Republic of Turkey
Prime Ministry
State Planning Organization

GAP

The Southeastern Anatolia Project Master Plan Study

Final Master Plan Report

VOLUME 2

Master Plan

April 1989

Nippon Koei Co. Ltd.
Tokyo, Japan

GAP

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All the monetary terms in this report are in mid-1988 price

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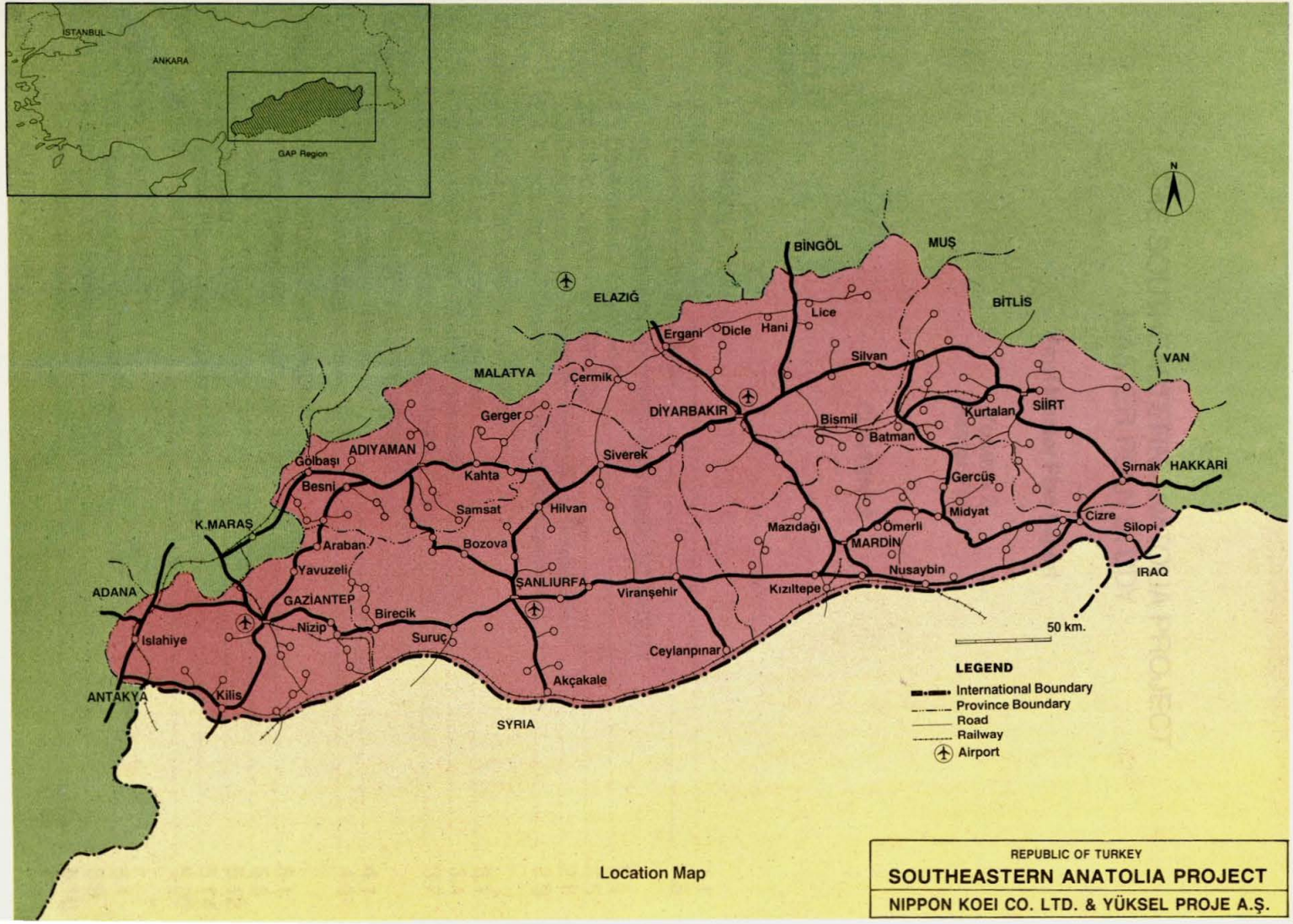
This report, prepared as part of consultancy services for the Southeastern Anatolia Project Master Plan Study, is to convey interim results of the study to policy decision makers and others concerned. It may be used by recipients only in the performance of their offcial duties. Its contents may not otherwise be disclosed without the permission of SPO and may be subject to changes.



Location Map

REPUBLIC OF TURKEY

SOUTHEASTERN ANATOLIA PROJECT

NIPPON KOEI CO. LTD. & YÜKSEL PROJE A.Ş.

THE SOUTHEASTERN ANATOLIA PROJECT
MASTER PLAN STUDY

Final Master Plan Report

Volume 2
Master Plan

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ABBREVIATIONS

Abbreviations of Organizations/Institutions (1/2)

CBIE		Census of Business and Industrial Establishments
CIMMYT		International Maize and Wheat Improvement Center
ÇİTOSAN	Çimento Sanayii	Turkish Cement Company
Çukobirlik		Çukurova Cotton Agricultural Sales Cooperatives Union
ÇÜZF	Çukurova Üniversitesi Ziraat Fakültesi	Çukurova University Facultyof Agriculture
DESİYAB	Devlet Sanayi ve İşçi Yatırım Bankası A.Ş.	State Industry and Workers Investment Bank (Now, Development Bank of Turkey)
DMI	Devlet Meteoroloji İşleri	State Meteorological Service
DSİ	Devlet Su İşleri	General Directorate of State Hydraulic Works
EBK	Et ve Balık Kurumu	Fish and Meat Organization
EIE (EIEI)	Elektrik İşleri Etüd İdaresi	Electrical Power Resources Survey and Development Administration
FAO		Food and Agriculture Organization
GAP	Güneydoğu Anadolu Projesi	Southeastern Anatolia Project
GDRA		General Directorate of Rural Affairs, MAFRA
Güneydoğu Birlik		Southeastern Agricultural Sales Cooperatives Union
IRRI		International Rice Research Institute
İGEME	İhracatı Geliştirme Merkezi	Export Promotion Center
KÜSGET	Küçük Sanayi Geliştirme Teşkilatı	Small Industry Development Organization
MAED		Model for Analysis of the Energy Demand
MAFRA		Ministry of Agriculture, Fishery and Rural Affairs
MAG	Müsteşarlık Araştırma Grubu	Research and Project Promotion Group, SPO
MENR		Ministry of Energy and Natural Resources
METU		Middle East Technical University
MGAP	Müsteşarlık Güneydoğu Anadolu Projesi	Southeastern Anatolia Project Group, SPO
MTA	Maden Tetkik Arama	Mineral Research and Exploration Institute
PB	Pamukbank	
PMU		Project Management Unit
RDC		Regional Development Center
ŞEB	Şekerbank	
SECP		Census of Social and Economic Charasteristics of the Population

Abbreviations of Organizations/Institutions (2/2)

SEE		State Economic Enterprise
SIS	Devlet İstatistik Enstitüsü DİE	State Institute of Statistics
SPO	Devlet Planlama Teşkilatı DPT	State Planning Organization
SÜB	Sümerbank	
TAÇE	Türk-Alman Çıraklık Eğitimi	Turkish-German Apprentice Training Center
TCDD	Türkiye Cumhuriyeti Devlet Demiryolları	Turkish State Railways
TCK	Türkiye Cumhuriyeti Karayolları	General Directorate of State Highways
TCZB	Türkiye Cumhuriyeti Ziraat Bankası	Turkish Agricultural Bank
TEK	Türkiye Elektrik Kurumu	Turkish Electricity Authority
TEKB	Türkiye Emlak Kredi Bankası	Turkish Emlak Bank
TETEK	Türkiye Transit Karayolu	Trans Turkey Highway
THB	Türkiye Halk Bankası	Turkish Halk Bank
THK	Türk Hava Kurumu	Turkish Air Organization
THY	Türk Hava Yolları	Turkish Airlines
TİB	Türkiye İş Bankası	Turkish Is Bank
TİGEM	Tarım İşletmeleri Genel Müdürlüğü	State Farms General Directorate
TKİ	Türkiye Kömür İşletmeleri	Turkish Coal (lignite) Enterprises
TKK	Tarım Kredi Kooperatifleri	Agricultural Credit Cooperatives
TKV	Türkiye Kalkınma Vakfı	Turkish Development Foundation
TMO	Toprak Mahsulleri Ofisi	Soil Products Office
TOPRAKSU		(Former) General Directorate of Land and Water Development
TPAO	Türkiye Petrolleri A.O.	Turkish Petroleum Corporation
TSEK	Türkiye Süt Endüstrisi Kurumu	Turkish Dairy Industries Organization
TSK	Tarım Satış Kooperatifleri	Agricultural Sales Cooperatives
TTK	Türkiye Taşkömürü Kurumu	Turkish Hard Coal Enterprises
TURSAB	Türkiye Seyahat Acentaları Birliği	Union of Travel Agencies of Turkey
TYT	Türkiye Yapağı Tiftik	Turkish Wool Mohair Corporation
TYUAP	Tarımsal Yayım ve Uygulamalı Araştırma Projesi	Agricultural Extension and Applied Research Project
TZDK	Türkiye Zirai Donatım Kurumu	Turkish Agricultural Supply Organization
WASP		Wien Automatic System Planning Package
YSE	Yol Su Elektrik	(Former) Road, Water and Electricity Services

