	70,589	100	185	290	416
Jaranwala	17,969	26,953	46,494	69,459	100	150	259	387
Pak pattan	24,326	27,974	42,028	69,820	100	115	173	287
Gojra	20,407	29,667	41,975	68,000	100	145	206	333
Sadiqabad	5,758	16,007	37,121	63,935	100	178	645	1,110
Wazirabad	33,027	29,399	40,063	62,725	100	89	121	1,905

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Chishtian	10,270	26,041	38,496	61,959	100	254	375	603
Kamalia	28,636	35,248	50,934	61,107	100	123	178	213
Mianwali	23,341	31,398	48,304	59,159	100	135	207	253
Ahmed Pur East	23,055	32,423	43,312	56,979	100	101	135	178
Khushab	20,476	24,851	43,391	56,274	100	121	212	275
Daska	15,375	20,406	34,487	55,555	100	133	224	361
Muzaffargarh	11,271	14,474	24,726	53,799	100	128	219	477
Vehari	8,986	15,410	28,246	53,192	100	171	314	592
Kharian	4,598	19,469	21,306	51,506	100	423	463	1120
Leiah	14,914	19,608	33,549	51,482	100	131	225	345
Chichwatni	12,083	21,380	34,064	50,568	100	177	282	419
Shorkot	7,174	7,197	35,583	50,241	100	100	496	700
Islamusa	17,958	22,633	35,430	46,626	100	126	197	260
Chakwal	13,319	16,843	29,143	43,670	100	126	219	328
Mandi Bahauddin	17,715	22,295	36,172	44,796	100	130	211	261

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality		Population of urban areas in numbers				Population of urban areas (Index)			
		1951	1961	1972	1981	1951	1961	1972	1981
Arifwala		11,537	18,558	28,171	43,654	100	161	244	378
Haroonabad		10,014	22,575	35,189	42,590	100	225	351	425
Bhakkar		12,397	21,749	34,638	41,934	100	175	279	338
Attock		17,689	19,041	29,172	40,000	100	108	165	226
Mian Channay		12,071	19,888	31,935	40,609	100	165	265	336
Texilla		---	---	---	38,374	---	---	---	---
Toba Tek Singh		12,089	17,847	28,028	37,844	100	148	232	313
Shujabad		14,601	16,815	24,422	37,810	100	115	167	259
Kot-Addu		10,507	13,107	21,409	37,479	100	125	204	357
Hasil pur		3,490	7,970	15,742	37,026	100	228	451	1061
Bhalwal		8,678	10,207	13,093	35,600	100	118	151	410
Muridke		---	6,757	18,507	35,419	---	100	274	518
Chuhar Khan		6,585	8,682	15,146	34,995	100	132	230	531
Narowal		15,298	16,127	22,174	35,125	100	105	145	230
Kahrur-pacca		15,322	16,870	22,922	35,600	100	110	157	232

Table 4.1-10: Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality		Population of urban areas in number				(Index)			
		1951	1961	1972	1981	1951	1961	1972	1981
Gujar Khan		8,503	11,529	24,121	33,920	100	136	284	399
Pattoke		11,903	20,006	34,963	100	168	315		
Mailsi		10,242	13,617	21,318	33,652	100	133	208	329
Sangla Hill		9,379	13,738	25,411	33,771	100	146	271	360
Nanakana Sahib		16,599	17,140	25,703	32,963	100	103	155	199
Sammundri		6,637	9,515	13,642	30,849	100	143	206	465
Jalalpur Jatan		18,154	16,988	23,459	29,590	100	94	129	163
Bhai-pheru		12,456	10,999	19,404	30,140	100	88	156	242
Mitha tiwana		12,380	16,046	26,393	28,959	100	130	213	234
Bhera		16,644	17,992	24,167	29,654	100	108	145	178
Rabwah		2,684	9,991	15,879	28,010	100	372	592	1044
Ghakhar		8,775	11,008	18,175	27,789	100	125	207	317
Jampur		13,235	13,161	19,944	27,949	100	99	151	211
Haveli Lakha wasawala		8,480	10,624	18,276	27,633	100	125	216	326
Kundian		14,429	25,998	26,219	100	180	182		

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Darya Khan	---	10,533	16,726	25,877	---	100	159	246
Qila Didarsingh	8,553	10,266	15,667	25,442	100	120	183	297
Shakargarh	4,919	9,104	20,201	25,484	100	185	411	518
Pasrur	9,403	10,836	19,647	26,087	100	115	209	277
Kot moman	9,061	4,723	18,459	25,383	100	52	204	280
Kot Radha Kishan	8,657	10,536	14,468	24,969	100	122	167	288
Chunian	9,892	10,519	16,557	24,521	100	106	167	248
Depal Pur	7,889	9,452	13,933	25,237	100	120	177	320
Dina	---	---	16,292	23,670	---	---	100	145
tandlianwala	10,099	13,563	16,075	24,324	100	134	159	241
Shah Kot	11,230	10,110	17,515	240,12	100	90	156	214
Sambrial	4,919	7,750	14,300	24,432	100	158	291	497
Basir Pur	---	---	15,872	24,032	---	---	100	151
Hujrashah Maqim	---	---	16,629	24,012	---	---	100	144
Hasan Abdal	6,349	7,971	12,248	22,704	100	126	193	358

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Malakwal	6,106	8,139	18,451	22,734	100	133	302	372
Piplan	---	---	16,832	22,570	---	---	100	134
Sarai Alamgir	---	---	2,609	23,664	---	---	100	907
Hadali	11,348	8,502	17,112	21,755	100	75	151	192
Kabirwala	4,330	5,326	12,287	22,141	100	123	284	511
Abdul Hakim	5,155	6,644	12,143	21,686	100	129	236	421
Lodhran	4,890	6,663	14,232	21,791	100	136	291	446
Dinga	7,570	9,053	13,817	20,376	100	120	183	269
Lilliani	---	---	18,774	21,449	---	---	100	114
Sahiwal	8,406	9,685	19,988	21,231	100	115	238	253
Alipur Chatta	---	---	---	20,905	---	---	---	---
Nowsheravirkar	---	---	---	20,397	---	---	---	---
Jatoi	4,744	5,384	8,068	21,422	100	113	170	452
Mustafabad	---	---	---	20,905	---	---	---	---
Randighab	10,157	12,416	17,982	20,535	100	122	177	202

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Localty (rebn)		Population of urban areas in number				Index		(Index)	
		1951	1961	1972	1981	1951	1961	1972	1981
Tala Gang		8,755	10,818	17,395	20,885	100	124	199	239
Shahpur		9,278	11,254	15,408	19,119	100	121	166	206
Taunsa		7,286	9,712	13,439	19,934	100	133	184	274
Khewra		--	12,086	15,004	19,083	--	100	124	158
Jaunharabad		--	18,189	14,681	18,742	--	100	179	229
Kahnanau		--	8,397	10,312	19,169	--	100	123	228
Khark pur		9,056	9,820	13,863	18,907	100	108	153	209
Rajanpur		5,280	6,575	10,011	18,789	100	125	190	356
Fortabbas		2,499	6,982	13,687	18,760	100	279	468	751
Chak Jhumra		8,058	9,869	16,278	17,420	100	122	202	246
Pir mahal		--	5,173	16,247	18,684	--	100	314	361
Alipur		5,933	6,369	8,106	17,592	100	107	137	297
Tulamba		8,016	9,612	15,894	17,497	100	120	198	218
Renalakhurd		4,975	7,867	11,799	18,287	100	158	237	368
Jhawarian		6,250	7,955	11,368	17,643	100	127	182	282

Contd.

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Lalian	8,357	7,142	10,578	16,977	100	85	127	203
Raiwind	5,364	7,621	9,476	16,628	100	142	177	310
Pindi Bhattian	6,784	7,212	10,039	16,819	100	106	148	248
Narang	--	4,810	10,122	17,081	--	100	210	355
Murree	9,406	13,486	17,065	15,928	100	143	181	169
Kunjah	8,822	9,887	13,342	16,366	100	112	151	186
Garh Maharaja	--	--	9,905	16,233	--	--	100	164
Jahanian	--	9,695	12,421	15,930	--	100	128	164
Jalal pirwala	8,488	8,750	12,140	15,864	100	103	143	187
Dunyapur	5,786	6,148	11,252	16,341	100	106	194	282
Khairpur Tamewali	8,270	8,098	11,318	16,077	100	98	137	194
Samasatta	--	--	8,618	16,313	--	--	100	189
Raja Jang	9,897	10,625	13,590	15,638	100	107	137	158
Warburton	--	6,571	10,801	14,605	--	100	164	222
Khankah dogran	--	5,561	8,560	15,115	--	100	154	272

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Jamke Cheema	--	--	12,780	14,848	--	--	100	116
Minchinabad	4,906	5,020	7,112	14,550	100	102	145	297
Liaquatpur	--	4,614	8,699	15,271	--	100	189	331
Hazro	7,512	9,622	12,969	14,307	100	128	173	190
Fatehjang	5,127	5,989	10,662	13,505	100	117	208	264
Shadi wal	--	--	--	13,701	--	--	--	--
Sillanwali	7,217	7,839	10,274	14,490	100	109	142	201
Sukheke	--	--	--	14,168	--	--	--	--
Uch Sharif	4,172	5,483	8,491	13,386	100	131	204	321
Donga Bonga	--	--	13,044	13,894	--	--	100	107
Pind Dadan Khan	7,339	8,328	10,253	12,639	100	113	140	172
Phalia	--	--	8,565	13,193	--	--	100	154
Phularwan	9,297	8,249	11,346	12,719	100	89	122	137
Nurpurthal	4,964	2,320	9,985	12,911	100	47	201	260
Kalur kot	5,577	6,723	9,430	12,456	100	121	169	223

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Ahmedpur Sial	4,620	6,408	10,811	13,131	100	139	234	284
Eminabad	9,443	9,526	12,066	13,794	100	101	128	146
Dhaban Singh	--	3,551	8,457	12,609	--	100	238	355
Baddomalhi	--	7,773	10,112	13,244	--	100	130	170
Chwinda	7,858	7,792	10,497	13,185	100	99	134	168
Makhdoompur-Pahoran	--	--	--	12,610	--	--	--	--
Trindasawi Khan	--	--	11,437	13,599	--	--	100	119
Khudian	6,292	6,821	9,119	12,884	100	108	145	205
Kanganpur	--	--	7,699	12,009	--	--	100	156
Kotli Loharan	--	--	--	12,836	--	--	--	--
Qadirpur Rawan	--	--	--	11,740	--	--	--	--
Isakhel	6,366	7,611	13,507	11,516	100	120	212	181
Kala Bagh	10,523	9,073	13,018	10,598	100	86	124	101
Bhopalwala	--	--	9,473	10,641	--	--	100	112
Zafarwal	--	4,074	7,610	10,646	--	100	187	261

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				Index			
	1951	1961	1972	1981	1951	1961	1972	1981
Karor	2,584	5,567	8,454	11,290	100	215	327	437
Khangarh	4,408	5,371	7,187	11,445	100	122	163	260
Kahuta	--	4,398	8,097	9,455	--	100	184	215
Miani	6,069	6,387	9,930	9,768	00	105	164	161
Jandanwala	--	--	--	10,311	--	--	--	--
Sahdra	--	--	--	10,135	--	--	--	--
Sarai Siddhu	--	--	--	10,365	--	--	--	--
Yazman	--	--	3,579	10,060	--	--	100	281
Faqirwali	--	--	--	10,444	--	--	--	--
Harnoli	--	--	--	9,389	--	--	--	--
Bhawana	--	--	--	9,043	--	--	--	--
Bagh	--	--	--	8,499	--	--	--	--
Rasul nagar	4,987	5,826	8,184	9,035	100	117	164	181
Jalal pur	--	--	--	9,015	--	--	--	--
Kaleke	--	--	--	9,144	--	--	--	--
Kalaswala	--	--	7,277	8,515	--	--	100	117
Shehrsultan	--	--	5,029	8,650	--	--	100	172

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/Locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Kot Samaba	1,716	2,013	3,311	8,811	100	117	193	513
Dhonkal	--	--	--	7,671	--	--	--	--
Kot mithan	3,675	4,382	6,338	8,531	100	119	172	232
Mandi Sadiq Ganj	4,582	5,892	7,818	8,203	100	129	171	179
Ahmedpurlama	1,744	5,203	7,041	8,824	100	298	404	506
Naushera	--	--	7,794	7,078	--	--	100	91
Begowala	--	--	6,392	6,993	--	--	100	109
Rojhan	--	3,647	4,869	6,633	--	100	134	182
Tibba Sultanpur	--	--	--	7,564	--	--	--	--
Kamra	--	--	--	5,858	--	--	--	--
Sanjwal	--	--	--	6,275	--	--	--	--
Mangla	--	--	2,306	6,063	--	--	100	263
Dullewala	--	--	--	6,436	--	--	--	--
Qila Sobha Sing	--	3,426	4,877	6,377	--	100	142	186
Deradinpanah	--	3,073	3,350	6,243	--	100	109	203
Maroolianwala	--	--	--	5,002	--	--	--	--
Wahcement works	1,663	3,498	4,473	4,428	100	210	269	266
Khaur	--	2,600	3,642	3,803	--	100	140	146

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
<u>SIND</u>								
Karachi	1,068,459	1,912,598	3,515,402	5,208,132	100	179	329	487
Hyderabad	241,801	434,537	628,631	751,529	100	180	260	311
Sukkur	77,057	103,216	158,781	190,551	100	134	206	267
Mirpurkhas	40,240	60,861	81,965	124,371	100	151	203	308
Larkana	33,414	48,008	71,893	123,890	100	144	215	371
Nawabshah	34,205	45,651	81,045	102,139	100	133	237	299
Shikarpur	45,376	53,910	70,924	88,138	100	119	156	194
Jacobabad	22,835	35,278	57,596	79,365	100	154	252	348
Tandoadam	21,275	31,246	49,747	62,744	100	147	234	295
Khairpur	18,186	34,144	48,299	61,447	100	188	266	338
Shahdadpur	15,313	21,537	29,180	42,107	100	141	191	275
Tando M. Khan	10,735	15,536	39,003	41,757	100	145	363	389
Dadu	13,716	19,145	30,184	39,298	100	140	220	287
Kotri	15,154	20,262	29,747	39,390	100	134	196	260
Dharki	---	3,879	7,013	17,417	---	100	181	449
Shahdadkot	8,994	15,043	24,323	32,888	100	167	270	366
Kandhkot	---	12,253	21,946	31,948	100	100	179	261
Rohri	13,243	19,072	26,818	31,332	100	144	203	237

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Thatta	9,716	12,786	19,106	21,524	100	132	197	222
Tando allahyar	11,873	17,273	26,314	30,647	100	145	222	258
Moro	---	10,019	19,132	30,340	---	100	191	303
Ghotki	5,883	6,956	19,275	28,837	100	118	328	490
Sanghar	---	10,153	19,739	29,239	---	100	194	288
Kambar	9,101	12,090	18,476	25,885	100	133	203	284
Matli	7,420	10,496	17,088	23,508	100	141	230	317
Tharimirwah	---	---	---	22,591	---	---	---	---
Hala	9,481	11,956	18,282	23,877	100	126	193	252
Badin	---	6,387	21,939	23,657	---	100	343	370
Hingorja	---	---	---	21,719	---	---	---	---
Mirpur Mathelo	---	3,585	13,517	21,241	---	100	377	592
Rato dero	6,365	7,201	13,292	19,704	100	113	209	310
Pano Auqil	---	6,282	11,412	20,330	---	100	182	324
Pir-jo-Goth	---	9,923	13,688	18,322	---	100	138	185
Gambat	3,843	5,646	13,962	17,455	100	147	363	454
Setharja	---	---	---	18,237	---	---	---	---
Sobhoderro	---	---	---	17,068	---	---	---	---
Badah	---	8,916	13,536	16,645	---	100	152	186

Contd.