Abbreviations of Technical Terms

BOT	Build, Operate and Transfer
CIF	Cost, Insurance and Freight
D/D	Detailed Design
El.	Elevation
F/S	Feasibility Study
GDP	Gross Domestic Product
GNP	Gross National Product
GRP	Gross Regional Product
ICOR	Incremental Capital Output Ratio
IRR	Internal Rate of Return
LPG	Liquified Petroleum Gas
M/P	Master Plan
O-D	Origin-Destination
TDN	Total Digestible Nutrients
TDS	Total Dissolved Solids
VAT	Value-Added Tax

Abbreviations of Measures

Length

mm	millimeter
m	meter
km	kilometer

Area

km^2	square kilometers
ha	hectare
m^2	square meter
da	decare = 0.1ha

Volume

lit	litre
m^3	cubic meter
Mm^3	million cubic meters

Weight

kg	kilograms
t	tons

Time

s	second
sec	second
hr	hour
yr	year

Money

TL	Turkish lira
US $	United States dollar

Energy

GWh	Gigawatt-hour
kWh	Kilowatt-hour
kW	Kilowatt
MW	Megawatt
koe	kilograms of oils equivalent
toe	tons of oil equivalent
Mtoe	million tons of oil equivalent
kcal	kilocalorie
GJ	Gigajoule
hp	Horse power

Others

%	percent
^{0}	degree
^0C	degree Celsius

1

Chapter I

INTRODUCTION

1.1 Background

(1) Study background

The Government of the Republic of Turkey has been placing increasing emphasis on the rectification of inter-regional disparity in the Country's socio-economic development. The Department of Less Developed Regions was established in 1971 within the State Planning Organization (SPO), and the highest priority was attached to the Eastern and the Southeastern Anatolia regions bordering on USSR, Iran, Iraq and Syria.

In particular for the Southeastern Anatolia region, further institutional arrangements have been made within SPO in recognition of high development potentials and needs to coordinate and manage various development activities, which are in totality called the Southeastern Anatolia Project (Güneydoğu Anadolu Projesi; GAP). The Research and Project Promotion Group (MAG) has been created and vested with the following responsibilities:

- to determine priorities of necessary infrastructure establishments and investments for economic and social development at macro level,
- to use financial resources efficiently for the implementation of plans and programs,
- to enhance the rate of returns on investment, and
- to put to use the local and the Central Government consumptions for the integration of Nation's economy.

In addition, the Project Management Unit (PMU) was established in May 1986 under the coordination and supervision of MAG in order to facilitate the planning and implementation of regional development by procuring and mobilizing necessary expertises, both Turkish and foreign. Further, the Southeastern Anatolia Project Group (MGAP) has been established, separated from MAG.

The clear intention of the Government in taking these measures is to adopt a very implementation oriented approach to regional development encompassing project identification, coordination and integration, financial management and related activities. As the important first step to realize these ideas, the Southeastern Anatolia Project Master Plan Study (the Study) has been ordered with the terms of reference prepared by PMU.

(2) Study objectives

The objectives of the Study are:

- to prepare the integrated regional development master plan for the Southeastern Anatolia Region (hereinafter called the GAP region or the Region) in order to clarify the general direction of the development of the Region and to formulate additional projects to complement the on-going and already planned projects with investment scheduling, and

– to establish an efficient project management system for coordination and integration of individual investments, and monitoring and evaluation of project implementation.

(3) Work progress

Work setup

The GAP Master Plan Study is being carried out by the Consultant of Nippon Koei Co. Ltd., Japan and Yüksel Proje A.Ş., Turkey joint venture team, in accordance with the contract concluded between the Undersecretariat of the State Planning Organization of the Government of the Republic of Turkey and the Consultant. Execution of the Consultant's work has been aided and monitored by PMU assigned by SPO to these functions.

The first foreign team of the Consultant arrived in Turkey by February 10, 1988 and started discussions with SPO and PMU on various subjects related to the Study, together with the Turkish team of the Consultant. The latter was formally assigned to the Study on February 15, 1988. The contract between SPO and the Consultant became effective on February 19, 1988. Thereafter, the Consultant moved to Şanlıurfa and established its office there within the SPO compound provided for the GAP project.

Phase I

The first stage of the Study in Phase I was spent mostly for data collection in Ankara and in the GAP region, discussions with PMU/SPO to clarify the scope, procedure and other related matters for the Study, reconnaissance surveys and study of existing conditions of the Region, covering all the different sectors. It has been re-confirmed through a series of discussions between SPO, PMU and the Consultant that the Study will focus on the three crucial issues:

1) General direction of the development of the Region, i.e. the Master Plan,

2) Scheduling of the GAP and related projects, and

3) Establishment of the Project Management System,

and that the degree of detailed analysis undertaken for each task will be determined on the basis of data availability and its relationship to the above crucial issues.

The study of existing conditions by sector was carried out based on the data collected by the Consultant during this period with the aid of SPO, PMU and other related agencies and institutes. The Mid-Term Report 1 was submitted on April 18, containing summary results of the Study in this initial stage.

The Study proceeded immediately to the second stage. The main objectives of the Study at this stage was to clarify frameworks for the Region's development for the coming decades by setting development targets, identifying priority areas with respect to resource capacity and spatial development structure, projecting the Region's economy, population and employment, and examining various conditions for development. In the course of these analyses and projections, some ideas on possible development projects and associated institutional measures also emerged.

During the second stage, comments on the Mid-Term Report 1 were received both formally from SPO and individually from staff of PMU. Extensive discussions took place from May 30 to June 2 between SPO/PMU and the Consultant on many important issues involved in the Study. The Mid-Term Report 2 was prepared, incorporating the SPO/PMU comments to an extent possible, and submitted on June 6.

The third stage of the Study in Phase I was for the elaboration on development strategy, formulation of specific measures to attain development targets and preparation of an investment schedule as well as further modifications of previous works based on the SPO/PMU comments and revision of socio-economic and spatial frameworks for the Region's development. During this period, occasional discussions were held between the PMU staff and the Consultant to clarify approaches to the Region's development and planning methodologies and to exchange views on development strategy.

Throughout the Study in Phase I, the experts of the Consultant visited many agencies/ organizations and individuals related to the GAP to have discussions on various aspects of the Region's development, to test their hypotheses and to obtain additional data and information. Those agencies/organizations visited include the Ministries of Agriculture, Forestry and Rural Affairs, Public Works and Settlement, Transportation, Industry and Commerce, Energy and Natural Resources, Culture and Tourism, Education, Youth and Sport, Health and Social Affairs, DSI, TEK, EIE, TCK, TCDD and DESIYAB as well as SPO in Ankara, provincial offices in the Region such as G.D. of Rural Affairs (ex TOPRAKSU), Provincial Governors Offices and Chambers of Commerce and Industry, regional offices of MAFRA, DSI and G.D. of Highways, research institutes and the State Farm in Şanlıurfa.

Phase I completed by the submission of the Phase I Completion Report on July 28. The report consists of two volumes: Volume 1 containing the first draft of the GAP Master Plan, and Volume 2 presenting the proposal for the Project Management System.

Phase II

Phase II of the GAP Master Plan Study was originally planned for three months. However, the deadline for the submission of Phase II Completion Report was extended, in consideration of an additional task imposed on the Consultant and the need to accommodate a large number of comments issued on the Phase I Completion Report. The additional task was to revise the socio-economic projection of the Master Plan to investigate a wider range of alternatives for the development of the GAP region. The "Interim Macro-economic Plan" report was prepared by the Consultant and submitted on November 7. It contained alternative socio-economic projections with expected performance of each measured by some socio-economic indices as well as objectives, basic scenario and concepts of the GAP Master Plan.

The proposed Project Management System (PMS) contained in the Phase I Completion Report was further eleborated on by clarifying the PMS functions, presenting alternatives for organizational measures required in Ankara and in the GAP region, and proposing initial actions to be taken. The results were submitted on November 7 as the Phase II Completion Report, Volume 2.

Major Works have been carried out during Phase II for the revision of the GAP Master Plan. In revising the socio-economic projection, assumptions on cropping patterns under irrigation, yield by crop, labour productivity by sector, raw materials availability for agro-processing and other aspects were reviewed. A tripartite meeting was held on September 29 between SPO, the State Hydraulic Works (DSI) and the Consultant to discuss and settle some critical issues involved in planning the GAP hydropower and irrigation schemes.

Comments on the Phase I Completion Report were received not only from SPO - MAG and PMU but also from other departments of SPO. They were extensively discussed during the September 5-7 meetings. Most comments, except a few for which no additional data/information were obtained, have been taken into account in the revised GAP Master Plan.

In order to finalize the GAP Master Plan jointly, PMU and the Consultant had a series of discussions.Each chapter or appendix of the Master Plan report was prepared by the Consultant in a draft form, circulated to PMU staff in advance, and discussions were held. Final corrections were made by the Consultant reflecting the results of discussions.