Table 4.1.10 Population of urban areas in 1951, 1961, 1972 & 1981 Censuses

Province/locality	Population of urban areas in number				(Index)			
	1951	1961	1972	1981	1951	1961	1972	1981
Bhan	---	---	---	6,108	---	---	---	---
Johi	---	2,388	4,522	6,386	---	100	189	267
Bulri	---	---	---	5,626	---	---	---	---
Khadro	---	---	5,110	6,011	---	---	100	118
Sathari	---	---	---	6,261	---	---	---	---
Islamkot	---	---	---	5,940	---	---	---	---
Daro	---	---	7,194	5,848	---	---	100	81
Darya Khan mari	---	---	---	5,337	---	---	---	---
Bandhi	---	---	3,788	4,806	---	---	100	127
Pithoro	---	---	4,025	4,574	---	---	100	114
Mirpur Bathoro	---	3,015	4,146	4,851	---	100	138	117
Mirpur Sakro	---	---	6,620	5,016	---	---	100	76
Jati	---	8	---	4,956	---	---	---	---
Golarchi	---	---	---	3,447	---	---	---	---
Samaro	---	---	---	4,636	---	---	---	---
Kumb	---	---	---	3,549	---	---	---	---
Khoski	---	---	---	3,557	---	---	---	---
Shah Dipali	---	---	---	3,296	---	---	---	---
Perumal	---	---	---	1,468	---	---	---	---

Table 4.1.11 Area and population (by sex, urban/rural and density 1972 & 1981 Census)

(Population in thousands)

Province	Area in sq. kilometres	All areas								
		Both sexes			Male			Female		
		1972	1981	% increase	1972	1981	% increase	1972	1981	% increase
Pakistan	796,095	65,309	84,253	29.0	34,833	44,232	27.0	30,476	40,021	31.3
Islamabad Fed. Area	906	235	340	44.7	130	185	42.3	105	155	47.6
Punjab	205,344	37,610	47,292	25.7	20,211	24,860	23.0	17,399	22,432	28.9
Sind	140,914	14,156	19,029	34.4	7,574	9,999	32.0	6,582	9,030	37.2
N.W.F.P.	74,521	8,389	11,061	31.9	4,363	5,761	32.0	4,026	5,300	31.6
FATA	27,220	2,491	2,199	(-)11.7	1,266	1,143	(-) 9.7	1,225	1,056	(-)13.8
Baluchistan	347,190	2,428	4,332	78.4	1,289	2,284	77.2	1,139	2,048	79.8

Contd.

Table 4.1.11 Area and population (by sex, urban/rural and density 1972 & 1981 Census)

Province	(Population in thousands)								
	Urban areas								
	Both sexes			Male			Female		
	1972	1981	% increase	1972	1981	% increase	1972	1981	% increase
Pakistan	16,594	23,840	43.7	9,027	12,766	41.2	7,567	11,074	46.3
Islamabad Fed. area	77	204	164.9	46	113	145.7	31	91	193.5
Punjab	9,183	13,051	42.1	4,977	6,951	39.7	4,206	6,100	45.0
Sind	5,726	8,243	44.0	3,131	4,433	41.6	2,595	3,810	46.8
N.W.F.P.	1,196	1,665	39.2	647	898	38.8	549	767	39.7
FATA	13	—	—	8	—	—	5	—	—
Baluchistan	399	677	69.7	218	371	70.2	181	306	69.1

Contd.

Table 4.1.11 Area and population (by sex, urban/rural and density 1972 & 1981 Census)

(Population in thousands)

Province	Rural areas									Density per sq. kilometre		
	Both sexes			Male			Female			1972	1981	% increase
	1972	1981	% increase	1972	1981	% increase	1972	1981	% increase			
Pakistan	48,715	60,413	24.0	25,806	31,466	21.9	22,909	28,947	26.4	82	106	29.3
Islamabad Fed. area	158	136	(-)13.9	84	72	(-)14.3	74	64	(-)13.5	259	376	45.2
Punjab	28,427	34,241	20.5	15,234	17,909	17.6	13,193	16,332	23.8	183	230	25.7
Sind	8,430	10,786	27.9	4,443	5,566	25.3	3,987	5,220	30.9	100	135	35.0
N.W.F.P.	7,193	9,396	30.6	3,716	4,863	30.9	3,477	4,533	30.4	113	148	31.0
FATA	2,478	2,199	11.3	1,258	1,143	(-) 9.1	1,220	1,056	(-)13.4	92	81	(-)12.0
Baluchistan	2,029	3,655	80.1	1,071	1,913	78.6	958	1,742	81.8	7	12	71.4

Source: Population Census Organization.

Table 4.1.12 Population Growth of cities/towns from 1901 to 1981

City/town	(In thousands)								
	1901	1911	1921	1931	1941	1951	1961	1972	1981
Islamabad	...	...	...	...	...	...	...	77	204
<u>N.W.F.P</u>									
Peshawar	95	98	104	122	173	152	213	273	566
Mardan	4	9	11	26	42	49	78	115	148
D.I.Khan	32	35	39	40	51	42	46	59	68
Kohat	31	23	28	34	45	41	50	65	78
Abbottabad	8	12	14	16	27	28	31	47	66
Bannu	14	17	22	31	39	27	32	44	43
Charsadda	19	20	20	21	30	27	37	46	63
Nowshera	10	25	28	29	44	41	44	56	75
<u>PUNJAB</u>									
Lahore	203	229	282	430	672	849	1,296	2,170	2,953
Rawalpindi	88	86	101	119	185	237	340	615	795
Multan	87	99	85	119	143	190	358	539	732
Faisalabad	9	20	28	43	70	179	425	823	1,104
Sialkot	58	65	71	101	139	168	167	204	302
Gujranwala	29	29	38	59	84	121	196	360	659
Sargodha	--	9	18	27	36	78	129	200	291
Jhang	24	26	30	36	50	73	95	132	196
Kasur	22	25	31	47	53	63	75	101	156
Sahiwal	7	8	15	26	38	50	75	107	151
Gujrat	19	19	22	27	31	47	60	100	155
Bahawalpur	19	18	18	21	40	42	84	134	180
Burawala	--	--	--	--	7	15	34	58	86
Chiniot	16	14	18	26	34	39	47	70	106
Jhelum	15	20	18	23	33	57	53	70	106

Table 4.1.12 Population Growth of cities/towns from 1901 to 1981

(In thousand)

City/town	1901	1911	1921	1931	1941	1951	1961	1972	1981
Khanewal	--	--	6	11	17	38	49	68	89
D.G.Khan	24	18	21	23	32	36	47	72	102
Okara	--	--	--	11	8	35	68	101	153
Rahim Yar Khan	--	--	--	--	6	15	44	74	119
Hafizabad	5	--	9	14	17	30	35	62	83
Sheikhupura	--	--	3	12	22	30	42	81	141
Kamalia	7	8	9	13	14	29	35	51	61
Wah Cantt.	--	--	--	--	--	33	37	108	122
Kamoke	--	--	--	--	12	16	25	50	71
<u>Sind</u>									
Karachi	136	187	244	301	387	1,068	1,913	3,515	5,208
Hyderabad	69	76	82	102	135	242	435	629	752
Sukkur	31	35	41	65	66	77	103	159	191
Shikarpur	49	54	55	62	63	45	54	71	88
Mirpur Khas	3	5	6	10	20	40	61	82	124
Nawabshah	--	--	3	7	18	34	46	81	102
Larkana	14	16	18	25	28	33	48	72	124
Jacobabad	8	8	11	16	22	23	35	58	79
<u>BALUCHISTAN</u>									
Quetta	25	34	49	60	64	84	107	158	286

Source: Population Census Organization.

Table 4.1.13 Targets for crude birth and death rates and growth rates during the sixth five year plan period

	1982-83 (bench-mark)	1983-84	1984-85	1985-86	1986-87	1987-88
Estimated level of crude birth rate	40.3	39.8	38.5	38.1	37.3	36.2
Estimated level of crude death rate	11.6	11.3	10.8	10.6	10.4	10.2
Estimated level of rate of growth	28.7 (2.87%)	28.5 (2.85%)	27.7 (2.77%)	27.5 (2.75%)	26.9 (2.69%)	26.0 (2.60%)

Source: Planning Commission
(Sixth Five Year Plan p. 359)
(Draft)

Table 4.1.14 Projection on selected demographic parameters of Pakistan's population, fertility, mortality and growth rates, 1983-2100

Year 1st January	Total population (in 000s)	Total fertility rate (TFR)	Gross reproduction rate per woman	Net reproduction rate (NRR)	Crude birth rate (CBR) (per 1000-population)	Crude death rate (CDR)	Growth rate (percent)
1983	88,269	5.90	2.88	2.57	40.30	11.60	2.87
1988	100,540	5.40	2.63	2.35	36.20	10.20	2.60
2000	135,091	4.00	1.95	1.79	30.90	9.50	2.14
2010	168,352	2.90	1.41	1.32	22.62	8.50	1.46
2020	197,222	2.40	1.17	1.11	19.77	7.50	1.23
2030	224,003	2.00	0.98	0.94	16.91	7.00	0.93
2050	259,068	2.00	0.98	0.94	11.90	6.60	0.53
2075	281,642	2.00	0.97	0.94	8.80	6.30	0.25
2100	288,716	2.00	0.97	0.94	6.00	6.00	0.00

Source: Planning Commission Sixth Five Year Plan (draft) p.355

Table 4.1.15 Per Capita Income Gross

Y e a r	(Rupees)			
	At current factor cost	Annual % <u>1</u> / growth	At constant 1959-60 prices	Annual % <u>2</u> / growth
1971-72	778	5.5	530	(-) 0.2
1972-73	939	19.2	546	3.0
1973-74	1,212	29.1	569	4.2
1974-75	1,496	23.4	574	0.9
1975-76	1,702	13.8	582	1.4
1976-77	1,903	11.8	588	1.0
1977-78	2,246	18.0	632	7.5
1978-79	2,439	8.6	650	2.8
1979-80	2,813	15.3	676	4.0
1980-81	3,224	14.6	692	2.4
1981-82	3,646	13.1	716	3.5
1982-83	4,102	12.5	751	4.9
1983-84	4,488	9.4	757	0.8
1984-85	4,889	8.9	791	4.5
1985-86	5,344	9.3	823	4.0

1/ At current factor cost2/ At constant factor cost

Table 4.2.01 Road Kilometre Statistics

Year	Total	Hightype	Lowtype
1975-76	49,773	27,111	22,662
1976-77	51,123	31,004	20,119
1977-78	93,415	31,249	62,166
1978-79	95,222	33,176	62,046
1979-80	95,660	33,611	62,049
1980-81	90,436	34,487	61,949
1981-82	98,582	30,824	61,758
1982-83	99,332	31,501	61,831
1983-84	100,300	39,081	61,219
1984-85	10,428	43,464	59,954

Source: Communication Division.

Table 4.2.02 Number of motor vehicles registered in Pakistan

Year	Motor cars Jeeps & station Wagons	Motor cabs/ taxis	Buses	Trucks	Motor cycles 2 wheels	Motor cycles 3 wheels	Others	Total
1976	2,03,451	18,113	38,991	61,864	2,47,314	29,129	57,542	6,56,404
1977	2,08,844	18,418	41,650	56,898	2,82,578	31,678	75,972	7,16,038
1978	2,42,134	20,773	43,408	59,847	3,40,487	34,774	95,264	8,36,687
1979	2,80,076	23,156	47,482	65,304	4,28,547	40,476	1,29,290	10,14,331
1980	2,64,028	18,951	49,851	58,000	5,08,025	45,906	1,65,137	11,09,898
1981	2,82,519	19,595	51,183	59,562	5,49,098	45,349	1,83,796	11,91,102
1982	3,04,449	20,715	51,710	63,021	6,35,196	45,525	2,17,346	13,37,962
1983	3,39,105	22,889	53,725	66,922	7,09,000	46,276	2,46,294	14,84,211
1984	3,80,465	23,978	58,489	68,900	7,87,986	46,745	2,87,791	16,54,354

Source: Excise & Taxation Departments and
Provincial Transport Authorities

Table 4.2.03 Employment, employment cost, operating expenses, gross earnings & gross value added in commercial private mechanized road transport in selected centres 1981-82 a)

Particulars	Rawalpindi	Lahore	Karachi	Peshawar	Quetta
1. Total No. of vehicles	8,815	15,425	26,870	10,915	3,321
2. No. of persons engaged	19,643	33,608	48,624	21,819	6,199
3. Employment cost (000 Rs.)	214,074	313,753	354,277	228,675	62,128
4. Operating and other expenses (000 Rs.)					
Total	993,181	1,084,850	1,205,212	955,500	211,448
Fuel & lubricants	597,797	662,601	804,137	594,469	147,023
Others	395,384	422,249	401,075	361,031	64,425
5. Gross earnings (000 Rs.)	1,676,992	2,382,998	2,658,454	1,902,391	401,901
6. Gross value added (000 Rs.)	683,811	1,298,148	1,453,242	946,891	190,453

a) Based on Survey of mechanised road transport conducted by the Federal Bureau of Statistics.

Table 4.2.04 Development of Railways

Year	Route kilometres	Locomotives (Nos.)				Freight wagons (Nos.)
		Steam	Diesel	Electric	Total	
1976-77	8,815.03	481	468	29	978	36,720
1977-78	8,815.03	481	468	29	978	36,406
1978-79	8,815.03	488	462	29	979	36,276
1979-80	8,817.33	488	486	29	1,003	36,235
1980-81	8,817.33	457	474	29	960	36,248
1981-82	8,817.33	446	488	29	963	36,213
1982-83	8,774.87	446	504	29	979	35,990
1983-84	8,774.87	422	492	29	943	35,782
1984-85	8,774.87	405	482	29	916	35,341

Source: Pakistan Railways.

Table 4.2.05 Gross earnings, movement of passengers and freight by rail

Year	Gross earnings (million rupees)	Number of passengers carried (million)	passenger Kilometres (million)	Freight carried (tonnes) (million)	Freight carried Kilometres
1976-77	1,748	143	13,199	14	7,857
1977-78	2,213	149	15,375	13	8,557
1978-79	2,274	146	16,713	12	9,375
1979-80	2,709	144	17,316	12	8,598
1980-81	2,942	123	16,387	11	7,918
1981-82	3,044	120	16,502	11	7,067
1982-83	3,395	123	18,031	12	7,323
1983-84	3,680	107	18,287	11	7,385
1984-85	3,681	95	17,807	11	7,203

Source: Pakistan Railways.

Table 4.2.06 PIA-traffic/capacity

	Bench-mark 1982-83	1983-84	Projection 1987-88	Capacity 1987-88	Gap to be filled in by the private sector
Passenger	5,941 MPKS	6,369	8,437 MPKS	6,965 ASKS	1,472 MPKS
Freight	249.3 MFTKS	274.2	404.8 MFTKS	183.4 AFTKS	221.5 MFTKS

Source: Planning Commission (Sixth Five Year Plan p. 271).

Table 4.2.07 Projection of transport demand

Mode of transport		Unit	Bench-mark 1982-83	1983-84	Target for 1987-88	Annual compound growth rate %	
						Fifth plan	Sixth plan
Railway	Freight	Million tonnes kms	7,500	7,385	11,100	(-) 4.5	8.2
	Passenger	Million passenger kms	16,502	18,283	21,000	4.1	4.9
Road	Freight	Million tonnes kms	21,200	22,620	29,294	9.8	6.7
	Passenger	Million passenger kms	79,513	84,363	106,885	4.0	6.1
Port	Dry	Million tonnes	8.958	9.6	12,915	10.8	7.6
	Liquid	Million tonnes	8.4	8.9	11,449	6.3	6.4
Air	Domestic	Passenger	4.092	4.5	6.423	8.8	9.4
	Freight	Million tonnes	0.031	0.036	0.069	2.1	18.0
International	Passenger	Million passengers	2.671	2.9	3.777	16.4	7.2
	Freight	Million tonnes	0.079	0.087	0.126	15.2	9.8
Pipe line		Million tonnes kms	1,609	1.77	2,566	—	9.8

Source: Planning Commission (Sixth Five Year Plan p. 262).