During Phase II, preliminary results of the Study were conveyed to a wide range of audience for the purpose of receiving their responses. On August 1, a ministerial briefing was held at the Prime Ministry, inviting several Ministers and other high ranked officials of the Turkish Government. The Consultant presented a summary of the draft GAP Master Plan contained in the Phase I Completion Report. Scope, objectives and basic concepts of the master planning and some interim results were explained also to several delegations, both Turkish and foreign, on different occasions. The "Interim Macro-economic Plan" report was distributed by SPO-MAG to all the related agencies.

Phase III

The Phase II Completion Report containing the revised Master Plan was distributed widely by SPO-MGAP to all the related agencies. Formal responses were obtained by a specified date from some 30 Government agencies and institutes. SPO also transmitted its consolidate comments to the Consultant, compiling extensive comments from SPO departments and PMU.

All the comments were carefully examined by SPO-MGAP, PMU and the Consultant. PMU and the Consultant visited selected agencies to clarify their comments and to have follow-up discussions.

The finalization of the Master Plan has been done jointly by PMU and the Consultant, keeping in touch also with SPO-MGAP. For all the chapters of the main Master Plan report and all the appendices, the Consultant prepared the proposed revisions, taking into account all the comments received. PMU cleared with SPO-MGAP the proposed revisions or provided further revisions.

(4) Working Paper Series

A Working Paper Series was inaugurated, associated with the Study. The purpose was to convey preliminary results of the Study promptly to SPO/PMU with more detailed data and analyses and to provoke discussions on important planning issues.

The following working papers have been issued during Phase I and Phase II.

1) An Initial Note on the GAP Regional Model
2) Early Issues within GAP's Transportation Sector, Conditions and Development
3) Land Use Pattern in GAP Provinces
4) Agronomic Review of the Proposed Cropping Pattern for the GAP Irrigation Project
5) Preliminary Ideas on Possible Project Management Systems
6) Municipal and Regional Planning and Its Implications
7) Existing Conditions of Livestock Sector
8) Changing Rural Socio-Cultural Structures and Land Tenure Systems in the GAP Region
9) Crop Budget Analysis for the GAP Irrigation Project
10) Agricultural Sector Review
11) Tourism Resources and Potentials in the GAP Region
12) Optimum Central Locations in the GAP Region
13) A Macroeconomic Analysis of GAP Investment and Financing

14) Agricultural Development Possibilities in the GAP Region
15) Water Demand and Supply Balance Study
16) Evaluation of Land Capability in GAP Region
17) Manufacturing Sector Review
18) Project Financing-International Agencies and International Sources
19) Fishery Sector Report
20) Prospects and Measures for Tourism Development in the GAP Region
21) Project Financing - The Context
22) Project Financing - Public Investment Projects
23) Social Needs for the GAP Development
24) Urban Sector Review
25) Energy Sector Report
26) General Land Use Plan for the GAP Region
27) Manufacturing Sector Report
28) Analysis of Inter - Provincial Migration Related to the GAP Region
29) A Simple Network Model for Analyzing Future Traffic Patterns

1.2 Organization of the Report

(1) Composition of Final Master Plan Report

The Final Master Plan Report of the Southeastern Anatolia Project Master Plan Study has been compiled both in Turkish and in English, consisting of four volumes, respectively:

Volume 1 : Executive Summary
Volume 2 : Master Plan
Volume 3 : Appendices A,B,C
Volume 4 : Appendices D, E, F, G

(2) Organization of the Master Plan report

The main Master Plan report (this volume) contains a complete regional development master plan for the GAP region. The seven appendices support the main Master Plan report by providing more detailed analysis on the present conditions by sector and some specific aspects with all the supporting data.

The remaining part of the Final Master Plan Report, Volume 2: Master Plan is organized in the following way. In Chapter II, the objectives for the development of the GAP region are set and basic strategy is established. First, an overview of the national economy is given and the Region's position in the socio-economy of Turkey is clarified. Second, development problems of the Region are analyzed in a macroscopic way to clarify main constraints to the Region's development. Third, development objectives are set and basic strategy established with the view to overcoming the constraints. Objectives and strategy by economic sector are also presented on the basis of more detailed analysis contained in Appendices A and B.

In Chapter III, the Region's development scenarios are described. First, main features of the basic scenario are explained, and the time dimension (development phasing) and the spatial dimension (spatial development procedure) are introduced. Second, development scenarios by sector are described, highlighting important aspects of agricultural and industrial development to be observed in the Region.

Chapter IV presents the development frameworks, consisting of a socio-economic framework and a spatial development framework. The socio-economic framework is described by value-added by sector, urban and rural population, labour force and per capita gross regional product projected to the year 2005 in a mutually consistant way. Basis for this projection is included in Appendix C. The spatial development framework is clarified on the basis of the analysis on land capability, transportation network and settlement pattern. Details are given in Appendix D. Areas of higher potential are eventually identified.

In Chapter V, development conditions of various resources that would support the regional development are examined, including water, energy, human, and financial resources. General measures for the development of these resources are proposed. This chapter is supported by the detailed data and analyses in Appendices E, F and G.

Chapter VI presents the development plan, consisting of specific projects associated with the areas of high potential and associated institutional measures. An investment schedule for the initial phase is also presented.

Finally in Chapter VII, an action plan is proposed. It consists of administrative steps to be taken, project formulation/promotion activities for priority projects, and other follow-up studies.

2

Chapter II

DEVELOPMENT OBJECTIVES AND BASIC STRATEGY

2.1 Development Objectives

2.1.1 National economy and the Region's position

(1) National economy

Overview of past performance

Since 1963, when the first five year development plan was launched, the economic development policy of Turkey had centered around state enterprise initiative and import substituting industrialization. The policy was effective in attaining high economic growth, when the basic economic infrastructure was insufficient to expect private enterprises to flourish in competitive markets. The gross national product (GNP) grew on an average by 6.7 % and 7.1 % per annum respectively in the first and the second five year plan period (1963-67 and 1968-72).

Such high economic performance was frustrated by a series of sharp increases in petroleum prices in 1970's, coupled with other unfavorable factors such as stagnated export of agricultural produce due to generally sluggish world economy, hikes in import prices and ad hoc public expenditure in some sectors. Continuation of the high growth economic policy under these conditions disclosed the structural problems of the Turkish economy.

State enterprises in key economic sectors exhibited their inherent inefficiency and low productivity. Their deficit management became a prime factor to cause serious inflation. With a highly protected lucrative domestic market, the manufacturing enterprises had no incentive to export. Over - valuation of Turkish Lira worked negatively for export, resulting in aggravating balance of payments which was furthered by the sharp increases in petroleum prices.

In order to overcome these difficulties, the Economic Stabilization Programs were issued in 1980 by the Government. The aims of the Programs were first to stabilize the economy in the short run for suppressing the inflation and improving the balance of payments, and to reform the economic structure in the long run.

Along the basic aims of the Programs, the following measures have been taken. First, a series of measures have been taken under general tight-money policy, including ceiling for money supply, higher interest rates, higher indirect tax rates and the new value - added tax system. Second, measures to improve the efficiency of state enterprises and privatize some of them have been taken to utilize competitive market mechanism effectively. Third, export promotion measures have been introduced such as tax rebates, subsidized export credits, foreign exchange retention privilages, and tax incentives to improve the balance of payments. Measures for lowering and removing protective rates on imports and for promoting foreign capital investment have also been introduced gradually.

Some effects of these policy changes were phenomenal as in growth of exports. The full impact of these measures is yet to be seen. However, there is no doubt that the Programs have set a correct overall framework for the development of Turkish economy toward the twenty - first century and the actual development will take place along the lines indicated by the Programs. In this sense, the Turkish economy has entered a new era of development, and renewed growth is expected to be attained in the long run, overcoming short-term difficulties.

Gross domestic product

The gross domestic product (GDP) of Turkey in recent years is presented in Table 2.1 by economic sector. The share of agriculture, livestock, forestry and fishery has been steadily declining, and now claims less than 20 % of the GDP. The industrial sector, including manufacturing, mining and utilities, surpassed the argicultural sector in 1979 and expanded rapidly to reach the 30 % level share in the GDP. Over 80 % of the industrial GDP is due to the manufacturing industry.

In the seven year period between 1979 and 1986, Turkey's GDP grew at an average annual rate of 4.1 % in real terms. The industrial sector contributed twice as much as the agricultural sector to the increase in GDP during this period by attaining 5.4 % per annum average growth. In particular, the average annual growth of the manufacturing industry was 5.8 %. The growth of the agricultural sector in the same period was a modest 3.0 %.

The per capita GDP of Turkey grew in this seven year period at an annual average rate of 2.3% in real terms. The per capita GDP in 1985 is calculated to be TL 1,834 thousand in mid-1988 price. However, there exist wide disparities in per capita gross regional product (GRP) of different regions. According to a recent study, which classified the Country in 16 regions, the per capita GRP of these regions in 1986 ranged from 48% to 150% of the national per capita GDP (Eraydın, A., Dept. of City and Regional Planning, METU, unpublished, 1988).

Import / export and balance of payment

The share of primary agriculture and agro-industry products in the total export of Turkey has sharply decreased in recent years from over 50% share in 1982. Still this sector contributes most to the Country's export value. To compensate this decrease, the export of textile and clothing had expanded and reached 30%. Other major export products are iron and steel, machinery and transport equipment and various chemicals. No significant change in export structure is observed for these and other commodities (Table 2.2).

The fuels, lubricants and related materials are decreasing their share in the total import value of Turkey, reflecting primarily the decreasing petroleum prices. Imports of agricultural and manufactured goods seem to be in line with development of Turkish economy itself (Table 2.2).

The foreign trade balance has been "consistently in red" in recent years. Once it improved from the record deficit of US$ 4.6 billion in 1980, but it started to increase after 1985. Despite the substantial positive net transfer, primarily due to the remittances of workers abroad, the current account balance has been consistently negative, although it does not show any clear sign of aggravation (Table 2.3).

(2) Region's position

Area and population

The Southeastern Anatolia region under study is defined as the jurisdictions of six provinces: viz. Adıyaman, Diyarbakır, Gaziantep, Mardin, Siirt and Şanlıurfa. It occupies the southeastern part of Turkey bordering on Syria to the south and Iraq to the southeast, covering the land area of 73,863 km^2 (datum area) corresponding to 9.5 % of the total land area of Turkey. The total population at the 1985 census is reported to be 4,303,567 in the Region, accounting for about 8.5 % of the Nation's total, 50,664,458 in 1985. The average population density was 58 per km^2, compared with the Country's average of 65 per km^2.

Population growth and movements

Growth rates of population in the GAP region have been consistently higher than those for Turkey for any five-year period since 1945. Consequently the population share of the Region has been steadily increasing from 7.0 % in 1945 to 8.5 % in 1985. This is due to high birth rates in the Region, which more than offset the significant out-migration.

Within the Region, the growth rates of urban population are significantly higher than those of rural population, despite the birth rates that are higher for rural families.

Population movements of the Region seem to be dominantly rural to urban, and a significant portion of rural population seems to be attracted to the cities outside the Region, including those cities close to the Region boundaries such as Adana, K.Maraş, Malatya, and Elazığ. The combined population of the latter four cities (1,420,986 in 1985) is almost equivalent to the total population of all the major cities in the Region having population over 40,000 in 1985 (1,594,653 in 14 cities). The capacity of cities within the Region to attract and assimilate people from its rural areas may not be sufficient to counter the out-migrating force to these outer cities as well as to Ankara and Istanbul.

Economy

The gross regional product (GRP) of the Region in 1985 is compared with the gross domestic product (GDP) of Turkey (Table 2.4). Agriculture by far is the dominant production sector, claiming its share in the Region's GRP close to 40 %. The Region contributes in this sector to over 9 % of the agricultural value-added of Turkey, higher than the Region's population share in the Country.The Region produces substantial portions of the national production for some crops: 75 % lentils, 17 % chickpeas, 17 % barley, 10 % wheat, 41 % sesame, 43 % sorghum-millet, 12 % cotton, 94 % pistachios, 21 % grapes and 25 % pomegranate (1985).

Manufacturing shares 11.7 % in the GRP, contributing only to 1.9 % of this sector's value-added in Turkey.The Region had 11,378 manufacturing establishments in 1985, of which only 243 were classified as large employing 10 or more workers.

As a whole, the Region's economy claims a modest share of 4.0 % in the Turkey's GDP, much lower than its population share. The per capita GRP of the Region was TL 862 thousand, only 47 % of the per capita GDP of Turkey in 1985.

Food production

The per capita production of main foodstuff in the GAP region and in Turkey is compared in the table below. The per capita consumption of wheat, the staple crop for the people in the Region and in Turkey exceeds the level of self-sufficiency. The Region is a net exporter of wheat to other regions and countries.

The per capita production of meat in the Region (15.2 kg in 1985) is larger than the national average (13.4 kg in 1985). The Region is a net exporter of meat as well as live animals to neighbouring countries.

The per capita production of milk in the Region (95.1 kg in 1985) is lower than the national average (122.4 kg in 1985), but it is almost self-sufficient, if not ideal. However, due to intra-regional imbalance in milk production as well as perishable nature of this commodity, some areas in the Region are net importer of milk from neighboring areas, sometimes beyond the Region boundary.

Per Capita Production of Main Foodstuff

	Per capita production[1] (kg/year) Turkey	GAP region	Ratio of net import to production[2] in Turkey (%)
Wheat	336	406	0.9
Meat	13.4	15.2	-8.1 (i.e.net export)
Milk	122.4	95.1	0.1

1) 1985
2) Average of 1983, 84 and 85

Sources: Agricultural Structure and Production 1985 (Production), Statistical Yearbook 1987 (Population), FAO Production Yearbook 1985 (Production) and FAO Trade Yearbook 1985 (Export/Import)

2.1.2 Development problems of the Region

The GAP region at present faces a range of problems which are interacting with one another. Major problems and more important interactions are illustrated in Figure 2.1 as the problem structure of the GAP region. In the figure, those problems on the right side are more immediate or easily observable problems, while issues on the left may be considered more fundamental problems.

Referring to Figure 2.1, the more immediate development problems of the Region may be summarized as follows.

- Low income level due to immature economic structure, characterized by a small share of manufacturing industry sector and dominance of low productivity rainfed agriculture and livestock.
- Out-migration from villages to larger cities in the Region and out of the Region.

These immediate problems indicate the objectives for the Region's development to be established.

The more fundamental development problems are observed from Figure 2.1 to be the following.

- Unfavorable topographic and climatic conditions, in particular maldistribution of water resources and low productivity land without land/water management.
- Distortion in land distribution / ownership.
- Low levels of education and health services.
- Lack of proper planning and management for resource utilization.

The Region's development in the long run can be most effectively attained by tackling more fundamental problems. Thus the basic strategy for the Region's development will be formulated on the basis of these more fundamental problems (Section 2.2).

2.1.3 Development objectives

(1) National development objectives

The Turkish economy entered a turning point in 1980's, and fundamental changes have been introduced by the Government in its development policy in order to reform the socio-economic structure of the Country (subsection 2.1.1). Such changes are reflected in the current five year development plan.

Main objectives of the current five year development plan (1985-89) may be summarized as follows.

(i) To increase industrial output in order to raise employment, improve income distribution, and promote export, taking into consideration the potential for agricultural development and requirements for national defence.

(ii) To sustain stable economic growth and keep inflation under control.

(iii) To gear the economy to market mechanism, while taking macro policy measures and institutional adjustments, and bring up reinforced private sector.

(iv) To utilize indigenous resources, both physical and human, effectively to meet requirements for social stability, international competition and self-sufficiency.

(v) To balance international payments, particularly by the diversification and expansion of exports and promotion of foreign capital investment.

The Government recognizes that the development of less developed regions would contribute substantially to the attainment of these objectives. The specific target is to develop regions designated as the Preferential Development Areas, starting with the Eastern and Southeastern Anatolia regions. Also the plan stipulates that the functions of local governments be augmented in order to replace direct Central Government involvement and expense.

(2) Regional development objectives

On the basis of the relative position of the Region in the Nation's socio-economy (subsection 2.1.1), the development potentials and problems, and the national development objectives listed above, the objectives for the development of the GAP region are set as follows.

(i) To raise the income levels in the GAP region by improving the economic structure in order to narrow the income disparity between the Region and other regions.

(ii) To increase the productivity and employment opportunities in rural areas.

(iii) To enhance the assimilative capacity of larger cities in the Region.

(iv) To contribute to the national objectives of sustained economic growth, export promotion, and social stability by efficient utilization of the Region's resources.

2.2 Basic Development Strategy

The problem structure analysis (subsection 2.1.2) has clarified the more fundamental development problems facing the GAP region. Of them, the lack of proper planning and management for resource utilization can be alleviated by streamlining the SPO functions and taking other associated measures in accordance with the project management system proposed by this study.

To overcome the other fundamental problems, the basic strategy for the Region's development is drawn up as follows:

(1) To develop and manage water and the related land resources for irrigation, urban and industrial uses.

(2) To improve the land use by managing more efficiently cropping patterns based on marketability and land suitability, and devising appropriate farming practices and farm management systems.

(3) To promote the manufacturing industry with the emphasis on agro-related industries and those based on other local resources.

(4) To improve the provision of social services and urban infrastructure to meet the requirements of local people and to attract technical and administrative staff to stay in the Region.

2.3 Objectives and Strategy for Agricultural Development

2.3.1 Development constraints and objectives for agriculture

(1) Constraints to development

Agriculture

In the light of present conditions observed in the Region (Appendix A-1), the major constraints to the agricultural development may be summarized as follows:

1) Agro-ecological conditions: i.e. low and uneven distribution of rainfall, very high summer temperatures and extended dry periods.

2) The prevalence of low yield agricultural technologies with limited input use and commercialization. An example of this limited use of modern inputs is the fertilizers:

Fertilizer Use in the GAP Region and Turkey, 1985.