Table 4.2.08 Post and tele-communications

Year	Number of post offices	Number of letter boxes	Number of telegraph offices	Number of telephone instruments (000)	Number of long distance public call offices	Number of telephone exchanges
1976-77	9,586	20,496	221	274	745	652
1977-78	9,886	20,685	223	288	750	667
1978-79	10,488	20,865	231	314	873	720
1979-80	11,088	21,261	237	336	920	744
1980-81	11,238	25,775	252	358	974	784
1981-82	11,388	24,897	278	388	1,047	793
1982-83	11,528	24,825	294	445	1,125	862
1983-84	11,698	24,160	310	503	1,245	922
1984-85	11,898	24,039*	341	573	1,328	979

Source: Pakistan Post Office & T & T Departments.

Table 4.2.09 Number of TV and Radio licences issued

Year	T.V. sets counts	Number of Radio licences issued	Number of VCR Set
1976-77	458,692	1,228,711	--
1977-78	520,137	1,604,137	--
1978-79	547,223	1,489,589	--
1979-80	615,187	1,799,914	--
1980-81	582,815	1,528,827	--
1981-82	706,256	1,336,310	--
1982-83	676,033	1,400,000	--
1983-84	850,354	1,010,551	--
1984-85	1,055,089	1,207,000	133,709

Note:- Number of TV, Radio & VCR sets are based on the number of licences issued.

Source: 1. Pakistan Broadcasting Corporation.
2. Pakistan Television Corporation.

Table 4.2.10 Number of accidents in mining industries by provinces

	Total	Punjab	Sind	N.W. F. P.	Baluchistan
1980					
Fatal	49	17	5	--	26
Serious	165	33	51	2	79
Total	214	50	56	2	105
1981					
Fatal	52	17	6	--	22
Serious	132	31	39	2	59
Total	184	48	45	2	81
1982					
Fatal	57	20	6	2	28
Serious	129	32	41	3	52
Total	186	52	47	5	80
1983					
Fatal	52	10	17	--	23
Serious	160	30	80	--	51
Total	212	40	97	--	74
1984					
Fatal	69	13	15	1	40
Serious	140	38	40	2	60
Total	209	51	55	3	100
1985					
Fatal	65	19	12	--	34
Serious	187	38	87	--	62
Total	252	57	99	--	96

Source: Provincial Inspectorates of Mines.

Table 4.2.11 Average daily employment in mines

Particulars	1976	1977	1978	1979	1980	1981	1982
All mineral	34,071	57,716	48,991	58,868	74,490	80,512	95,474
Surface	5,373	10,112	8,042	10,042	16,480	3,410	5,143
Under-ground	20,972	24,746	24,145	26,116	36,807	46,502	52,229
Open cast working	4,663	19,482	12,639	17,748	16,475	26,117	33,438
Gas & oil fields	3,063	3,376	4,165	4,962	4,728	4,483	4,664

Source: Labour Division.

Table 4.2.12 Industrial accidents in factories registered under Factories Act. 1934

Type of Accidents	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total	15.71	11.94	13.64	15.39	18.87	20.72	16.31	13.94	9.26	15.87	16.53	12.97
Fatal	0.28	0.25	0.30	0.19	0.48	0.39	0.31	0.19	0.08	0.14	0.24	0.11
Serious	3.63	2.79	2.48	2.10	2.16	2.18	2.01	1.77	1.18	2.22	2.29	1.44
Minor	11.80	8.90	10.86	13.10	16.23	18.14	13.99	11.99	8.00	13.52	14.01	11.42

Source: Labour Division.

Table 4.2.13 Number of registered factories and those working and reporting under
Factories Act-1934.

Year	No. of registered factories	No. of working factories	No. of reporting factories
1973	6,087	5,514	2,096
1974	5,915	5,519	2,205
1975	6,095	5,478	1,924
1976	6,199	5,443	1,592
1977	6,243	5,296	1,546
1978	6,436	5,488	1,829
1979	6,578	5,430	1,784
1980	6,117	4,483	1,776
1981	6,296	5,316	2,031
1982	6,326	5,439	2,213

Source: Labour Division.

4.2.14 Summary statistics by major industry groups 1980-81

Major Industry Group	No. of reporting establishments	Average daily employment during the year	Employment cost during the year	Industrial cost during the year	(Value in million Rs.)	
					Value of the production during the year	Census value added during the year
All industries	3,815	451,710	5623.8	55596.0	84,288.3	28,692.1
Food manufacturing	494	52,408	725.5	11,760.3	17,532.3	5,771.9
Beverage industries	35	3,844	55.4	470.4	993.6	523.2
Tobacco manufacturing	20	13,093	136.3	1,045.1	4,850.1	3,805.0
Manufacture of textiles	914	187,208	1,753.5	10,067.8	14,639.2	4,571.3
Manufacturing of wearing apparel except footwear	56	4,228	60.3	353.4	608.0	254.5
Manufacture of leather and leather products, leather substitutes and fur except foot-wear and wearing apparel	61	4,583	40.9	889.6	1,194.7	305.1
Manufacture of footwear except vulcanised or moulded rubber or plastic footwear	19	5,072	66.4	330.4	558.1	227.7
Ginning pressing and baling of fibres	261	12,907	105.1	4,914.3	5,678.2	764.0
Manufacture of wood and cork products except furnitures	22	1,743	18.6	121.1	199.7	78.7
Manufacture of furniture and fixtures except primarily of metal	35	920	12.4	41.0	85.5	44.4
Manufacture of paper/products	38	8,283	128.9	684.2	1,109.1	424.9
Printing publishing and allied industries	139	8,416	85.2	339.2	555.0	215.7
Manufacture of drugs and pharmaceutical products	103	11,228	228.8	1,418.9	2,654.6	1,235.7
Manufacture of industrial chemicals	80	12,748	305.4	1,700.7	3,290.1	1,589.4
Manufacture of other chemical products	148	9,078	141.6	1,288.3	1,995.2	706.9
Petroleum refining	3	2,820	64.1	10,532.9	12,505.1	1,972.1
Manufacture of miscellaneous products of petroleum and coal	12	802	12.6	334.5	480.6	146.1

Contd.

4.2.14 Summary statistics by major industry groups 1980-81

Major industry group	No. of reporting establishments	Average daily employment during the year	Employment cost during the year	Industrial cost during the year	(value in million Rs.)	
					Value of the production during the year	Census value added during the year
Manufacture of rubber products	52	5,646	67.9	511.3	788.6	277.3
Manufacture of plastic products n.e.s.	31	1,963	29.1	139.3	225.1	85.8
Manufacture of pottery china and earthenware	17	1,958	21.3	46.6	101.9	55.3
Manufacture of glass and glass products	28	3,177	33.5	100.6	196.3	95.7
Manufacture of other non metallic mineral products	69	11,781	205.5	1,040.8	2,737.8	1,697.0
Iron and steel basic industries	197	18,180	257.6	2,165.9	3,309.1	1,143.1
Non-ferrous metal basic industries	14	527	6.9	41.8	55.5	13.7
Manufacture of fabricated metal products except machinery and equipment	272	10,222	128.1	620.6	923.7	303.1
Manufacture of machinery except electrical	273	13,716	201.4	933.0	1,424.3	491.3
Manufacture of electrical machinery apparatus appliance and other supplies	185	16,721	254.8	1,660.7	2,655.6	995.0
Manufacture of transport equipment	122	22,735	412.8	1,711.1	2,419.2	708.1
Manufacture of scientific precision and measuring instruments and equipment	45	2,543	26.9	94.8	163.6	68.8
Manufacture of photographic and optical goods	7	247	3.4	41.5	57.1	15.6
Manufacture of sports and athletic goods	22	1,119	10.4	62.0	89.3	27.3
Other manufacturing industries	41	1,794	22.5	133.9	212.1	78.2

Table 4.2.15 Percentage distribution of Civilian Force.

Year	Total			Employed			Unemployed		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
1970-71	30.14	27.82	2.59	29.88	27.36	3.52	0.53	0.46	0.07
1971-72	29.90	27.35	2.55	29.29	26.80	2.49	0.61	0.55	0.06
1974-75	29.50	27.49	2.01	29.00	27.00	2.00	0.50	0.49	0.01
1978-79	31.02	27.23	3.79	29.92	26.42	3.50	0.10	0.82	0.29
1982-83	30.19	26.71	3.48	29.01	25.59	3.42	1.18	1.11	0.07

Table 4.2.16 Projection of employment by major sectors
1983-88

Sectors	Internal employment level, July 1983 (million)	Annual sectoral growth rate %	Elasticity of employment	Projected internal employment level, July 1988 (million)	Projected increase in internal employment 1983-88 (million)
Agriculture	13.73	4.9	0.420	15.20	1.47
Mining & quarrying	0.03	7.5	0.340	0.03	—
Manufacturing	3.92	9.3	0.392	4.69	0.77
Electricity, gas & water	0.19	8.0	0.277	0.21	0.02
Construction	1.51	9.0	0.40	1.80	0.29
Wholesale & retail trade	3.08	7.9	0.408	3.61	0.53
Transport, storage & communications	1.25	7.0	0.408	1.44	0.19
Financial institutions	0.21	6.0	0.153	0.22	0.01
Services	2.48	4.7	0.205	2.60	0.12
Unallocated	0.08	—	—	—	(-) 0.08
Total:	26.48	6.7	0.357	29.80	3.32

Note:- Sectoral breakdown of employment in July 1983 based on the labour force survey, 1978-79 project on same elasticities of employment shown above except for agriculture (0.51) manufacturing (0.32) and construction (0.684).

Table 4.2.17 Percentage distribution of employed persons by major industry division

Industry division	1971-72	1974-75	1978-79	1982-83	1971-72	1974-75	1978-79	1982-83	1971-72	1974-75	1978-79	1982-83
	Both areas				Rural areas				Urban areas			
Total employed persons	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Agriculture, forestry, hunting and fishing	57.32	54.80	52.65	52.73	70.61	72.08	67.38	67.69	6.54	6.20	5.65	6.70
Mining and quarrying	0.45	0.15	0.14	0.14	0.28	0.13	0.16	0.11	1.07	0.19	0.08	0.08
Manufacturing	12.47	13.63	14.52	13.44	8.98	9.32	11.01	9.38	25.79	25.74	25.69	25.94
Electricity, gas and water	0.37	0.49	0.74	1.13	0.16	0.23	0.45	0.96	1.16	1.23	1.66	1.65
Construction	3.41	4.20	4.92	4.80	2.77	3.41	4.24	4.12	5.85	6.41	7.11	6.88
Wholesale & retail trade & restaurants and hotels	9.89	11.09	11.08	11.94	5.53	5.81	6.93	7.14	26.56	25.93	24.30	26.70
Transport, storage and communication	4.84	4.87	4.73	4.59	3.44	2.94	3.09	3.09	10.20	10.30	9.79	9.20
Financing, insurance, real estate and business services	0.86	0.67	0.86	0.82	0.32	0.09	0.26	0.26	2.92	2.31	2.77	2.54
Community, social and personal services	7.27	9.78	10.10	10.19	4.19	5.70	6.26	6.94	19.05	21.26	22.35	20.17
Activities not adequately defined	3.12	0.33	0.27	0.27	3.72	0.29	0.23	0.31	0.86	0.44	0.40	0.13

Table 4.2.18 Percentage distribution of employed persons by occupational groups

Major occupational groups	1978 79	1982-83
TOTAL	100.00	100.00
Professional, technical and related workers	3.05	3.08
Administrative and managerial workers	0.73	0.86
Clerical and related workers	2.92	2.99
Sales workers	10.11	10.23
Service workers	4.61	4.80
Agricultural, animal husbandry and forestry workers	--	--
Fishermen and hunters	52.64	52.83
Production and related workers, transport equipment	--	--
Operators and labourers	25.94	25.23
Workers not classified by occupation	--	--

Table 4.2.19 Population by activity 1981 census

Areas/Sex	Total	Working	Looking for work	House keeping	Students	Others
<u>All areas</u>	56,338,856	21,924,641	701,808	24,063,885	4,506,282	5,142,240
Male	30,077,890	21,152,229	639,129	---	3,148,839	5,137,693
Female	26,260,966	772,412	62,679	24,063,885	1,357,443	4,547
<u>Urban areas</u>	16,710,747	5,728,030	315,420	6,309,491	2,516,518	1,841,288
Male	9,115,085	5,480,934	293,207	---	1,502,471	1,838,473
Female	7,595,662	247,096	22,213	6,309,491	1,014,047	2,815
<u>Rural areas</u>	39,628,109	16,196,611	386,388	17,754,394	1,989,764	3,300,952
Male	20,962,805	15,671,295	345,922	---	1,646,368	3,299,220
Female	18,665,304	525,316	40,466	17,754,391	343,396	1,732

Source: Population Census Organisation.

Table 4.2.20 Population (10 year and above) working and looking for work by sex and broad age group 1981 census

Area	Total working & looking for work	Less than 25 years			25-59 years			60 years & above		
		Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All areas	22,626,649	7,523,019	7,134,332	388,687	12,539,084	12,149,403	389,681	2,564,346	2,507,623	56,723
Urban areas	6,043,450	1,821,935	1,729,216	92,719	3,733,772	3,573,632	160,140	487,743	471,293	16,540
Rural areas	16,382,999	5,701,081	5,405,116	295,968	8,805,312	8,575,771	229,541	2,076,603	2,036,330	40,273

Source: Population Census Organisation.

Table 4.2.21 Number of establishments, employment, gross margin, sales and operating receipts and purchases of wholesale, retail trade and restaurant 1975-76 a)

Particulars		Total	Wholesale trade	Retail trade	Restaurants and cafes
Number of establishments	...	340,758	26,416	276,201	38,141
Employment numbers	...	688,642	86,679	501,773	100,190
Gross margin (Mln.Rs.)	...	4,323	1,070	2,866	387
Sales and operating receipts (Mln.Rs.)		27,264	9,097	16,472	1,695
Purchases (Mln.Rs.)	...	22,384	7,870	13,280	1,234

a) Estimates based on survey results of urban areas.

Table 4.2.22 Number of hospital/dispensaries and beds by province

Year (as on 1st January)		Hospitals (a)	Dispensaries	Maternity and child welfare centres	Beds in hospitals & dispensaries
<u>PUNJAB</u>	1978	230	1,252	476	20,004
	1979	232	1,273	483	21,235
	1980	234	1,277	508	21,865
	1981	236	1,287	510	22,355
	1982	237	1,296	506	23,397
	1983	239	1,163	476	24,190
	1984	239	1,156	467	24,843
	1985	246	1,138	449	25,827
<u>SIND</u>	1978	136	1,033	126	13,158
	1979	143	1,109	129	13,606
	1980	190	1,185	127	15,477
	1981	191	1,232	133	15,773
	1982	197	1,293	131	16,074
	1983	206	1,351	137	16,405
	1984	210	1,394	138	16,833
	1985	217	1,459	146	17,547
<u>N.W.F.P.</u>	1978	141	623	97	7,157
	1979	145	632	109	7,367
	1980	148	651	126	7,911
	1981	138	624	127	7,929
	1982	143	582	127	8,390
	1983	144	560	128	8,916
	1984	145	559	129	9,115
	1985	149	541	130	9,596
<u>BALUCHISTAN</u>	1978	29	398	49	2,150
	1979	30	353	51	2,159
	1980	30	353	51	2,159
	1981	35	335	53	2,384
	1982	36	288	53	2,474
	1983	37	277	53	2,650
	1984	39	277	53	2,812
	1985	40	277	53	2,916

(a) Some hospital and dispensaries have been converted into Rural Health Centres/basic Health Units. Data in respect of institutions run by armed forces & private doctors are not included.

Source: 1) Health & Social Welfare Division.
2, Provincial Health Directorates.

Table 4.2.23 Number of Hospitals, Dispensary, Basic Health units & Beds in
Azad Jammu & Kashmir & Northern Areas

Area/Period	Hospitals		Dispensaries		Basic Health unit	
	No	Beds	No	Beds	No	Beds
<u>Azad Jammu & Kashmir</u>						
1.1.1983	10	660	222	—	—	—
1.1.1984	12	716	119	—	106	—
1.1.1985	11	769	204	24	62	—
<u>Northern Areas</u>						
1.1.1983	12	487	97	32	—	—
1.1.1984	17	537	93	16	—	—
1.1.1985	23	617	99	12	—	—

Source: Health & Social Welfare Division Islamabad

Table 4.2.24 Number of hospitals/dispensaries,maternity & child welfare centres
Beds & medical personnel

Year (as on 1st January)	Hospitals (a)	Dispensaries (a)	Maternity & child welfare dispensaries	Beds in hospitals & dispensaries	Registered doctors (progressive total b/)	Registered nurses (Progressive total)	Registered lady health visitors (progressive totals)
1978	536	3,306	748	42,469	20,931	7,768	1,823
1979*	550	3,367	772	44,367	21,938	8,382	1,921
1980*	602	3,466	812	47,412	23,594	9,098	2,099
1981*	600	3,478	823	48,441	26,668	9,872	2,171
1982*	613	3,459	817	50,335	29,931	10,554	2,368
1983*	626	3,351	794	52,161	33,584	11,070	2,562
1984*	633	3,386	767	53,603	38,322	12,000	2,795
1985	652	3,415	778	55,886	42,501	14,249	2,992

Source: 1) Health & Social Welfare Division.
2) Provincial Health Directorates.

Note: Data for hospitals,dispensaries,MCH and beds in hospitals and dispensaries are as on 1st January of each year, and for doctors, nurses and LHV as on 31st December of each year.

a. Some hospitals and dispensaries have been converted into Rural Health Centres/Basic Health Units.Data in respect of institutions run by armed forces and private doctors are not included.

b. Does not include dentists.

Table 4.2.25 Health related statistics

Particulars		Pakistan			Middle Income economies 1977
		1965	1978	1983	
Life expectancy at birth (years)	Male	47	54	55	61
	Female	45	53	54	
Infant mortality rate (aged 0-1)	.. (per 1000 liv births)	140	105	100	60
Child death rate (aged 1-4)	(per 1,000)	12	...	10	5
Crude death rate	.. .. (per 1,000)	16	14	12	9

Source: Planning Commission, (Sixth Five Year Plan p.364)

Table 4.2.26 Physical achievement in vital health indices

Particulars		1978	Fifth plan targets for 1982-83	(per '000')
				Achievement upto June, 1983
Crude death rate	..	14	10.2	12
Infant mortality rate	..	105	79	100
Maternal mortality rate	..	6-8	--	6-8
Life expectancy at birth	..			
Males	..	54 years	60 years	55 years
Females	..	53 years	59 years	54 years

Source: Planning Commission, (Sixth Five Year Plan p.367)

Table 4.2.27 Achievement in physical health & manpower during fifth plan and targets of sixth plan

Category	Fifth plan 1978-83			Sixth plan targets	1983-88		
	Target	Achievements	Percentage achievement		Achievements		
					1983-84	1984-85	
Physical Facilities							
i) Basic health units/ dispensaries/MCH centres	4,596	1,617	35.2	2,600	322	440	
ii) Rural health centres	625	206	33.0	355	34	50	
iii) Hospital beds	25,820	5,308	20.6	11,770	1,090	1,508	
Health Manpower							
i) Doctors/dental surgeons	13,512	10,203	75.5	21,600	3,650	4,120	
ii) Nurses	4,780	4,246	88.8	5,000	800	900	
iii) Paramedics/auxiliaries	24,886	13,576	54.5	38,000	4,500	4,500	
iv) Community health workers/dais	50,371	9,000	17.9	30,000	6,000	6,750	

Source:- Planning Commission, (Sixth Five Year Plan, P. 367 & 374).

Table 4.2.28 Training of personnel in health and manpower

Category	1978		1983	
	No.	Yearly output	No.	Yearly output
i) Medical colleges	15	4,000	16	4,260
ii) Dental schools	4	117	4	120
iii) Nurse training schools	28	750	44	840
iv) LHV training schools	8	389	10	600
v) Medical technician training schools	—	—	26	650

Table 4.2.29 Change in population per facility, 1988

Facility	1983		1988	
	Benchmark	Population per facility	End position	Population per facility
Infrastructure:				
i) Hospital beds	51,400	1,790	63,170	1,678
ii) Rural health centres	374	172,241	729	101,133
iii) BHUs/Sub-centres/ dispensaries/MCH centres	6,490	12,943	9,090	9,820
Manpower:				
i) Doctors	20,000	4,600	36,000	2,940
ii) Dentists	1,100	83,000	1,700	62,350
iii) Nurses	5,530	1/6.4, beds	10,000	1/5 beds
iv) Paramedics	37,000	2,486	75,000	1,413
v) TBAs	15,000	1/3 villages	45,000	1/ villages

Source: Planning Commission, (Sixth Five Year Plan, P. 374).

Table 4.2.30 Level of Education by sex- Pakistan 1981

Level of education	Both Sexes	Male	Female
	(000)		
Primary	5,983	4,144	1,839
Middle	3,008	2,268	740
Matric	2,582	1,976	606
Intermediate	779	578	200
Certificate/Diploma (Less than Degree)	106	87	19
B.A/B.Sc.	498	367	131
M.A./M.Sc.	141	106	35
B.Sc Engineering & above	37	35	2
MBBS/BDS & above	33	26	7
L.L.B and above	37	36	1
Others	13	11	2

Note: Data are based on the results of sample.

Table 4.2.31 Literacy ratio of Pakistan and its provinces by male/female
and rural/ urban distribution -1981

Unit	Total			Urban			Rural		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
Pakistan									
1981	26.2	35.1	16.0	47.1	55.3	37.3	17.3	26.2	7.3
1972	21.7	30.2	11.6	41.5	49.9	30.9	14.3	22.6	4.7
N.W.F.P.									
1981	16.7	25.9	6.5	35.8	47.0	21.9	13.2	21.7	3.8
1972	14.5	23.1	4.7	33.7	44.7	19.9	11.0	19.0	2.2
Punjab									
1981	27.4	36.8	16.8	46.7	55.2	36.7	20.0	29.6	9.4
1972	20.7	29.1	10.7	38.9	47.8	28.0	14.7	22.9	5.2
Sind									
1981	31.5	39.7	21.6	50.8	57.8	42.2	15.6	24.5	5.2
1972	30.2	39.1	19.2	47.4	54.5	38.4	17.6	27.5	5.8
Baluchistan									
1981	10.3	15.2	4.3	32.2	42.4	18.5	6.2	9.8	1.8
1972	10.1	14.8	4.2	32.3	42.4	19.2	5.6	9.2	1.2

Source: Population Census of Pakistan 1981.

Table 4.2.32 Population(10 years and above) by age,sex and literacy-1981 Census

Age group	Population			Literates		
	Both sexes	Male	Female	Both sexes	Male	Female

PAKISTAN

10 years & above	56,338,856	30,077,890	26,260,966	14,745,234	10,544,528	34,200,706
10-14 years	10,803,048	5,856,744	4,946,304	2,806,444	1,835,366	971,078
15-19 years	7,763,087	4,192,513	3,570,574	2,837,888	1,888,725	949,163
20-24 years	6,227,756	3,269,776	2,957,980	2,177,975	1,503,040	674,935
25-29 years	5,479,158	2,891,427	2,587,731	1,661,721	1,208,371	453,350
30-34 years	4,617,328	2,388,124	2,229,204	1,239,246	926,172	313,074
35-39 years	4,197,237	2,120,580	2,076,657	1,042,833	787,299	255,534
40-44 years	3,865,024	1,937,256	1,927,768	828,909	638,891	190,018
45-49 years	3,076,082	1,610,303	1,465,779	617,165	491,482	125,683
50-54 years	2,965,617	1,637,892	1,327,725	532,025	421,385	110,640
55-59 years	1,610,857	859,488	751,369	278,473	233,039	45,434
60 years & above	5,733,662	3,313,787	2,419,875	722,555	610,758	111,797

Contd.

Table 4.2.32 Population (10 years and above) by age, sex and literacy-1981 Census

Age group	Percentage of literates		
	Both sexes	Male	Female

(PAKISTAN)

10 years & above	26.2	35.1	16.0
10-14 years	26.0	31.3	19.6
15-19 years	36.6	45.0	26.6
20-24 years	35.0	46.0	22.8
25-29 years	30.3	42.0	17.5
30-34 years	26.8	39.0	14.0
35-39 years	24.8	37.1	12.3
40-44 years	21.4	33.0	9.9
45-49 years	20.1	30.5	8.6
50-54 years	17.9	25.7	8.3
55-59 years	17.3	27.1	6.0
60 years & above	12.6	18.4	4.6

Source: Population Census Organisation

Table 4.2.33 Rural development fifth plan financial and physical achievements

	(Million Rs.)	
	Target	Estimated achievement
Financial:		
Primary education	1,830	848
Rural health programme	2,623	1,250
Rural roads (tertiary roads only)	1,020	1,600
Physical:		
Primary education	10,113 Schools	7,925 Schools
Rural health centres	625 Nos	206 Nos.
Basic health units	4,596 "	1,617 "
Rural roads (cumulative)	41,000 Kms.	46,000 Kms.

Source: Planning Commission.
(Sixth Five Year Plan P.142)

Table 4.2.34 Number of teachers in educational institutions by kind, level and sex

Year	Primary schools (in thousands)		Middle schools (in thousands)		Secondary schools (a) (in thousands)	
	Total	Female	Total	Female	Total	Female
1976-77	133.3	44.7	46.0	13.8	62.1	18.6
1977-78	134.4	45.3	48.8	14.2	62.8	19.1
1978-79	136.8	42.6	49.9	13.7	65.4	18.6
1979-80	140.9	47.8	51.4	14.9	66.6	20.1
1980-81	150.0	48.7	52.2	15.2	69.1	20.9
1981-82	159.0	49.6	53.7	15.6	72.1	21.8
1982-83	176.7	56.4	56.6	17.4	82.2	24.2
1983-84*	206.0	57.4	58.1	17.8	84.2	24.8
1984-85*	214.5	59.6	59.6	19.4	88.1	25.8

Contd.

Table 4.2.34: Number of teachers in educational institutions by kind, level & sex

Year	Arts & science colleges (Nos.)		Professional colleges (Nos.)		Universities (Nos.)	
	Total	Female	Total	Female	Total	Female
1976-77	11,834	3,246	3,167	472	2,916	351
1977-78	11,548	3,184	3,331	486	3,265	358
1978-79	11,836	3,348	3,443	501	3,573	340
1979-80	12,077	3,430	3,500	510	3,068	332
1980-81	12,384	3,544	4,000	510	3,288	396
1981-82	12,691	3,658	4,025	520	3,457	385
1982-83	14,063	4,411	5,050	522	3,700	390
1983-84 (b)	14,508	4,624	5,371	526	4,402	401
1984-85 (b)	15,011	4,869	5,714	544	4,489	407

Note: a) Secondary schools include high schools and secondary vocational institutions.

Source: Ministry of Education.

(b) Estimated data

Table 4.2.35 Number of students in educational institutions by kind, level and sex

Year	Primary schools (in thousands)		Middle schools (in thousands)		Secondary schools (a) (in thousands)	
	Total	Female	Total	Female	Total	Female
1976-77	5,611	1,591	1,298	309	548	124
1977-78	5,015	1,598	1,304	317	538	131
1978-79	5,131	1,629	1,300	327	513	133
1979-80	5,213	1,676	1,391	345	511	132
1980-81	5,474	1,782	1,412	359	549	137
1981-82	5,741	1,896	1,453	374	588	142
1982-83	6,179	2,010	1,614	413	599	147
1983-84	6,860	2,173	1,730	424	659	154
1984-85*	7,389	2,359	1,850	446	712	185

Contd.

Table 4.2.35 Number of students in educational institutions by kind, level and sex

Year	Arts and science colleges (in thousands)		Professional colleges (Nos.)		Universities (Nos.)	
	Total	Female	Total	Female	Total	Female
1976-77	223	66	56,932	9,541	37,711	8,968
1977-78	221	72	62,113	10,766	41,130	6,998
1978-79	233	75	67,296	11,986	38,623	6,000
1979-80	253	78	72,479	13,206	41,810	5,712
1980-81	270	87	77,662	14,426	42,688	7,113
1981-82	283	94	82,496	15,448	47,573	8,483
1982-83	388	121	84,330	16,470	50,833	7,866
1983-84	355	111	57,129	9,688	49,479	70,000
1984-85*	373	117	53,564	9,530	53,000	8,200

Note: (a) Secondary schools include high schools and secondary vocational institutions.

Source: Ministry of Education.

*Estimated data

Table 4.2.36 Number of educational institutions by kind, level and sex

Year	Primary school		Middle school		Secondary school (a)	
	Total	Female	Total	Female	Total	Female
1976-77	53,162	15,941	4,990	1,352	3,445	941
1977-78	53,964	16,246	5,100	1,359	3,481	962
1978-79	53,882	16,238	5,194	1,393	3,566	981
1979-80	57,220	17,771	5,233	1,407	3,580	1,009
1980-81	59,168	18,595	5,295	1,412	3,710	1,055
1981-82	61,117	19,420	5,362	1,423	3,844	1,102
1982-83	71,358	20,507	5,979	1,595	4,300	1,218
1983-84	72,053	21,202	6,053	1,609	4,300	1,250
1984-85*	75,532	22,050	6,229	1,656	4,544	1,575

Year	Arts & science college		Professional college		Universities	
	Total	Female	Total	Female	Total	Female
1976-77	433	116	98	08	12	—
1977-78	430	116	95	08	15	—
1978-79	429	119	99	08	15	—
1979-80	430	118	99	08	15	—
1980-81	434	120	100	08	19	—
1981-82	450	130	102	08	20	—
1982-83	500	152	102	08	20	—
1983-84	514	161	102	08	20	—
1984-85	520	163	107	11	20	—

Source: Ministry of Education.

(a) Secondary schools include high schools and secondary vocational institutions.

Table 4.2.37 Literacy 1972 & 1981 Censuses

Provinces	Literates (000)						Percentage of literates					
	Both Sexes		Male		Female		Both Sexes		Male		Female	
	1972	1981	1972	1981	1972	1981	1972	1981	1972	1981	1972	1981
Pakistan	9,319	14,745	6,994	10,545	2,258	4,200	21.7	26.2	30.2	35.01	11.6	16.0
Baluchistan	167	295	136	232	31	53	10.1	10.3	14.8	15.2	4.2	4.3
N.W.F.P.	785	1,238	665	973	120	190	14.5	16.7	23.1	25.9	4.7	6.5
Punjab	5,473 a	9,176 a	4,126	6,633 a	1,280	2,736 a	20.7	27.4	29.1	36.8	10.7	16.8
Sind	2,894	4,036	2,067	2,707	827	1,221	30.2	31.5	39.1	39.7	19.2	21.6
Islamabad												

(a) The literate Population of Islamabad's also included in the Province of Punjab.