(Unit: kg/ha of cultivated area)

	Nitrogenous (21% N)	Phosphate (17% P_2O_5)	Potassium (50% K_2O)	Total
Region	124	70.8	0.52	**195**
Turkey	199	141.3	2.63	**343**

Source: MAFRA

3) Low level of farm mechanization and modernization. Utilization of tractors in the Region is comparatively low.

Utilization of Tractors in the GAP Region and Turkey 1985.

	Tractor horse power/ha	No. of tractors/1,000 ha	Cultivated area per tractor (ha)
Region	0.41	8.29	120.4
Turkey	1.05	22.30	44.8

Source: GAP Symposium in 1985, Ankara

This is primarily due to the predominance of dry farming system, the dominance of three relatively less machine intensive crops (wheat, barley and lentils), and land tenure system.

The combine harvester hiring system is well developed. Many combine harvesters come from other regions for early crop maturity season in the Region.

4) Socio-cultural structure. Enrollment ratios at different education levels are generally lower in the Region than the national average, although they are rapidly improving, and the literacy ratios are still low. The traditional hierarchical structure in the social system tends to hinder innovative decisions and creation of farmers' organizations.

5) Land tenure situation with a few large landlords and many landless/smallholder farmers, existence of "ağa", continuing land disputes and incomplete agrarian reform.

6) Inefficient marketing systems. Prices of most agricultural commodities are set, under the commodity support price system, largely on the basis of production costs. While this contributes to the stabilization of prices for essential foods, it tends to bias the crop selection

by farmers in favour of those crops more heavily subsidized and their purchase guaranteed. It tends to deprive incentives for farmers to be innovative. Some crops face marketing problems due to over-production and the lack of sufficient storage facilities.

7) Insufficiency in other support services including extension, partly due to dispersed settlement patterns.

Livestock

Observed characteristics of the Region constraining the development of the livestock sector may be summarized as follows.

1) Lack of sufficient forages coupled with the diminishing productivity of village common pastures.
2) Animal diseases promoted by climatic conditions and nomadic movements.
3) Dominance of the livestock population by sheep and goats and small shares of cattle and poultry, reflecting severe climatic conditions, and also the dominance of nomadic stock breeding.
4) Peripheral location and dispersed settlement patterns which hamper support services to reach individual farmers effectively.
5) Inadequacy of the people's knowledge on breeding, animal care, quality control and services available.
6) Low population density and the small regional market for fresh milk and meat.

Forestry

Due primarily to climatic conditions, forest areas in the GAP region are quite limited, confined mostly in the mountainous areas along the northern and northeastern borders. Illicit cutting of trees for fuelwood and pressure on existing forest and bush areas for grazing/cultivation are reducing the quality of forest resources. Afforestation activities are constrained by insufficient seedlings/saplings supply capacity, although supply by private enterprises has been encouraged with incentives due to Forestry Law 6831 amended and new Afforestation Legislation introduced in 1987.

Fishery

Lack of authorities and strong initiatives for inland fishery development is the main constraint. Unrevealed demand for fish is another constraint for fishery activities in the Region. The Region does not have any large lakes and river fishery is not popular.

(2) Objectives

The objectives for agricultural development in the GAP region, including crop cultivation, livestock, and fishery, are established on the basis of the Region's development objectives (Section 2.1) and the regional resource base (Appendix A-1).

1) To raise the income levels in rural areas by enhancing agricultural productivity and diversifying farming activities including crop cultivation in summer and winter and also in greenhouses, livestock activities for cattle and poultry as well as sheep and goats, and possibly aquaculture,
2) To provide sufficient inputs to agro-processing industries to be established within the Region,
3) To increase employment opportunities to minimize the drift of people out of the rural areas, and

4) To contribute to the production of exportable surpluses.

2.3.2 Basic strategy for agricultural development

Overall strategy

The enhancement of agricultural productivity would be a key of attaining the agricultural development objectives. The strategy for this consists of the following:

1) to provide irrigation facilities where found effective in overcoming the adverse agro-ecological conditions,
2) to promote farm mechanization in proper combinations with the application of fertilizer, agro-chemicals and irrigation water,
3) to distribute, timely and in sufficient quality and quantity, better inputs,
4) to improve land tenure systems in consideration of the present situation characterized by a few large landlords and many landless/smallholder farmers and of past experiences in agrarian reform, and
5) to improve pricing and marketing to give incentives for farmers to produce more.

Irrigation development

For those areas where irrigation is found effective in enhancing productivity, most measures under the strategy above can be taken in an integrated manner. Optimal levels of fertilizer and agro-chemicals application under irrigated conditions should be established as well as better farming practices with mechanization. In addition, the following strategy should guide the formulation of specific measures to be taken for irrigated agriculture in the Region.

1) To identify and promote strategic crops in view not only of agro-ecological conditions but also of marketability and prospects for processing into exportable commodities;
2) To encourage higher crop intensity by establishing cropping patterns/rotations suited to irrigated agriculture and adjusting water charges in order to maximize the cost-effectiveness of irrigation investment; and
3) To organize farmers in irrigated areas for on-farm management of irrigation water in order to minimize soil erosion, water-logging, salinization and other water-related problems, and to utilize such organizations as recipients of extension services.

Livestock

In order to overcome the present constraints and contribute to the attainment of development objectives, the strategy for livestock development may be spelled out as follows.

1) To improve the present low productivity husbandry practices by:
   a) improving the local cattle breeds through artificial and natural insemination wherever appropriate,
   b) improving feeding by better pasture management, forage production and production of feed concentrates, and
   c) improving veterinary services,
   and
2) To improve the physical infrastructure to promote commercial livestock production.

Fishery and forestry

Strong public sector initiatives would be required to establish fishery activities in the GAP region, which at present are almost non-existent. The basic strategy may be spelled out as follows.

1) To utilize dam lakes to promote inland fishery; and
2) To provide a package of supporting services including a hatchery, fingerlings production, training and research, processing, marketing and pricing.

An additional and important strategy for maintaining/enhancing land productivity and providing new opportunities for economic activities as well as for protecting environment for sustained growth is:

3) To conduct intensive afforestation within the designated forest areas and areas around the reservoirs and to encourage on-farm tree planting especially on slope land with good soil.

2.4 Objectives and Strategy for Industrial Development

2.4.1 Development constraints and objectives for industry

(1) Constraints to development

Manufacturing

The manufacturing industry in the Region is still immature, constrained generally by the following factors:

- Small regional market,
- Insufficient entrepreneurship,
- Insufficient capital accumulation and capital flow out of the Region partly due to tendency of potential local entrepreneurs to avoid association,
- Insufficient managerial and technical skills,
- Inadequate incentives, and
- Inadequate communication facilities, insufficient/unstable public water and electricity supplies.

Mining

Mining activities in the Region are limited at present to petroleum, asphaltite/coal, copper and phosphate (Appendix B-1). More extensive mining activities are constrained by the following main factors:

- limited exploration activities, and
- lack of sufficient investment capital.

Due to limited basic exploration and insufficient dissemination of available data/information on reserves, private sector interests and capital cannot be attracted to the Region.

Tourism

Tourism activities in the Region are very small at present, despite its potentials. The following are the main constraints:

- insufficient accommodation and other support facilities both in quantity and in quality,
- limited exploitation of potential resources, and

- lack of publicity activities and agents for such purposes.

(2) Objectives

In view of the Region's development objectives (Section 2.1) and the present conditions of the industry sector (Appendix B-1), the following objectives are set for the industrial development in the Region.

1) To serve on the one hand as a driving force for economic development of the GAP region, including related economic activities, and on the other hand as a demand generator for education, technology development and vocational training, in order in both ways to enhance the Region's images, social welfare and the people's motivation;
2) To contribute to the rectification of inter-regional income disparity by expanding employment opportunities in high paying jobs; and
3) To contribute to the national objective of export promotion and foreign exchange earnings/savings.

2.4.2 Basic strategy for industrial development

Overall strategy

In order to realize the industrial development by overcoming the constraints and satisfy the development objectives very deliberate efforts would be required. In formulating the basic strategy for the Region's development, the following points are noted. First, the Region is well supplied with most consumer goods and construction materials. These industries can grow only following the Region's economic growth and cannot be a driving force for the Region's industrial development. Second, Gaziantep initiative for industrial development should become less distinct in the future. The reasons for the latter are (1) Gaziantep faces basically the same constraints that the rest of the Region faces, (2) conflicts with agriculture in land use is most acute around the city of Gaziantep, (3) more intra-regional equity would be demanded, and (4) processing in Gaziantep of significantly increased agriultural produce from other provinces would put stress on the transportation infrastructure.

It follows from the above that in addition to continuing industrial development in Gaziantep, substantial industrial development will have to take place in the other five provinces, and those industries other than consumer goods or construction material industries should be encouraged. Thus the following should constitute the basic strategy for industrial development in the GAP region.