Source: Population Census Organisation.

Table 4.2.38 Indicators of social and physical infrastructure

Indicators	Baluchistan	Average of Pakistan
Literacy rate	8.5%	23.5%
Children attending school (5-9 years)	21%	48%
Doctor population ratio	1:10,000	1:5,320
Per capita electricity consumption (KWH)	124	231
Telephone density per 1000 persons	2.7	5.0

Source:- Planning Commission (Sixth Five Year Plan p.195)

Table 4.2.39 Selected indices of women's development

	1977-78	1982-83	1983-84	1987-88 (planned)
1. Education:				
(a) % of total literate population	14.0	15.0	15.0	48.0
(b) % of total primary enrolment	28.8	32.0	32.5	37.4
(c) % of total secondary enrolment	21.6	25.1	25.3	27.0
(d) % of college/university enrolment	28.0	30.0	30.0	30.0
(e) % in vocational training	40.0	45.0	45.2	50.0
2. Health:				
(a) availability of trained dais (thousand)	10	15	N.A.	45
(b) children's immunization (million)	n.a.	6	"	30
(c) reduction in infant mortality (death per-thousand)	105	100	"	60
(d) reduction in maternal deaths (death per-thousand)	6-8	6-8	"	4-6
(e) population welfare centres (number)	1,003	1,003	"	1,500
(f) number of births prevented	1.5 million	2.0 million		
	(1978-83)	(1983-88)		
3. Employment:				
(a) % remuneratively employed	7.6	8.9	N.A.	12.5
(b) % of civil services	n.a.	2.0	"	5.0
(c) lady doctors	n.a.	1,330	"	4,000
(d) lady health visitors	n.a.	1,940	"	4,900
(e) nurses	n.a.	5,000	"	10,000

Source: Planning Commission (Sixth Five Year Plan P.19)

Table 4.2.40 Quality of life indices

	1960-61	1982-83	1983-84 (Estimated)	1987-88 (planned)
1. Literacy:				
-number (million)	4.8	13.9	15.0	33.0
percentage	15.0	23.5	27.0	48.0
2. Primary education:				
-number enrolled (million)	2.0	6.8	7.2	12.3
boys	1.6	4.6	4.9	7.7
girls	0.4	2.2	2.3	4.6
-Percentage of primary age population	30	48	48	75
boys	44	63	64	90
girls	11	32	33	60
3. Infant mortality (age 0-1)				
-Per thousand	162	100	100	60
4. Life expectancy:				
-number of years	43	55	55	60
5. Access to clean water:				
-% of total population	...	38	38	60
-% of rural population	...	22	22	45
-% of urban population	...	77	77	90
6. Access to sewerage facilities:				
-% of total population	...	16	16	26
-% of rural population	...	4	4	10
-% of urban population	...	48	48	60
7. Availability of electricity:				
-number (million)	2.46	30.8	30.8	52.9
-% of total population	5.4	35.5	35.5	53.3
8. Availability of telephones:				
-number	87,500	414,000	414,000	934,000
-% of total population	1.8	5.0	5.0	9.0

Source: Planning Commission

Table 4.2.41 Rural share in benefits of development

	1977-78	1982-83	1983-84 Estimated	1987-88 (planned)
1. Education:				
(a) *urban literacy rate	42.3	43.6	44.0	62.0
*rural literacy rate	14.0	15.0	15.1	42.0
*% of rural in total	46.5	46.0	46.3	58.9
(b) *urban primary enrolment (million)	2.1	2.7	2.8	4.0
*rural primary enrolment (million)	3.4	4.1	4.4	8.3
*% of rural in total	61.8	61.4	—	67.5
2. Health:				
(a) *doctors in urban areas (number)	12,324	18,800	3,400	27,000
*doctors in rural areas (number)	600	1,200	—	9,000
*% of rural in total	4.6	6.0	—	25.0
(b) *rural health centres (number)	168	374	32	729
*basic health units including government-run sub-centres, dispensaries and MCH centres (number)	2,645	4,262	340	7,000
3. Electricity:				
*number of villages electrified	7,609	16,400	2,371	36,400
*% of total villages electrified	16.9	36.4	—	81
*rural electricity consumption as % of total	4.8	6.0	—	9
4. Roads:				
*increase in km of farm to market roads	5,000	10,000	2,250	—
*increase in km of canal roads open to public use		30,000		
5. Water and sewerage:				
(a) *number of rural people served with potable water (million)	7.66	13.65	0.879	31.2
*% of total rural population	14	22	—	45
(b) *number of rural people served with sewerage facilities (million)	0.14	2.5	1.079	6.9
*of total rural population	0.25	4	—	10

Source: Planning Commission
(Sixth Five Year Plan p.18)

Table 4.2.42 Primary education indices

	1982-83	1983-84	1984-85	1987-88 planned	Absolute increase in 88 over 83 planned	% increase in 88 over 83
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A. Enrolment (in million)

Total	6.8	7.0	7.3	12.3	5.3	76
Rural	4.1	4.2	4.4	8.3	4.1	98
Urban	2.7	2.8	2.9	4.0	1.2	43
Boys	4.6	4.7	4.9	7.7	3.0	64
Girls	2.2	2.3	2.4	4.6	2.3	100

B. Participation and literacy rates (%)

	Participation rate				Literacy rate			
	Participation rate				Literacy rate			
	1982-83	1983-84	1984-85	1987-88	1982-83	1983-84	1984-85	1987-88
Total	48	48.5	49	75	23.5	27.1	28	48
Rural	40	40.5	41	70	15.0	15.5	16	42
Urban	72	72.5	73	95	43.6	44.0	45	62
Boys	63	63.5	64	90	32.0	32.5	33	49
Girls	32	32.5	33	60	13.9	14.0	14.5	47
Rural girls	20	20.5	21	50	5.7	5.8	6	40

Source: Planning Commission

Table 4.3.03 Physical achievements

Major programmes	Unit	1977-78	1982-83	1983-84	1984-85	1987-88 projected	Percentage increase	
							in 83 over 78	in 88 over 83 Projected
Development of plots in								
Urban areas	.. Nos.	54,149	57,000	50,650	76,000	140,000	5.3	. 145.6
Urban W.S/ sewerage and drainage	. Additional population served in million	2,462	2.562	1.90	2.17	3.7	4.1	44.4
Rural W.S./								
sewerage and drainage	.. "	2.186	1.485	1.4	2.03	9.0	(-)32.1	506.0
Government offices/ buildings	.. Million sft.	0.71	1.555	1.20	1.00	0.5	119.0	(-)67.8
Government								
servants housing	.. No.	1600	2875	4000	25.00	2000	79.7	(-)30.4

Source: Planning Commission(Sixth Five Year Plan
P. 548) .

Table 4.3.04 Federal and provincial government subsidies

Particulars	(Rs. in millions)						
	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84 Revises	1984-85 Budget
Wheat + Sugar	2,524	1,777	1,135	1,303	1,160	1,370	1,373
Edible oils	577	884	583	1	--	1,485	945
Fertilizer	1,692	2,454	2,457	1,794	1,948	1,690	1,500
Plant protection, pesticides and equipment	267	218	--	--	--	--	--
Tubewells	24	22	20	24	24	--	--
Export subsidies	500	550	705	1,153	1,380	1,780	1,306
Sugar	--	--	--	--	--	--	--
Petroleum products (a)	424	480	450	--	--	--	--
Others	22	639/8	28	58	267	1,143	444
Total	6,030	7,024	5,378	4,333	4,779	7,468	5,568

Note = Includes losses of Cotton Export Corporation of Rs.575 million in 1979-80 and Rs. 301 million in 1982-83

Source: Pakistan Economic Survey
1984-85 P.129

a = Includes only direct subsidies and excludes refund of surcharges on petroleum products.

SECTION 5
POLLUTION

Section 5: POLLUTION - EXPLANATORY NOTES

5.01 The term 'pollution' describes a series of environmental disruptions or damages. A 'pollutant' is an agent such as a chemical, noise or radiation, that produces such a disruption or damage. By definition, pollution is a man-made phenomenon. But, this is not to deny that agents naturally present in the environment can be harmful, such as ionising radiation, pollens, hydrocarbons emitted by trees, volcanic matter and its influence on the climate, etc. Qualitative pollutants are agents produced and released only by human activities and not otherwise present in nature. By contrast, quantitative pollutants are contributions from society to the environmental pools of agents that would be present even in the absence of human influences. The media into which the pollution phenomena are discharged are air, water and soil. However, other serious problems which should be included in the analysis of the statistical aspects of pollution are noise, radiation, solid wastes, pesticides and related compounds, trace metals, and chemical mutagens. The field of pollution covers such a wide range of activities, commodities and problems that it constitutes the core area of the discipline known as environmental studies (6).

5.02 On the solid waste management in Pakistan, W.H.O. Consultant in his assignment report submitted in March 1982 has made certain observations and recommendations: (14) According to him the solid waste management administration follows the old British system in that it is generally under the medical officer of health, chief public health inspectors or sanitary officers, who have many other ties as well. The situation in each city is described below:-

Islamabad: This city, being new, has fewer problems than any other. The workshop has made tractor trailers for refuse collection and that they could manufacture special trailers that could pick up the containers, so that there is no need to provide more than one chassis.

Rawalpindi: This city has problems owing to the fact that not all the town is sewerage and excreta have to be put out on the refuse heaps. Mechanically loaded bins will help.

Peshawar: The problems are much the same as those found in Rawalpindi. It has two extra problems: (1) The refugee problem. Here they might be able to develop a Zabaleen system. (2) There are very serious problems of water-logging, particularly in that part of the city where unplanned housing has been allowed in old brick fields. This is a particularly difficult problem causing a very grave health hazard and intolerable living conditions for the residents. Pumping is essential. Biogas would of course help provide the power, but the matter is so urgent that alleviating measures should be taken immediately.

Lahore: This city has already been the subject of an excellent study and report initiated by the Institute of Public Health Engineering and Research. Those involved should travel to industrial countries, not to follow their methods but to see the mechanically loaded bin method in operation as it will avoid the need for mini transfer stations and concrete bins.

Hyderabad: This city, like Lahore, has an enormous number of buffaloes and other animals living in the city. Like other cities, it also has the sanitation problems of open sewers. Debris falls into these sewers and has to be cleared out manually, resulting in heaps of earth and other material lying alongside the Open sewer. Hand-operated sliding grids with a collecting basket at the bottom should be installed in pairs so that the debris can be regularly removed at one point. This obviates the need to clean out the whole length of the sewer often. A cement kiln near Hyderabad that could perhaps use at least a fraction of the refuse and a new power station are being planned. Thorough sampling and analysis of the refuse, including calorific tests from different areas of the city, are essential to determine whether the refuse is suitable for this purpose and would contribute enough heat to justify utilization.

Karachi: This city has the advantage that convenient sites are available for the utilization of wastes around the city: a high calorific fraction as a supplementary fuel for the power station and the cement kiln, and composting near the sewage treatment plant. The refuse is certainly suitable for composting. What other uses might prove economic cannot be known after the sampling and test results are available.

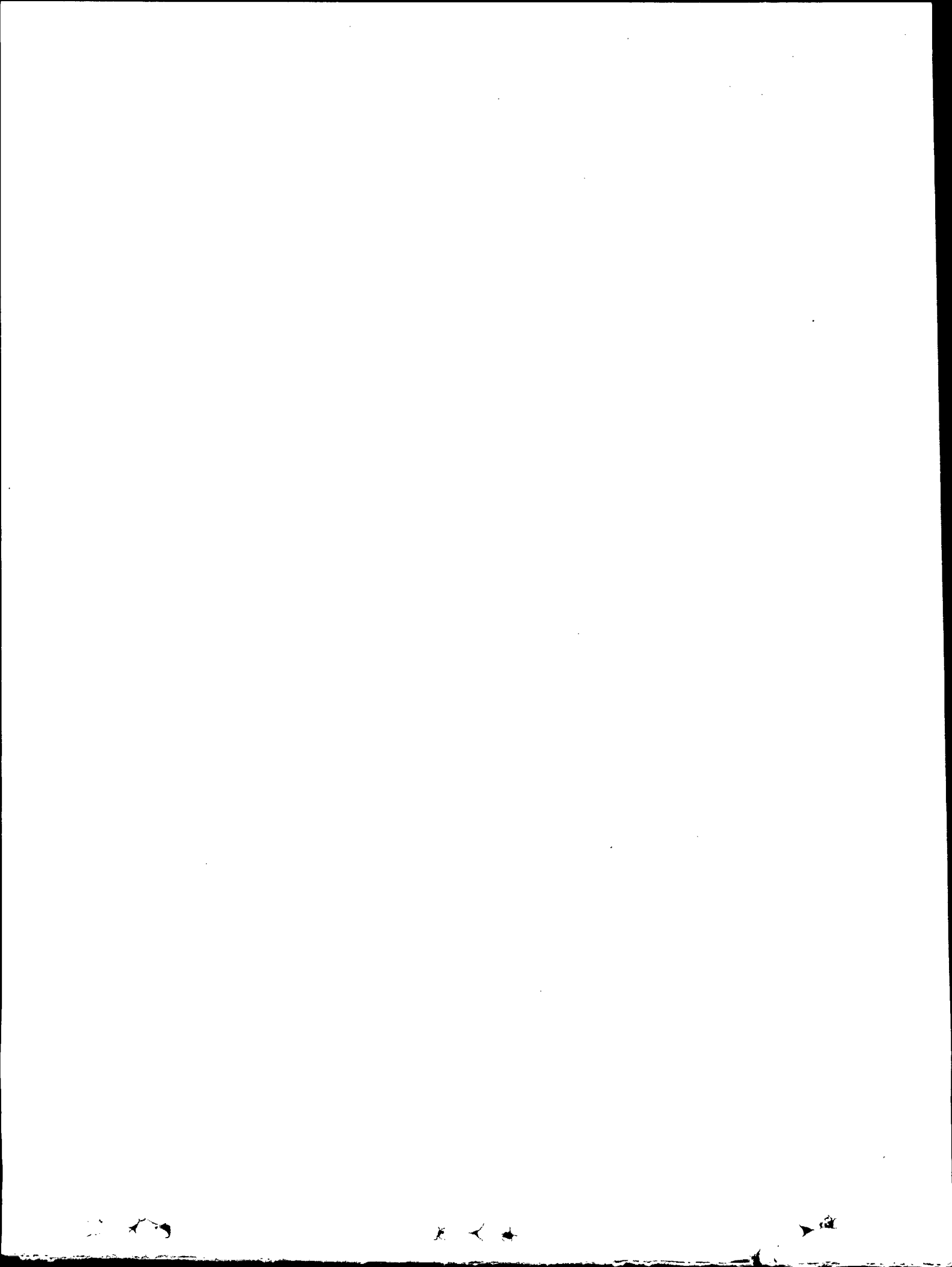
5.03 Tables 5.1.01 to 5.1.15 provide information on wastes flowing into the sea from Lyari river, wastes flowing into Lyari river from industrial area, summary of different type pollutants on the coasts of Pakistan, environment emission standard (Gaseous and Liquid), characteristics of rivers of Indus Basin, monthly averages of: dissolved oxygen, surface temperature, and salinity at Karachi Harbour and Clifton beach, data on average wave heights tide and gaseous emissions and industrial liquid wastes at selected areas, TSP concentration at Karachi & comparative data.

5.04 The data gaps in the area of pollution are given below:-

- Air pollution: incidence of concentration of individual pollutants (over time) by source i.e. transportation, stationary fuel combustion, industrial processes, solid waste disposal, misc. (oil and gasoline production);
- Water pollution: water storage and water quality, water consumption, volume of water discharged, its pollution and purification;
- Soil pollution: The loss of degeneration of the quality of soil and the harmful effects of the application of various elements to the land;
- Noise pollution: the particular source of noise which are responsible for high levels of impact; the cumulative aerial effect of several varied types of noise, which in combination create unhealthy environment;
- Pesticides and related compounds: basic monitoring data on the production and application of pesticides, insecticides, herbicides and biocides;
- Trace metals: concentration of trace metals (lead, mercury, cadmium, arsenic, beryllium, nickel, chromium, vanadium, molybdenum, copper and zinc) for human activities (mining) and natural processes (emission to air, natural rainout and natural stream load).

- Radiation: data compiled by IAEA will be of direct use as well as that developed by WHO on the environmental health effects of radiation and other pollutants; that data will help in the development of statistics on this aspect of pollution.
- Solid wastes: the composition and sources of the wastes, the method of disposal and the recycling or recovery of materials and energy (solid wastes are the discarded materials from industry, construction, agriculture, commerce and households, for which no further use can be ascribed).
- Toxic chemicals: Chemicals represent a particularly difficult series of problems in connection with pollution of the environment. Many synthetic chemicals released into the environment are mutagenic, they include dyes, refrigerants, pesticides, anticancer drugs, medical and veterinary drugs, air pollutants, fuel additives, tranquilisers, chemical agents used in the plastic industry, antibiotics and a variety of industrial chemical agents. The work of UNEP with the development of an International Register of Potentially Toxic Chemicals should be followed closely, with a view to abstracting statistical series and indicators from the data to be included in the Register.

As far as methods of data collection are concerned, pollution data pose a specific problem, given that they originate both as pointsource emission observations and as area-monitoring quality observations: the level at which monitoring data and statistics should be drawn into a composite treatment of pollution problems and phenomena must be investigated further (6).



**5. TABLES ON POLLUTION
ASPECT OF ENVIRONMENT**

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5. POLLUTION

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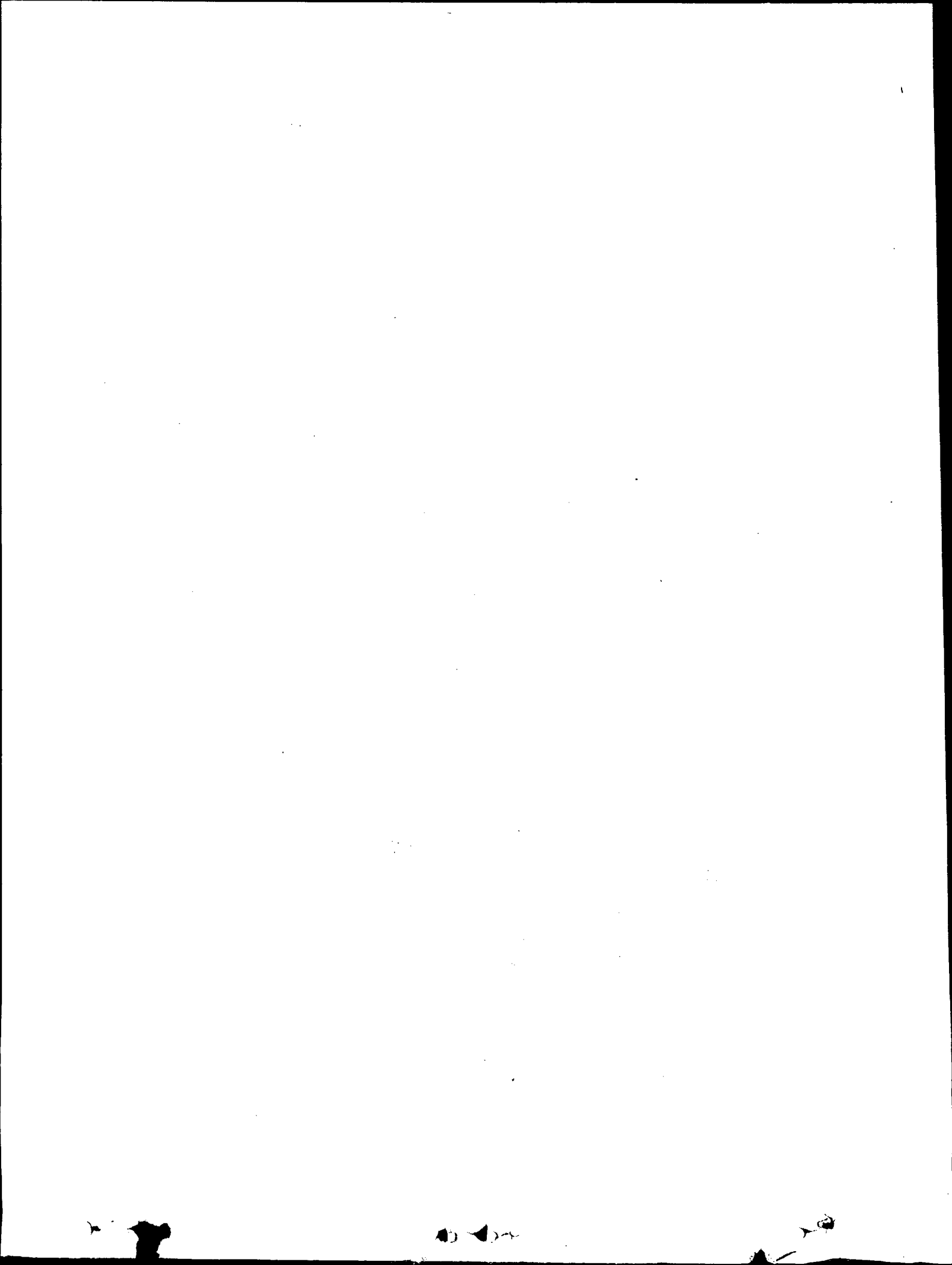


Table 5.1.01 Wastes flowing into the sea from
Lyari River-1974

Composition of Waste	Per day (Metric tons)	Per annum (Metric tons)
Chloride	152.46	53,200.0
Sulphate	151.74	53,109.0
Suspended solids	34.20	11,970.0
Total dissolved solids (T.D.S)	376.20	131,070.0
Organic matter in T.D.S.	47.34	16,555.0
Ammoniacal nitorgen	2.30	805.0
Albuminoid nitrogen	0.054	18.9
Total nitrogen	2.254	822.5
Alkalinity as calcium carbonate	115.74	40,495.0
Phosphate	2.62	917.0
Calcium as bicarbonate	162.00	67,700.0
Iron oxide	5.14	1,799.0
Aluminium oxide	1.36	476.0
Magnesium oxide	60.00	21,000.0
Arsenic oxide	1.40	490.0

Sorce: P.C.S.I.R. Laborateries, Karachi
(Part I. Survey of the polluted
Lyari River).

Table 5.1.02 Waste flowing into Lyari River from industrial area 1975.

Composition or waste	Matric ton/day
Chloride	90.9
Sulphate	64.9
Suspended solids	22.0
Total dissolved solids (TDS)	59.7
Organic matter in TDS	42.0
Ammoniacal nitrogen	1.1
Alkalinity as calcium carbonate	69.8
Phosphate	1.5

Source:- Industrial Effluents, their nature and disposal in Karachi Region Part II. Survey of the polluted streams of Sind Industrial Trading Estate Manghopir Area-by Mr.M.Arshad Ali Beg and other PCSIR Laboratories, Karachi.

Table 5.1.03 Summary of different types of pollutants
on the coast of Pakistan.

Area	Oil Sliks	Tar on Beaches	Tar Balls	Indust poll	Sewage domest Wastes	Sedim	Thermal poll
Jiwani	++	-	++	-	-	-	-
Gwadar							
East Bay	++	+	++	-	+	-	-
West Bay	++	-	+++	-	-	-	-
Pasni	+	-	+++	-	+	-	-
Ormara	+	-	+	-	-	-	-
Sonmiani Bay	+	-	-	-	+	-	-
Gadani	++	++	++	+	-	-	-
Cape Monze	-	-	+	-	-	-	-
Paradise Point	-	-	++	-	-	-	++
Buleji	-	-	+	-	-	-	-
Hawksbay	-	-	++	-	-	-	-
Sandspit	-	-	++	-	-	-	-
Manora Island (Exposed)	-	-	+	-	-	-	-
Manora Channel	++++	+++	++	++++	++++	++++	+
Clifton	++	-	+	+	+	+	-
Korangi Cr.	+	-	+	+	+	+	-
Port Qasim	++	+	+	++	+	++++	+++
Indus Delta.	-	-	-	-	+	++++	-

+ Low
++ Medium
+++ High
++++ Highest

Source:- Environment and Urban Affair
Division Islamabad.

Table 5.1.04 Environmental emission standards for municipal and liquid industrial effluents.

Parameter	Mgl-1	
	Relaxed Standard (up to 1990)	Ultimate Standard (after 1990)
Temperature	40 ⁰ C	40 ⁰ C
PH	5.5-9-5	6.0-9.0
5 day biochemical oxygen demand (BOD) at 20 ⁰ C	200	80
Chemical Oxygen demand (COD)(a)	400	150
Total suspended solids	400	200
Total dissolved solids	5000	3,500
Grease and oil	20	10
Phenolic compounds (as phenol)	1.5	0.3
Chloride (as Cl ⁻)	1,000	1,000
Flouride (as F ⁻)	20	10
Cyanide (as CN ⁻)	2	1
Anionic Detergents(b) (as MBAS)	30	20
Sulphate (SO ²⁻)	1,000	1,000
Sulphide (S ²⁻)	2.0	1.0
Anmonia	75	40
Pesticides, herbicides, fungicides and insecticides	0.75	0.15
Cadmium (c)	2.0	0.1
Chromium (c) (trivalent and hexavalent)	2.0	1.0
Copper (c)	4.0	1.0
Lead (c)	2.0	0.5
Mercury (c)	0.1	0.01

Table 5.1.04 Environmental emission standards for municipal
and liquid industrial effluents

Parameter	Mg1-1	
	Relaxed Standard (up to 1990)	Ultimate Standard (after 1990)
Selenium (c)	1	0.5
Nickel (c)	2.0	1.0
Silver (c)	2.0	1.0
Total toxic metals (c)	10.0	2.0
Zinc	10.0	5.0
Arsenic	2.0	1.0
Barium	4.0	1.5
Iron	10.0	1.5
Manganese	10.0	1.5
Boron	10.0	6.0
Chlorine	1.0	1.0

(a) Assumes minimum dilution 10.0 on discharge,
if not more stringent local standards necessary

(b) Assuming biodegradable (stringent standards
required for nonionic surfactants)

(c) subject to total toxic metal discharge.

Source:- Environment and Urban Affair
Division Islamabad.

Table 5.1.05 Characteristics of rivers of Indus Basin

Item	Indus	Jhelum	Chenab	Ravi	Beas	Sutlej
1. Length (miles)	1830	430	640	410	220	900
2.(a) Catchment above Rim stations (sq. miles)	118500	12600	10480	2300	7050	23500
(b) Glacier area (sq. miles)	14415	142	1475	100	227	2468
Percentage of 2(a)	(12%)	(1%)	(14%)	(4%)	(3%)	(11%)
3. Approximate mean annual rainfall over the hilly catchment (inches)	17.4	42.33	47.24	52.00	56.50	19.71
4. Mean annual run-off at Rim stations (MAF)	78.36	23.86	23.28	6.54	12.55	13.94
5. Mean annual run-off in inches per sq. miles of hilly catchment.	13.8	35.5	41.6	53.3	33.4	11.1
Percentage of (3)	(79%)	(84%)	(88%)	(102%)	(59%)	(56%)
6. Highest flood peak recorded at the Rim station with year (thousand cusecs)	950 (1942)	1050 (1959)	1100 (1957)	680 (1955)	276 (1955)	298 (1955)
7. Run-off per sq. mile of hilly catchment for the highest flood peak (cusecs)	8	83	106	296	39	13

Source:- 'Environment Problems of Pakistan' by Mr. M. Arshad Ali Beg, PCSIR Laboratories Karachi 1977.

Table 5.1.06 Monthly average of surface dissolved oxygen surface temperature & surface salinity
at Karachi Harbour for the year 1983

Month	Surface dissolved oxygen ml/L	Surface temperature C°	Surface salinity ‰
Jan	3.32	20.0	36.302
Feb	6.56	21.5	35.800
Mar	2.80	23.0	36.415
Apr	4.80	25.3	35.460
May	4.60	29.9	35.890
Jun	—	—	—
Jul	4.90	31.5	34.187
Aug	4.60	28.4	34.460
Sep	3.90	29.7	35.480
Oct	5.00	27.7	35.790
Nov	6.20	24.0	35.300
Dec	—	—	—

Source: National Institute of Oceanography,
Karachi.

Table 5.1.07 Monthly average of surface dissolved oxygen, surface temperature
& surface salinity for the year 1984

Month	Karachi Harbour			Clifton Beach		
	Surface dissolved oxygen ml/L	Surface temperature C°	Surface salinity ‰	Surface dissolved oxygen ml/L	Surface temperature C°	Surface salinity ‰
Jan	1.50-3.0	18-22	34-36	—	18-22	36-37
Feb	2.25-4.25	20-24	34-36	—	19-23	36-37
Mar	—	23-25	31-35	—	23-26	36-37
Apr	1.0-3.0	24-28	34.0-36.5	—	25-27	35-36
May	2.0-4.0	27-30	35.5-37.5	—	28-30	36-37
Jun	—	28-31	33-36	—	28-31	36-37
Jul	3.0-4.5	28-32	29-34	—	26-28	32-36
Aug	3.0-4.0	26-30	28-33	—	26-28	29-33
Sep	3.0-4.5	26-28	30-35	—	—	33-35
Oct	—	—	—	—	—	—
Nov	—	—	—	—	—	—
Dec	—	—	—	—	—	—

Source: National Institute of Oceanography,
Karachi.

Table 5.1.08 Average Wave Heights Off Karachi

Months	Meter									
	1980		1981		1982		1983		1984	
	Average highest significant wave	Average lowest significant wave	Average highest significant wave	Average lowest significant wave	Average highest significant wave	Average lowest significant wave	Average highest significant wave	Average lowest significant wave	Average highest significant wave	Average lowest significant wave
Jan	0.5	0.4	0.7	0.4	0.5	0.3	0.6	0.5	No wave recording	
Feb	0.7	0.5	0.8	0.6	0.6	0.4	0.8	0.6	"	
Mar	1.0	0.8	1.1	0.9	0.7	0.6	0.9	0.8	"	
Apr	1.1	0.9	1.3	1.1	0.9	0.7	1.0	0.9	1.0	0.4
May	1.5	1.2	1.5	1.2	1.6	1.3	1.2	1.0	1.4	1.1
Jun	2.3	1.9	2.3	1.9	2.4	1.8	1.2	1.0	3.0	2.4
Jul	3.0	2.5	3.0	2.6	3.1	2.7	1.6	1.1	2.7	2.2
Aug	2.2	1.9	2.4	2.0	2.3	2.0	1.6	1.2	2.4	2.0
Sep	1.4	1.2	1.3	1.1	1.3	1.1	0.9	0.7	1.7	1.4
Oct	0.8	0.6	Wave data missing		0.8	0.6	0.6	0.5	No wave recording	
Nov	0.5	0.4	0.5	0.4	0.4	0.3	0.5	0.3	"	
Dec	0.3	0.2	0.3	0.1	0.3	0.2	0.5	0.3	"	

Source: National Institute of Oceanography, Karachi.