1) To identify and promote industries of strategic importance which would be established or much enhanced on the basis of locally available raw materials, developed in a stepwise manner with associated economic activities and directed to exports;
2) To utilize the strategic industries to demonstrate production and management technologies, procurement of capital, development of entrepreneurship and access to the international markets;
3) To establish at least one such strategic industry in each of the five less developed provinces, except Gaziantep, in consideration not only of comparative locational advantages but also of interactions between the provinces and intra-regional equity;
4) To streamline functions of related public agencies first to assist the strategic industries and second to sustain the industrial development initiated by them; and
5) To encourage the local entrepreneurs through credit, information, technical supports, and other necessary incentives.

Mining

Mining is already an important economic activity in the Region. In order to maintain such a position, the following basic strategy is in order.

- To conduct on the one hand systematic and comprehensive exploration of mineral resources using various survey techniques, and on the other hand to concentrate exploitation activities on more promising resources.

Tourism

The long-term strategy is necessary for the tourism development in the Region.

1) To increase domestic tourists and visitors from neighbouring countries in the short to medium term and to promote international tourism in the long run; and
2) To coordinate activities of related agencies in both the public and the private sectors for publicity, restoration of historical ruins, and improvement of accommodations and other facilities with support services.

Table 2.1: Gross Domestic Product of Turkey by Economic Sector

(Unit: billion TL in current prices)

	1979	1980	1981	1982	1983	1984	1985	1986	Real growth rate, 1979-86 (% p.a.)	1987
1. Agriculture	471.6 (23.4)	937.2	1,345.4	1,703.8	2,150.8	3,433.4	4,875.5	6,594.6 (18.6)	3.0	9,705.7 (18.3)
2. Industry	491.4 (24.4)	1,048.4	1,612.2	2,241.0	3,161.6	5,222.4	8,230.5	11,593.3 (32.7)	5.4	17,196.6 (32.4)
3. Construction	105.8 (5.2)	217.1	292.2	365.5	458.7	716.4	980.0	1,451.4 (4.1)	2.2	2,211.3 (4.2)
4. Wholesale and retail trade	308.2 (15.3)	664.2	1,033.5	1,397.4	1,942,7	3,201.9	4,490.9	6,216.5 (17.5)	5.4	9,512.6 (17.9)
5. Transport and communication	200.5 (9.9)	423.0	626.8	845.8	1,141.5	1,794.3	2,724.6	3,678.4 (10.4)	3.2	5,350.7 (10.1)
6. Government services	235.2 (11.7)	377.6	481.1	686.6	860.9	1,056.5	1,441.0	2,073.3 (5.8)	4.1	3,219.0 (6.1)
7. Others	202.6 (10.1)	430.5	632.8	840.8	1,101.2	1,904.3	2,783.5	3,888.0 (11.0)	3.4	5,814.3 (11.0)
Total 1-7	**2,015.3**	**4,098.0**	**6,024.0**	**8,080.9**	**10,817.4**	**17,329.2**	**25,526.0**	**35,495.5**	**4.1**	**53,010.2**

* Sector share (%) in parenthesis

Sources: Statistical Yearbook of Turkey: 1987 (1979-86 and growth rates)
Statistical Pocket Book of Turkey, 1988 (1987)

Table 2.2: Commodity Composition of External Trade

(Unit: %)

	1982	1983	1984	1985	1986	1987
Imports						
1. Machinery and transport equipment	26.4	25.7	25.3	27.3	36.9	28.5
2. Fuels, lubricants and related materials	43.9	40.9	35.5	33.5	19.7	22.5
3. Chemicals	11.6	13.9	14.6	13.1	14.4	15.2
4. Agricultural goods and related products	6.8	6.3	11.1	10.5	12.3	12.6
5. Manufactured goods except iron and steel	6.1	7.0	7.2	7.9	9.9	11.8
6. Iron and steel	5.2	5.5	6.4	7.7	6.7	10.9
Total including others (billion TL)	**1,453**	**2,114**	**4,000**	**5,959**	**7,502**	n.a.
Exports						
1. Agricultural goods and related products	50.2	48.0	39.1	32.9	38.2	27.9
2. Textiles and clothing	20.4	26.1	31.3	28.6	29.5	33.7
3. Iron and steel	5.5	6.3	7.4	11.0	9.9	8.4
4. Machinery and transport equipment	5.2	5.2	4.8	8.1	5.5	10.7
5. Chemicals	2.9	2.6	2.8	3.8	5.5	6.6
6. Other manufactured goods	9.6	7.9	8.0	10.7	8.8	14.5
Total including others (billion TL)	**937**	**1,299**	**2,608**	**4,153**	**5,012**	n.a.

Sources: Statistical Yearbook of Turkey, 1987 (1982-86)
SPO, Main Economic Indicators, January 1989 (1987)

Table 2.3: Current Account Balance

(Unit: million US$)

	1979	1980	1981	1982	1983	1984	1985	1986	1987
Foreign trade balance	−2,554	−4,603	−3,864	−2,628	−2,990	−2,942	−2,975	−3,081	-3,234
Net service	−669	−976	−630	−501	−653	−579	−36	−396	- 171
Net transfer	1,810	2171	2,575	2,294	1,785	2,114	1,998	1,949	2,418
Current account balance	−1,413	−3,408	−1,919	−835	−1,828	−1,407	−1,013	−1,528	-987

Sources: Statistical Yearbook of Turkey, 1987 (1979-86); Economic Report 1988 (1987).

Table 2.4: GRP of GAP Region by Province 1985

(Unit: billion TL in 1985 price)

Sectors	Adıyaman	Diyarbakır	Gaziantep	Mardin	Siirt	Ş. Urfa	Total	% to GRP	Turkey	GAP as % of Turkey
1. Agriculture	42,545	96,353	77,626	84,175	31,957	105,315	437,972	39.6	4,891,353	9.0
Farming & Animal Husbandry	42,052	96,252	77,095	84,104	31,773	105,130	436,406	39.4	4672,442	9.3
Forestry	485	100	485	71	171	185	1,497	0.1	142,606	1.0
Fishery	8	1	46	0	13	0	69	0.0	76,305	0.1
2. Industry	8,723	25,913	60,274	12,364	55,809	10,636	173,719	15.7	8,753,328	2.0
Mining & Quarrying	684	4,002	1,762	2,847	18,585	626	28,506	2.6	645,531	4.4
Manufacturing Industry	7,657	19,104	53,210	6,294	34,889	8,196	129,350	11.7	6,952,621	1.9
Electric, Gas and Water	381	2,807	5,302	3,223	2,335	1,814	15,862	1.4	1,155,176	1.4
3. Construction	2,611	32,481	7,306	5,713	4,605	29,621	82,337	7.4	1,044,957	7.9
4. Trade	9,049	12,860	70,966	3,810	4,763	7,144	108,592	9.8	4,762,783	2.3
5. Transportation	7,351	9,868	26,150	10,361	4,687	14,308	72,725	6.6	2,741,039	2.7
6. Financial Institution	2,425	6,693	9,661	3,974	3,701	6,047	32,501	2.9	834,626	3.9
7. Housing	4,599	13,683	18,743	7,014	5,634	10,694	60,368	5.5	1,149,857	5.3
8. Professional Services	1,724	17,057	30,029	4,333	4,391	13,200	70,734	6.4	1,525,839	4.6
9. Imputed Service Expenditure	-1,209	-3,339	-4,819	-1,982	-1,846	-3,016	-16,211	1.5	-416,291	3.9
10. Sub Total (1-9)	77,818	211,570	295,935	129,762	113,700	193,950	1,022,736	92.4	25,295,730	4.0
11. Public Services	6,196	15,707	17,580	10,375	6,917	11,096	67,871	6.1	1,440,999	4.7
12. Sub Total (10+11)	84,014	227,277	313,515	140,137	120,617	205,045	1,090,607	98.5	26,738,729	4.1
13. Import Duties	1,021	2,526	6,413	999	4,213	1,277	16,448	1.5	823,347	2.0
14. GDP (12+13) (Purchasers Prices)	85,035	229,803	319,928	141,137	124,830	206,322	1,107,055	100.0	27,560,076	4.0

Source: İstanbul Sanayi Odası, Araştırma Dairesi, Yayın No: 1988/8
"Türkiye Gayri Safi Yurtiçi Hasılasının İller İtibariyle Dağılımı, 1979-86"

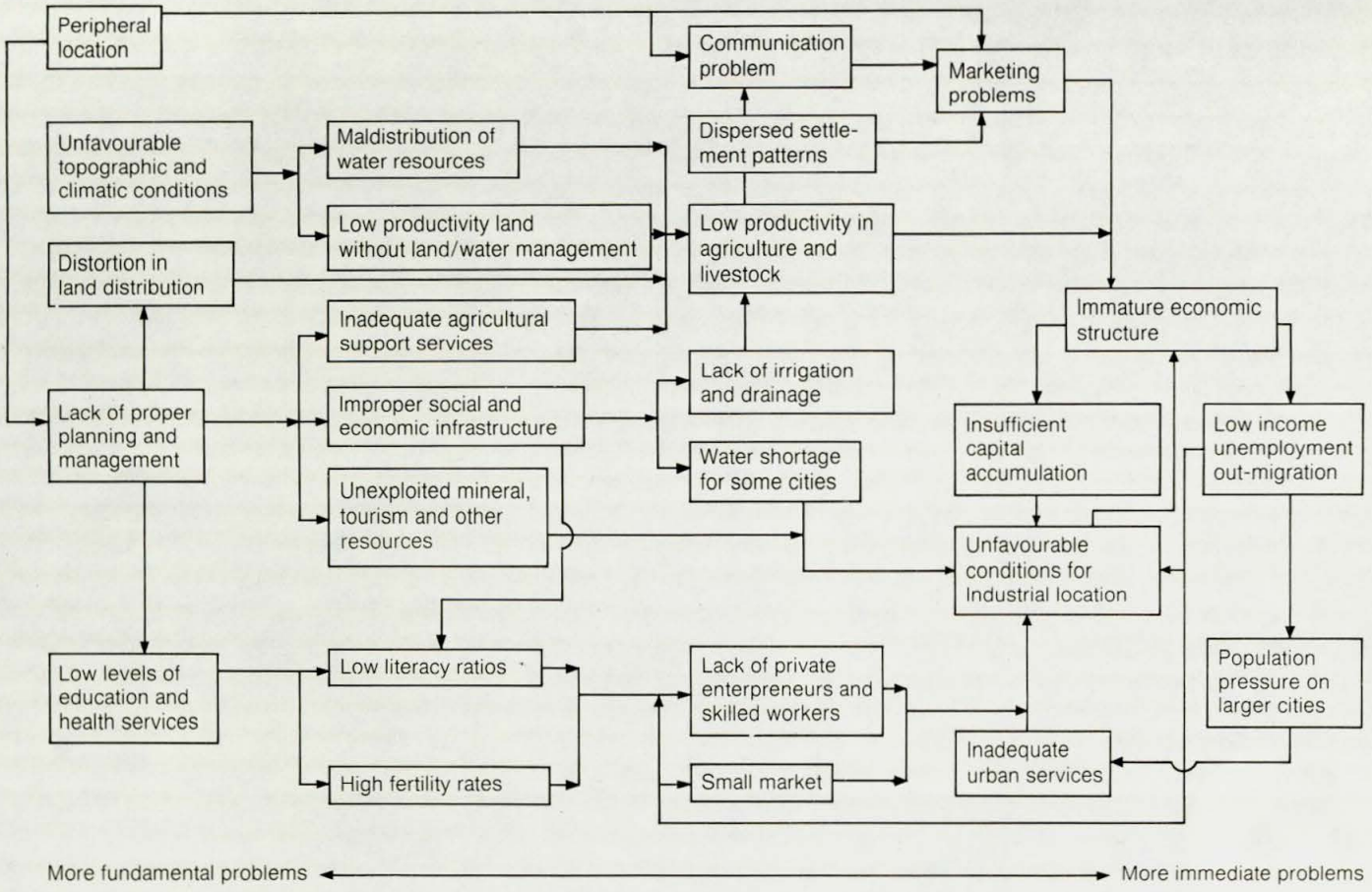

Figure 2.1: Problem Structure of the GAP Region

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NIPPON KOEI CO. LTD. & YÜKSEL PROJE A.Ş.

3

Chapter III

DEVELOPMENT SCENARIOS

3.1 Basic Development Scenario

(1) Main features

As expressed in the development objectives (Section 2.1), some structural change will have to be caused to the Region's economy in order to raise the income levels with sustained economic growth, and the productivity in rural areas and the service levels in urban areas will have to be simultaneously enhanced. Thus, the GAP development scenario has two basic features to be incorporated: (1) the economic structure of the Region and (2) rural - urban interaction.

Economic structure

The Region is in effect self-sufficient in basic foodstuff (subsection 2.1.1). However, the Region's economic structure is immature mainly due to a very weak manufacturing sector, and industrial crops in the Region have the smallest share in the national production of all the different kinds of crops (Appendix A-1). Therefore, any development scenario describing the Region's future primarily as a granary does not seem to be justified from the points of view of regional development with structural changes and contribution to the national objectives of sustained growth and export promotion.

Rather, crop diversification in favour of production of forage for livestock and industrial crops, and promotion of agro-related industries seem to be the main direction to be pursued. With production of industrial crops, the markets should be sought not only within the Region but more importantly outside the Region. For this, the peripheral location of the Region bordering on neighbouring countries may be effectively turned into an advantage. The ultimate goal of the GAP region may be called "the Agro-Related Export Base".

The manufacturing industry in the Region is expected to be primarily agro-based. These are both industries providing inputs for agriculture as well as processing/marketing agricultural produce. Some industries based on local mineral and tourism resources will also be established.

Rural-urban interactions

Significant out-migration is observed in the Region, which is basically of rural origin, and the population pressure on larger cities in the Region is increasing (subsection 2.1.1). To cope with these phenomena, more active and positive interactions should be sought between rural and urban areas. Such interactions, however, should be promoted more by enhancing functions of respective areas rather than by improving physical linkages between the two types of areas, as the transportation network in the Region is fairly well developed.

The functions of rural and urban areas can be enhanced most effectively by making use of complementary aspects of these areas. Typically, rural areas are to provide basic foodstuff and raw materials for processing, and urban areas to serve as distribution centers for agricultural inputs and outputs as well as to provide various social services. Other cases are (1) for rural areas to increase the production of industrial crops and for urban areas to promote agro-related industries in order to increase value-added in both ways, and (2) to ensure sufficient employment opportunities in rural areas and to enhance assimilative capacity of larger cities in order to reduce out-migration from the Region.

(2) Development phasing

Implementation of the Region's development has to be planned in phases, as the expansion of resource base and financial capacity and institutional development in the Region can only be realized over time. The planning period may be broadly divided into the following three phases.

Phase 1: up to 1994 (end of sixth five-year plan period)
Phase 2: 1995 - 2004 (seventh and eighth five-year plan periods)
Phase 3: beyond 2005

Expected performance of the Region in each phase is outlined below.

Phase 1 (up to 1994)

During this phase, all the on-going projects should be completed. Budget allocation to new major projects should be very limited in accordance with the Turkish Government policy.

As the agriculture is the predominant sector in the GAP region at present, the initial emphasis will be on the enhancement of productivity on existing farm lands. For this, the adoption of better varieties and farming practices with proper extension and information dissemination should be emphasized as well as irrigation schemes (e.g. Urfa-Harran) depending primarily on gravity flow of water. For those priority irrigation schemes, on-farm development and drainage should keep pace with the development of irrigation facilities to make a good precedent of all the GAP irrigation schemes. Livestock productivity improvement through breed improvement, better feeding and disease control, will be another important activity in agricultural/rural development to be initiated in this phase.

Various demonstration efforts for new industrial crops should be initiated/intensified, especially those to be introduced under irrigation such as horticultural crops, oil seeds and feed grains. For some new promising crops (e.g. irrigated sorghum and safflower) basic research should be initiated. Alternative schemes for pasture improvement under different climatic conditions and available forage composition should be demonstrated.

Industrial development in this phase will be supported primarily by steady growth of consumer goods industries. A few agro-related industries will be newly established. Measures to encourage commercial establishment of livestock-related industries should be introduced, such as dairy and poultry industries.

Current water shortage in some of major cities (e.g. Gaziantep and Şanlıurfa) should be alleviated first by urgent measures such as rehabilitation of existing facilities, while preparation is made for the development of new sources. No major transportation project seems to be in order, and emphasis in this sector will be on overlaying and maintenance/repair of existing roads as well as extension of rural roads associated with agricultural development. Communication facilities need improvements to satisfy a prerequisite for subsequent industrial development.

Comprehensive plans should be prepared for improving social infrastructure in line with the regional development master plan and for tourism development. Feasibility studies of post-Atatürk projects should be conducted during this phase.

Phase 2 (1995 - 2004)

This phase is the period of economic re-structuring and accelerated growth. The main part of the GAP hydropower and irrigation schemes will be completed.

On the basis of experience gained through the demonstration schemes implemented in Phase 1, areas under new industrial crops and double cropped will expand rapidly along with the completion of irrigation schemes. Land use will also become more intensive with mixed farming

and/or poultry farming combined with the cultivation of horticultural crops. Development of agro-related industries will be accelerated.

Intensive land use in rural areas and development of agro-related industries have important implications to population distribution in the Region. In fact, active economic interactions between rural and urban areas represent a crucial aspect of the development in this phase. On the one hand, urban functions will have to be strengthened, and on the other hand growth of rural areas should be encouraged with the assurance of good access to urban services and markets for their products.

The provision of infrastructure and utilities in some cities will have to be strategically improved. Betterment of living conditions in villages should also be undertaken at the same time. Development needs during this phase may include artery highways (Gaziantep - Şanlıurfa - Diyarbakır), selected secondary roads, selective railway reinforcement, industrial estates, water supply and sewerage for major cities, an international airport and container depots. The ports just outside the Region will be upgraded with container handling capacities.

Phase 3 (beyond 2005)

By the beginning of this phase, most industrial crops will have been fully expanded, although the maximum yields may not have been attained. Export markets will have been established for agricultural products and manufactured goods. Stable and self-sustained growth should be realized.