Table 5.1.09 Tide data of Karachi

Month	1983						1984						1985					
	Av. high water		Av. low water		Mean sea level		Av. high water		Av. low water		Mean sea level		Av. high water		Av. low water		Mean sea level	
	M	Ft	M	Ft	M	Ft	M	Ft	M	Ft	M	Ft	M	Ft	M	Ft	M	Ft
Jan	2.5	8.3	0.7	2.43	1.60	5.38	2.7	8.3	0.5	1.5	1.60	4.90	2.40	1.85	0.67	2.22	1.51	4.89
Feb	2.5	8.2	0.7	2.44	1.60	5.32	2.7	8.3	0.4	1.2	1.55	4.75	2.50	8.08	0.65	2.16	1.54	5.07
Mar	2.5	8.3	0.7	2.40	1.60	5.38	2.6	7.9	0.5	1.5	1.55	4.70	2.50	9.09	0.76	2.57	1.59	5.26
Apr	2.5	8.3	0.8	2.61	1.65	5.45	2.6	7.9	0.6	1.8	1.60	4.85	2.53	8.32	0.81	2.66	1.66	5.45
May	2.5	8.3	0.9	2.81	1.70	5.57	2.7	8.3	0.5	1.5	1.60	4.90	2.62	8.61	0.83	2.74	1.79	5.86
Jun	2.5	8.3	0.9	2.85	1.70	5.59	2.7	8.3	0.6	1.8	1.65	5.05	2.77	9.12	0.83	2.73	1.69	5.57
Jul	2.5	8.3	0.8	2.73	1.65	5.50	2.7	8.3	0.6	1.8	1.65	5.05	2.56	8.42	0.75	2.54	1.64	5.43
Aug	2.5	8.2	0.8	2.53	1.65	5.36	2.7	8.3	0.5	1.5	1.60	4.90	2.53	8.29	0.76	2.48	1.61	5.32
Sep	2.5	8.2	0.7	2.39	1.60	5.31	2.6	7.9	0.5	1.5	1.55	4.70	...	...	...	...	...	...
Oct	2.5	8.1	0.7	2.43	1.60	5.27	2.6	7.9	0.6	1.8	1.60	4.85	2.41	7.93	0.67	2.22	1.52	5.00
Nov	2.5	8.2	0.8	2.48	1.65	5.34	2.6	7.9	0.6	1.8	1.60	4.85	...	...	...	...	...	...
Dec	...	...	...	...	...	...	2.7	8.3	0.6	1.8	1.65	5.05	2.42	7.94	0.68	2.24	1.53	5.04

Table 5.1.10 Gaseous emission in selected areas

Area	No. of industries covered in the survey	Range of heights of emission points (Metre)	Harmful emission	Immediate remedial measures required
Karachi	11	6 to 50	<ul style="list-style-type: none"> - HC - H₂S - Lead particulate matter - Ammonia and solvents - Dust and Carbon cement dust fall etc. 	<ul style="list-style-type: none"> - Protection from dust & flit - Ventilation & Exhaust - Control of particulate matter
Multan	11	6 to 43	<ul style="list-style-type: none"> - NO₂ - Cl₂ - CO - Ammonium salts - Methane 	<ul style="list-style-type: none"> - Scrubers for NOx ammonia & Fluorine are immediately Required
Faisalabad	10	7 to 50	<ul style="list-style-type: none"> - SO₂ - Methane - SO₃ & fluorine 	<ul style="list-style-type: none"> - Burning system of Methane in Boiler should be improved - Exhaust fans - Proper control & prevention of leakages

Table 5.1.10 Gaseous emission in selected areas

Area	No. of industries covered in the survey	Range of heights of emission points (Metre)	Harmful emission	Immediate remedial measures required
Kala Shah Kaku	7	12 to 23	SO ₂	Proper control & prevention of leakges
			CO	
			Cl ₂	
			SO ₃	
Nowshera	7	15 to 33	SO ₂	Vacuum type dust collectors
			CO	
			HC	
			Cl ₂	
Peshawar	6	16 to 17	Hydrogen sulphide	—

Source: Environment & Urban Affair Division
(Industrial Waste Pollution Report
Pakistan, June 1983.)

Table 5.1.11 Industrial liquid waste discharge in selected areas

Areas	No. of industries covered in the survey	Average discharge per day in "000" gallons	Discharge % by industries					
			Fisheries	Oil/Ghee	Beverage	Textile	Paper & Board	Tannery
Karachi	15	1642	1.5	32.4	1.6	27.4	17.6	0.9
Multan	11	1018	—	19.1	—	45.3	—	—
Faisalabad	10	231	—	—	—	27.0	—	—
Kalashah Kaku	7	1421	—	24.3	—	—	—	—
Nowshera	9	14416	—	28.0	—	8.3	31.2	—
Peshawar	10	973	—	—	18.4	—	—	10.5

Areas	Discharge % by industries								Range of PH Value
	Chemicals	Refinery	Engineering	Fertilizer	Sugar	Maize	Ceramic	Others	
Karachi	5.6	6.1	6.1	—	—	—	—	0.8	2.1-10.3
Multan	—	—	—	34.0	—	—	—	1.6	5.8-10.5
Faisalabad	—	—	—	—	16.6	27.3	—	29.1	3.8-09.1
Kalashah Kahu	72.1	—	—	—	—	—	—	0.6	1.2-09.0
Nowshera	6.2	—	0.7	—	21.6	—	2.8	1.2	2.0-11.7
Peshawar	—	—	—	—	71.1	—	—	—	5.7-08.7

Source: Environment & Urban Affair Division
(Industrial Waste Pollution Report
Pakistan, June 1983.)

Table 5.1.12 TSP Concentration Observed at space and Atomospheric Research Centre (SPARCENT), Karachi, during 1985

Month	Average T S P Concentration n gm/m ³
January	172.48
February	236.08
March	239.80
April	233.01
May	242.08
June	260.49
July	231.45
August	...
September	296.48
October	245.38
November	254.93
December	240.68

Source:- Space and Atomospheric Research Centre (SPARCENT), Karachi.

Table 5.1.13 Environmental emission standards for industrial gaseous emissions.

Parameter	Source of Emission	Relaxed Standard (up to 1990)	Ultimate Standard (after 1990)
Smoke	smoke capacity not exceed	408	408
Particulate Matter	Boiler and furnace	(Ringleman Scale)	(Ringleman Scale)
	Using oil	600	300
	using coal		
	Cement-kilns,	750	500
	grinding, crushing	600	300
	clinker coders, and		
	related processes		
	metallurgical processes	700	500
	converters, blast		
	furnaces and cupolas		
Hydrogen chloride	any	500	400
Chlorine	any	200	150
Hydrogen fluoride	any	200	150
Hydrogen sulphide	any	10	10
sulphure oxides	sulphuric acid, plants other	8,000	6,000
Carbon monoxide	any	500	400
Lead	any	1,000	800
Mercury	any	100	50
Cadmium	any	30	10
Arsenic	any	30	20
Copper	any	50	20
Antimony	any	100	50
Zinc	any	50	20
Oxides of	any	300	200
Nitrogen		4,000	3,000
(NO)	any nitric acid manufacture		
x	other sources		

In defining more stringent attention should be paid to particle sizes of 104. to 101 mass emission per unit Time for large emitters.

Source: Environment and Urban Division Islamabad.

Table 5.1.14 Tentative comparative data on solid wastes a/

Country/Capital	Average persons/ dwelling	Production Gm./ head/day	Collected Gm./ head/day	Density Gm./ Cu. M.	Workers/1000 population
Bangladesh (Dhaka)	8.10	350	305	600	1.20
(Chittagong)	8.00	280	250	—	1.10
Burma (Rangoon)	5.80	250	210	400	1.00
Hong Kong	—	850	840	—	—
India (Bangalore)	5.00	415	370	570	1.80
(New Delhi)	—	—	—	—	3.20
Indonesia (Jakarta)	8.00	604	404	400	1.10
Nepal (Kathmandu)	6.00	250	75	600	1.50
Philippines (Manila)	—	500	—	—	1.67
Singapore	—	870	870	—	0.50
Sri Lanka (Colombo)	6.00	420	400	400	2.80
Thailand (Bangkok)	7.00	455	303	250	1.20
United Kingdom	3.00	900	900	150	1.30
Pakistan (Karachi)	6.50	1050	—	350*	1.63

a/ Problem and practices of solid waste management in Asia regional solid waste seminar, Asian Institute of technology September, 1978 Bangkok by Lohani, B.N. and Thanh.

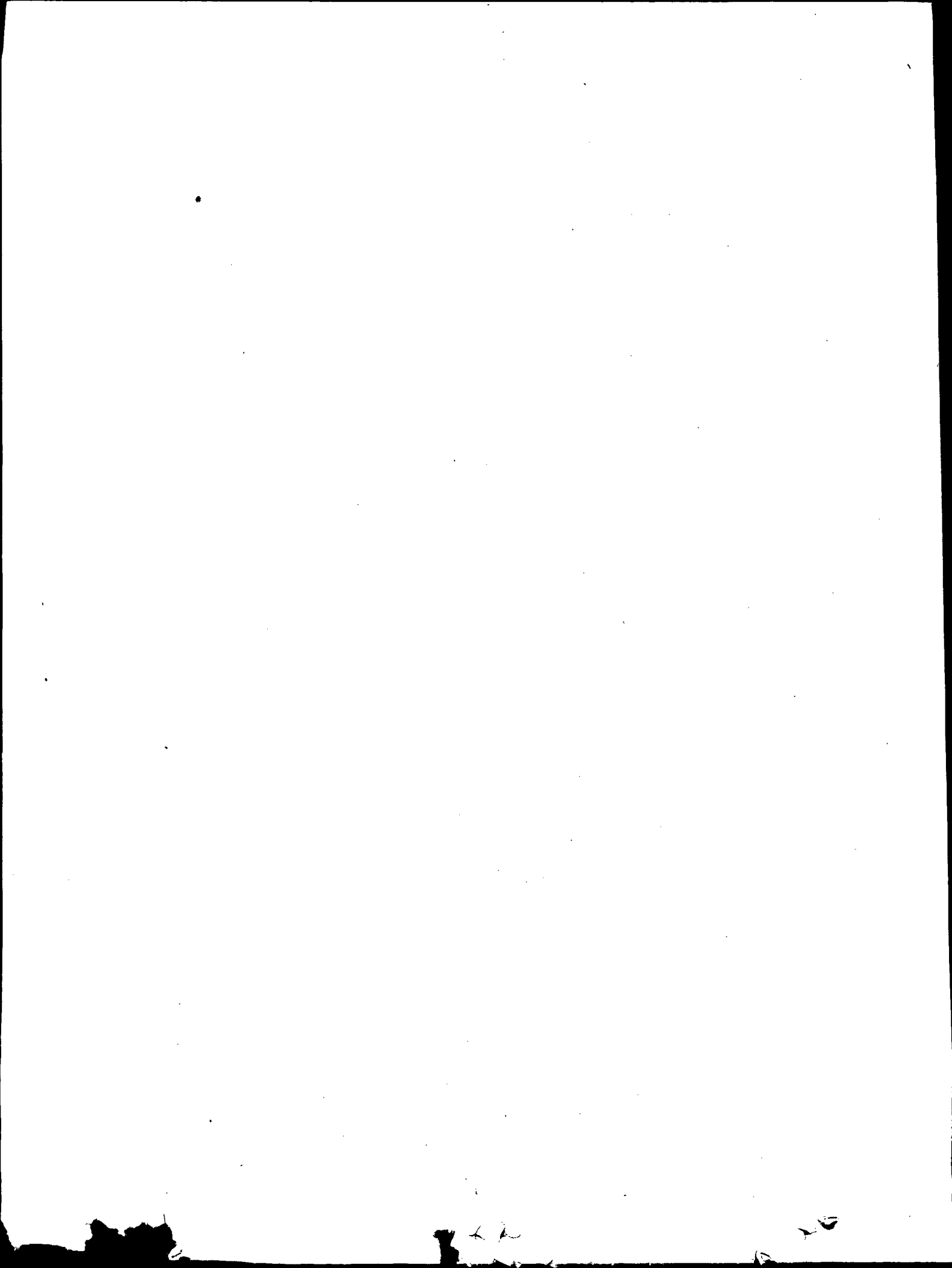
*Density KG/Cu.m.

Table 5.1.15 Comparative refuse analysis

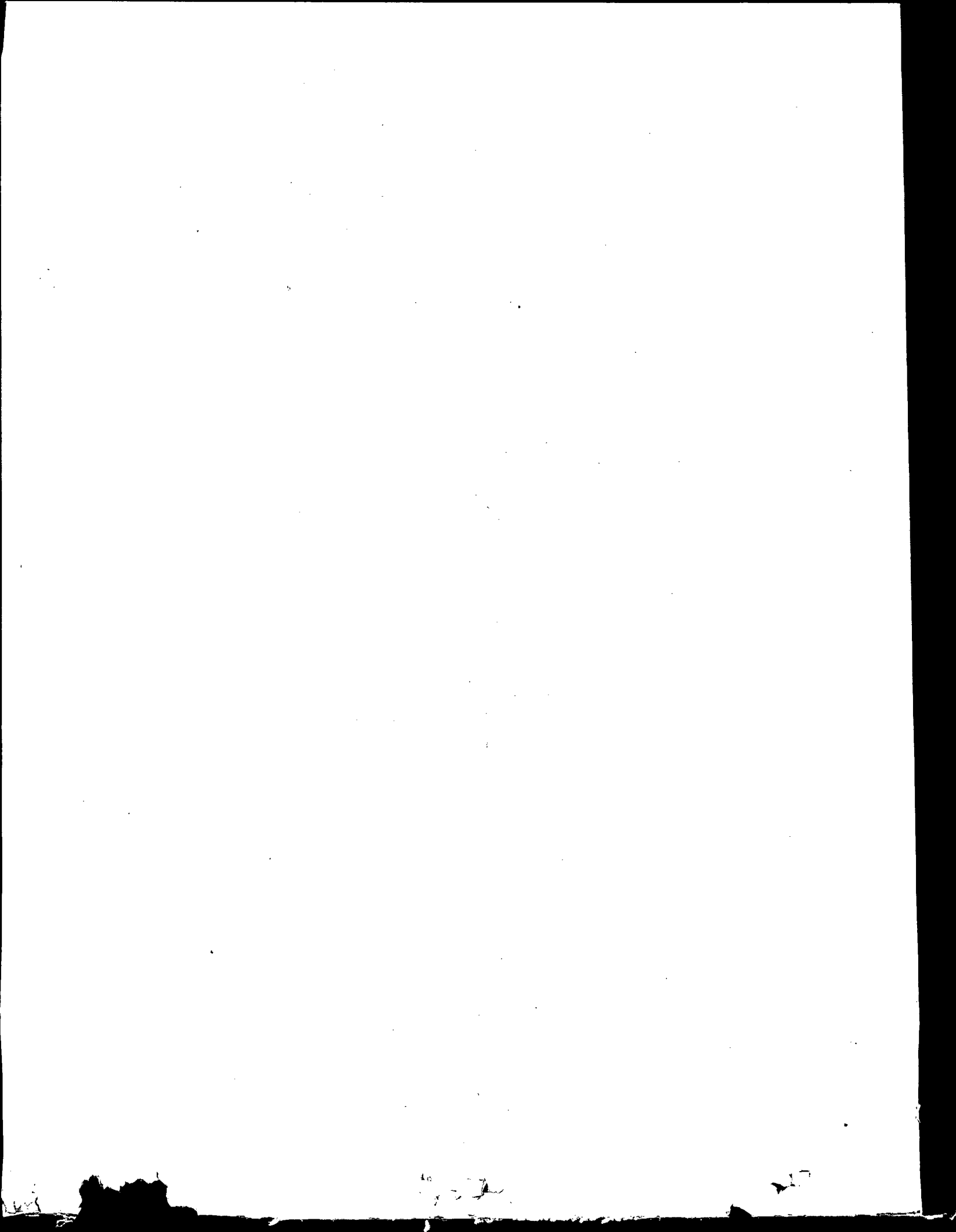
	Britain	Bangkok	Bangalore	Bangalore	Hong Kong	Jakarta	Seoul	Taiwan	Pakistan
	Typical	Analysis by municipality	Analysis by Flintoff Burner	Analysis by NEERI Summer					Analysis by WHO consultant
Vegetable/putrescible	28	44.0	75.2	65.1	9.42	60	—	24.6	55
Paper	37	24.6	1.5	2.7	32.46	2	4.00	7.5	15
Metals	9	1.0	0.1	0.4	2.17	2	0.40	1.1	5
Glass	9	1.0	0.2	0.2	9.72	2	0.15	2.8	4
Textiles	3	3.0	3.1	0.9	9.58	—	—	3.7	3
Plastics and Rubber	3	7.0	0.9	0.3	6.24	2	1.80	2.3	2
Misc. combustible	1	—	0.2	(exc. rubber) 0.2	4.94	7 (egg shells)	0.60 (Wood)	—	2
Misc. Incombustible	1	3.5	6.9	1.2	—	—	78.00 (ashes)	56.0 (ashes)	4
Inert below 10mm	9	4.8	12.0		14.09	—	—	—	—
Flue earth	—	—	—	29.0	—	—	—	—	—
Other materials	—	—	—	—	10.47	25	13.70	0.8	—
Density gm/cu.m	150	250	570	405	—	—	—	—	350*

Note:- Solid wastes management in south East Asia, report by Frank Flintoff, WHO consultant. Country report on solid waste management seminar, Bangkok, Thailand. Sept 1978. Assignment report on solid waste management in Pakistan prepared by Denys Tollemache, WHO consultant (March 1982)

*Density Kg/Cu.m



APPENDICES



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SYMBOLS, ABBREVIATIONS AND CONVERSIONSymbols and abbreviations:

SO ₃ .	Sulphur trioxide
TAC.	Technical Advisory committee of the National Statistical Council
TOE.	Ton oil equivalent
UNSO.	United Nations Statistical Office
UNEP.	United Nations Environment Programme
MMCFT.	Million Cubic Feet

pH The value of pH of a waste indicates the strength of acid or alkali present in it. Industrial wastes with very low pH value when discharged into streams badly damage marine life and crops. Similarly high pH values of waste water cause serious damage to soil as well as to aquatic life. A pH range of 6-9 is usually acceptable in many countries for the waste water being discharged into streams.

ACGR. Annual Compound Growth Rate

Conversion coefficients and factors:

1 cubic metre	35.314724 cubic feet
1 meter	3.2808 feet
1 meter	1.09361 yards
1 Square Kilometer	0.386102 Square mile
1 Hectare	2.4710 acres
1 Square Kilometer	247.1047 acres
1 Tonne	0.9842064 long ton
	1.1023109 short tons
1 bale cotton	170.09711 Kilograms
1 Kilogram	2.2046229 Pounds
1 Kilogram	0.019684 hundred-weight
1 Kilogram	0.0267922 maund
1 Kilogram	1.0716915 seers
1 Gram	0.0857353 tola
1 Gross	144 numbers
1 Passenger Kilometer	0.6213711 Passenger mile
1 Metric ton Kilometer	0.6849446 short ton mile
	0.6115575 long ton mile
1 litre	0.2199755 Imperial gallon
	0.2641795 U.S. gallons
1 litre	1.759803 Pints

PAKISTAN ENVIRONMENTAL PROTECTION ORDINANCE, 1983

The President, Gen. Mohammad Zia-ul-Haq promulgated Pakistan Environmental Ordinance 1983 (Ordinance XXXVII of 1983) on 2nd January, 1983. Following is the text of the Ordinance:-

Ordinance No. XXXVII of 1983: An Ordinance.

To provide for the control of pollution and preservation of living environment.

Whereas it is expedient to provide for the control of pollution and preservation of living environment and for matters connected therewith or ancillary thereto.

And whereas the President is satisfied that circumstances exist which render it necessary to take immediate action:

Now, therefore, in pursuance of the proclamation of the Fifth Day of July 1977, and in exercise of all powers enabling him in that behalf, the President is pleased to make and promulgate the following ordinance:-

1. Short title, extent and commencement:- (1) This order may be called the Pakistan Environmental Protection Ordinance, 1983.

(2) It extends to the whole of Pakistan and its territorial waters, exclusive economic zone and historic waters.

(3) It shall come into force on such day as the Federal Government may, by notification in the official Gazette, specify in this behalf.

2. Definitions:- In this ordinance, unless there is anything repugnant in the subject or Context:-

(a) "Agency" means the Pakistan Environmental Protection Agency (PEPA) established under Section 5;

(b) "Air pollutant" mean any substance that causes alternation in chemical, physical, biological or radiological integrity of air and includes soot, smoke particulates, combustion exhaust gases, obnoxious gases and radioactive substances;

(c) "Council" means the Pakistan Environmental Protection Council established under Section 3;

(d) "discharge" means spilling, leaking, pumping, pouring, emitting, emptying or dumping;

- (e) "effluent" includes any material in solid, slurry, suspension, liquid, vapour, fumes or gaseous form coming out as or from any industrial activity or any other source;
- (f) "effluent standards", means the permissible limits prescribed by the Agency regarding the quality and quantity of effluent and wastes;
- (g) "emission standards", means the permissible standards for emission of air pollutants prescribed by the Agency;
- (h) "Exclusive Economic Zone" shall have the same meaning as in the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);
- (i) "Government agency" includes a division, department, bureau, section, commission, board, office or unit of the Federal Government or a Provincial Government;
- (j) "historic waters" means such limits of the waters adjacent to the land territory of Pakistan as are for the time being specified by notification under section 7 of the Territorial Waters and Maritime Zones Act, 1976 (LXXXII of 1976);
- (k) "industrial activity" means any process for manufacturing, making, altering, repairing, ornamenting, finishing, packing or otherwise treating any article or substance with a view to its use, sale, transport, delivery or disposal or for pumping oil, water or sewage or for generating transforming or transmitting power;
- (l) "industrial waste" means waste resulting from an industrial activity;
- (m) "local authority" includes any agency set up or designated by the Federal Government or a Provincial Government to be a local authority for the purposes of this Ordinance;
- (n) "local council" means a local council constituted or established under a law relating to local government;
- (o) "municipal waste" includes sewage, refuse sludge and human excreta and the like;
- (p) "pollution" means any matter which, on being discharged into the air, soil or public waters, alters unfavourably the chemical, physical, biological or radiological integrity of the air, soil or public waters or, by itself or in combination with other discharges, is likely to make the air, soil or public waters unclean, noxious or impure or injurious or disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to aquatic life, animals, birds, fish, plants or other forms of life;
- (q) "prescribed" means prescribed by rules or regulations;

(r) "public waters" means water areas in public use and includes streams, nullahs, canals, seepage, drains, natural or artificial water courses, rivers, wells, ponds, ditches, lakes, reservoirs, underground or artesian water, territorial waters, the Exclusive Economic Zone and historic waters;

(s) "regulations" means regulations made under this Ordinance;

(t) "rules" means rules made under this Ordinance;

(u) "sewage" means liquid wastes from sanitary conveniences, kitchens, laundries, washing and the like;

(v) "standards" means effluent standards and emission standards;

(w) "territorial water" shall have the same meaning as in the Territorial Waters and Maritime Zones Act 1976 (LXXXII of 1976);

(x) "treatment works" means the various processes and devices used in the treatment of wastes; and

(y) "wastes" includes liquid wastes, suspended solids, industrial wastes, municipal wastes, wastes from mining processes and wastes from farm and agricultural activities such as poultry, cattle, animal husbandry, abattoirs and the use of fertilizers and pesticides.

3. Establishment of the Council:- (1) The Federal Government shall, by notification in the official Gazette, establish council to be known as the Pakistan Environmental Protection Council and consisting of:

- (i) the President of Pakistan ... Chairman.
- (ii) the Minister Incharge of the Subject of Environment Vice-Chairman.
- (iii) Ministers Incharge of the subject of Environment in the Provinces..... Members.
- (iv) such other persons as the Federal Government may appoint..... Members.
- (v) the Secretary to the Government of Pakistan dealing with the subject.....Secretary.

(2) The Members of the Council, other than ex-officio members, shall hold office for a term of three years.

(3) The Council shall frame its own rules of procedure.

(4) The Council shall hold meetings as and when necessary, provided that not less than two meetings shall be held in a year.

(5) The Council may, by general or special order and subject to such conditions as it may consider fit, delegate any of its functions under this Ordinance to a Committee or any member of the Council.

4. Functions of the Council:- (1) The functions of the Council shall be to-

- (a) ensure enforcement of this Ordinance;
- (b) establish comprehensive national environmental policy;
- (c) give appropriate direction to conserve the renewable and expendable resources;
- (d) ensure that environmental considerations are interweaved into National Development Plans and Policies;
- (e) ensure enforcement of the National Environment Quality Standards; and
- (f) give directions to any Government agency, a body or a person requiring it or him to take measures to control pollution being caused by such agency, body or person or to refrain from carrying out any particular activity prejudicial to public interest or the purposes of this Ordinance.

(2) The Council may, or if so required by the government or any Government agency shall, direct the Agency to prepare, submit and promote projects for the prevention of environmental pollution or to undertake research in any specified aspect of environment.

5. Establishment of the Agency:- (1) The Federal Government shall, by notification in the official Gazette, establish an Agency to be called the Pakistan Environmental Protection Agency to exercise the powers and perform the functions assigned to it under the provisions of this Ordinance, or the rules and regulations.

(2) The Agency shall be headed by a Director General who shall be appointed by the Federal Government on such terms and conditions as it may determine.

(3) The powers and functions of the Agency shall be exercised and performed by the Director General.

(4) The Agency shall have such administrative, technical and legal staff as the Federal Government may appoint.

(5) To assist him in the discharge of his functions, the Director-General may establish such advisory committees as he may deem fit and appoint as members thereof eminent representatives of universities, research institutes, the business community and other professions and fields of knowledge.

6. Functions of the Agency:- (1) The Agency shall-

- (a) administer this Ordinance and the rules and regulations;

- (b) prepare national environmental policy for approval of the Council;
- (c) publish an annual report on the state of environment;
- (d) establish National Environmental Quality Standards with the approval of the Council;
- (e) revise the National Environmental Quality Standards as and when deemed necessary;
- (f) co-ordinate environmental policies and programmes nationally and internationally;
- (g) establish systems for surveys, surveillance, monitoring, measurement, examination and inspection to combat environmental pollution;
- (h) take measures to promote the development of science and technology which will contribute to the prevention of environmental pollution, such as the consolidation of survey and research system, the promotion of research and development, the dissemination of the results of such research work and development work and the education and training of research experts and other governmental functionaries;
- (i) provide information and education to the public on environmental matters and to recommend to the Council the introduction of environmental information in the syllabi of educational institutions; and
- (j) co-ordinate and consolidate implementation of measures to control pollution with Provincial Governments and other Government agencies. (2) The Agency may-
 - (a) request any Government agency to furnish any information or data relevant to the functions of the Agency;
 - (b) with the approval of the Federal Government, initiate requests for foreign assistance in support of the objectives of this Ordinance and enter into arrangements with foreign agencies or organisations for the exchange of material or information and participate in international seminars or meetings;
 - (c) establish and maintain laboratories to conduct reserach in various aspects of environment and provide grants to institutions for specific projects;
 - (d) delegate any of its powers under this Ordinance and the regulations to any Government agency;
 - (e) identify the needs for legislation in the environmental field;
 - (f) at the request of the Federal Government or a Provincial Government or any Government agency, provide advice and assistance in environmental matters; and

(g) perform any other function which the Council may assign to it.

7. Powers of the Agency:- Subject to the provision of this Ordinance, the Agency may-

- (a) lease, purchase, acquire, own, hold, improve, use or otherwise deal in and with any property, both movable and immovable;
- (b) sell, convey, mortgage, pledge, exchange or otherwise dispose of its property and assets;
- (c) execute instruments, incur liabilities and do all acts or things necessary for proper management and conduct of its business; and
- (d) appoint such advisers and consultants as it considers necessary for efficient performance of its functions on such terms and conditions as may be prescribed by regulations.

8. Environmental impact statement etc. to be submitted to the Agency:-

(1) The provisions of this section shall apply to such:

- (a) persons or class of persons, or
- (b) industrial activity or class of industrial activity, or
- (c) category, type or volume of discharges of air pollutants or wastes, or
- (d) area or class of areas, or
- (e) classes of public waters. As may be prescribed by regulations.

(2) Every proponent of a project the construction or completion of which is likely to adversely affect the environment shall file with the Agency, at the time of planning the project, a detailed environmental impact statement including information on:

- (a) the impact on the environment of the proposed industrial activity;
- (b) the treatment works of the proposed project;
- (c) the unavoidable adverse environmental effects of the proposed project; and
- (d) the steps proposed to be taken by the project proponent to minimise adverse environmental effects.

(3) The Agency may prescribe guidelines for the preparation of environmental impact statements, and where such guidelines have been prescribed, the proponents of projects shall prepare environmental impact statements according to the said guidelines.

(4) The Agency may itself or through the appropriate Government agency review the environmental impact statement and, where it deems appropriate, it may also involve public participation in the assessment of the environmental impact statement.

(5) After the review under Sub- Section (4), the Agency may either approve the environmental impact assessment or recommend to the Federal Government that the project be modified or rejected in the interest of environmental objectives.

9. Agency to assist local councils, etc., in disposal of wastes:- The Agency shall assist the local councils, local authorities or other Government agencies and persons to implement schemes for the proper disposal of wastes in line with the standards and procedures prescribed by the Agency.

10. Funds of the Agency:- The funds of the Agency shall be derived from the following sources, namely:-

- (a) grants made and loans advanced by the Federal Government or the provincial government;
- (b) grants, loans, advances and other money received from local or international agencies;
- (c) fees, rates and charges received by the Agency under the provisions of this Ordinance; and
- (d) all other sums received by the agency.

11. Audit and Accounts:- (1) The Agency shall submit its annual budget estimates for approval of the Federal Government through the Council.

(2) The agency shall maintain proper accounts and other relevant records and prepare annual statement of accounts in such form as may be prescribed by rules.

(3) The accounts of the Agency shall be audited in such manner as may be directed by the Federal Government.

12. Penalty:- (1) Whoever contravenes or fails to comply with any provision of this Ordinance or of any rule or regulation or any direction issued by the Agency thereunder, shall be punishable with imprisonment for a term which may extend to two years, or with fine which may extend to one hundred thousand (100,000) rupees, or with both, and in the case of a continuing contravention or failure, with an additional fine which may extend to ten thousand rupees for every day after the first during which such Contravention or failure continues.

(2) The Director General or an officer generally or specially authorised by him in this behalf may compound any offence under this Ordinance.

13. Indemnity:- No suit, prosecution or other legal proceeding shall lie against the Council, the Agency, the Director General, or the members, officers, employees, experts or consultants of the Agency for anything in good faith done or intended to be done under this Ordinance or any rule or regulation.
14. Bar of Jurisdiction:- No court shall take cognizance of any offence punishable under this Ordinance except on a complaint in writing made by the Agency.
15. Dues of Agency recoverable as an arrear of land revenue:- Any dues recoverable by the Agency under the provisions of this Ordinance or any rules or regulations shall be recoverable as an arrear of land revenue.
16. Power to make rules:- The Federal Government may, by notification in the official Gazette, make rules for carrying out the purposes of this Ordinance.
17. Power to make Regulations:- (1) The Agency may, by notification in the official Gazette, with the approval of the Federal Government make regulations, not inconsistent with the provisions of this Ordinance or the rules, for carrying out the purposes of this Ordinance.
- (2) In particular and without prejudice to the generality of the foregoing power, such regulations may provide for the levy of fees, rates and charges in respect of services rendered, actions taken and schemes implemented by the Agency.