This phase will be characterized by active private sector investment not only in production activities but also in some infrastructure and social services. Major urban centers will be equipped with some higher order service functions such as a communication/conference center and higher education/advanced technology development. International tourism will also be well established by this time. The ultimate goal of the development of the GAP region may be the enhancement of an open society with an open economy directly linked to many countries as well as other regions of Turkey, which provides the meeting place for people of different backgrounds.

(3) Spatial development structure and process

Spatial development structure

The Region's spatial development structure is characterized by the fairly well developed road networks, relatively sparse settlement distribution and a few major cities where various economic activities are concentrated together with administrative functions and the military. Within the Region, there are two east - west highways: one in the south connecting three out of six provincial capitals, viz. Gaziantep, Şanlıurfa and Mardin, and the other serving the remaining three, viz. Adıyaman, Diyarbakır and Siirt. The inter-regional freight and passenger movements are dominantly along a southeast - northwest axis. Main road linkages from the Region pass through Elazığ/Malatya and Adana.

For planning the Region's spatial development, a kinked development axis may be hypothesized, connecting the three major cities: i.e. Gaziantep, Şanlıurfa and Diyarbakır (Figure 3.1). Gaziantep is not only the gateway from the Mediterranean coast, but easily connected to Adana, a nodal point on inter-regional traffics as noted above. Diyarbakır is the distribution center for goods from the inland, connected to Elazığ and Malatya.

The combined population of all the cities and settlements in the corridor along this development axis was 1.2 million in 1985. Further concentration of various economic activities in this corridor will be more easily attained than any other areas in the Region. At the same time, the development of other areas will have to be effectively attained. For this purpose, first the economic interactions between the corridor areas and other areas of high potential should be promoted. Second, the

development of the hinterlands of high potential areas should be induced by improving the service provision of central cities in each high potential area.

The basic strategy for the spatial development of the Region is summarized.

1) Consolidation of the corridor along the kinked development axis by providing improved infrastructure and utilities and encouraging location of strategic industries, and

2) Expansion of this corridor by promoting economic interactions between the corridor area and other areas of high potential, aiming at inducing the development of respective hinterlands.

Spatial development process

In the short-to mid-term, main development efforts should be focused on the corridor defined above. Urban infrastructure and utilities in the major cities should be improved as well as physical linkages between them. As the irrigated agriculture develops in the hinterlands with the implementation of major schemes, active rural-urban interactions should be sought. Strategic industries to process increased agricultural produce would find their locations within the corridor or secondary towns with the improved physical links to/from the respective hinterlands. A full range of service activities related to agriculture would be provided in these and other secondary towns, including major distribution depots, financial institutions, major storage and agro - processing facilities. Outside the corridor accelerated growth will take place only in selected population centers.

The expansion of the corridor will take place first from Diyarbakır to Batman, and from Gaziantep and Şanlıurfa to Adıyaman. In particular, the Adıyaman area is in a unique position encircled by the corridor and a few of large cities just outside the Region, viz. Elazığ, Malatya and K. Maraş. Although some portion of the productive land will be inundated by the Atatürk reservoir, rural-based development can be expected in this area, if complementary rural-urban interactions are effectively realized.

The corridor will be further consolidated as the intermediate cities develop with irrigated agriculture in the hinterland such as Siverek and Birecik. The corridor expansion will proceed also from Şanlıurfa to Viranşehir. The Diyarbakır-Batman axis will be further extended to Siirt, and the inter-connection between Diyarbakır and Mardin will become important. The development axis will be further extended from Mardin/Kızıltepe to Cizre/Silopi and from Siirt to Şırnak/Cizre/Silopi (subsection 4.2.3).

In this process, functional and hierarchical divisions among cities should be further clarified. The city of Şanlıurfa, in the middle of main corridor having in its hinterland the most promising irrigation schemes, can become a regional center, equipped with some higher order functions such as communication/conference and advanced education/technology development. Gaziantep will consolidate its industrial base to become an export-oriented manufacturing center, and Diyarbakır will be a regional commercial center.

The corridor eventually will have dual functions. To the southern periphery, it would serve as a consolidated and robust base with several strategic industries located. To the inland, it would hold the rich and versatile rural economy capitalized on the Atatürk reservoir. The corridor will provide not a barrier but a meeting place between the east and west and the north and south.

3.2 Agricultural Development Scenarios

In the short to medium term, agriculture will be dominantly rainfed. Improvement of productivity in rainfed agriculture, therefore, should receive serious attention. The long-term development of agriculture in the GAP region will, on the other hand, depend heavily on the implementation of the GAP irrigation schemes. Therefore, the development scenarios for the Region's agriculture may be drawn with the focus on the irrigation development.

(1) Rate of irrigation development

Original schedule

The rate of irrigation development as originally planned by DSI is shown in Table 3.1. This calls for completion of irrigation networks covering 1.6 million ha by the year 2002. This may be considered to represent the maximum rate of irrigation development.

Capacity of implementing agencies

A slightly slower rate of irrigation development with the total of 1.6 million ha irrigation by 2005 will require DSI to complete its irrigation works on almost 100,000 ha per year. Given the present status of the GAP project and DSI's proven capacity,this should be feasible provided that sufficient financing is made available. However, it will be extremely difficult for General Directorate of Rural Affairs (GDRA) to complete the on-farm development at a comparable rate. The Şanlıurfa GDRA office indicated that they now have on-farm development capacity of 1,000 ha per year but that 3,000 ha per year could be achieved by supplementing GDRA office capacity with contractors.

Land redistribution and consolidation

One reason for the lack of GDRA activities in the GAP region is the delay in carrying out the redistribution of farm lands expropriated under the land reform law and lands belonging to the State. The agrarian reform agency's goal to complete land redistribution for Şanlıurfa province by 1990 and for the remainder of the Region by 1992 may not be easily achieved.

Extension and research

Successful transformation of the Region's agriculture from its current pattern of dry land cereals and pulses to an intensive irrigated agriculture with a minimum of fallow will call for proper provision of extension services and research activities. In Şanlıurfa, the Provincial Directorate of MAFRA in charge of extension and research coordination has just started to gear up for the large scale introduction of irrigated agriculture. The various research organizations are continuing to test varieties under both dryland and irrigated conditions but have done very little research on crop rotations and irrigation practices.

The World Bank financed TYUAP project (Appendix A-1) provides support to the reorganization and strengthening of the extention services in the selected provinces and for the Southeast Anatolia Agricultural Research Institute in Diyarbakır. The fallow reduction program and the second crop program results will also be used to select new crops to be introduced in the newly irrigated areas. With all these efforts, however, it will take several years to establish appropriate farming practices for many irrigation schemes and to realize the optimal yields after the completion of each irrigation development.

Experiences in other irrigation projects

Experience in other irrigation projects both in Turkey and elsewhere shows that once water is available, farmers will want to utilize it even though on-farm works are not completed. Moreover with plentiful supplies of water there is a tendency to overirrigate leading to rising water tables and eventually to salinization. To avoid such problems it is extremely important that drainage and on-farm development are completed when irrigation is started. The large discrepancy between the expected pace of irrigation development and the extremely limited capacity for on-farm works is a critical problem to be redressed.

(2) Step-wise implementation

In view of the factors reviewed above, step-wise implementation of the GAP irrigation schemes may be conceived. The basic idea is to concentrate the development efforts on the most promising sub-projects in the short to medium term, while formulating longer term measures by utilizing information to be obtained in the meantime through basic research, monitoring of ongoing projects, and developments in the domestic and export markets.

General criteria to be applied in this step-wise implementation would be:

- early implementation of priority schemes including those at advanced development stages,
- attaintment of higher productivity by higher cropping intensity with proper water management and extension services, and
- maximization of geographic dispersion of irrigation benefits or better distribution of income within the Region.

The step-wise implementation would allow better cost-effectiveness of irrigation investment by increasing the unit benefit per ha and more effective provision of extension services. On-farm development can keep better pace with the development of irrigation facilities so that salinization and water logging due to lack of sufficient drainage will be minimized. The step-wise implementation would also facilitate the concomitant improvement of land tenure systems, organization of farmers and provision of new agricultural inputs as compared with the case where these efforts will be spread over much larger irrigation areas.

(3) Cropping patterns

The present and expected cropping patterns in the Region are dominated by cereals, pulses and cotton. This cropping pattern can be diversified by promoting three groups of crops.

Crops to be promoted

Turkey has been deficient in oil seeds and this deficiency is likely to remain in the short to medium term. Production of oil seeds in the Region should be emphasized to reduce this deficit and possibly contribute to exports. Sesame, groundnut and maize oil are high priced commodities with good export prospects. The cake can be both exported and will contribute to the livestock feed base. Other oil seeds that can be grown are soybeans, sunflower, rape and safflower. Safflower is native to Turkey but grown only on a very limited scale. Further research and trials will be necessary before it is introduced on a significant scale.

Another group of crops for agro-processing are fruits and vegetables. Olive oil, tomato paste, grape processing and some other regionaly grown fruits appear promising.

Further diversification can be achieved by introducing new strategic crops. One such promising crop to be planted immediately after cereals is high yielding sorghum. They yield up to 4.5 tons per ha as compared to yields of 1.5 tons/ha with traditional varieties. Sorghum can be substituted for maize in livestock feed and has established export markets.

The third group of crops are forage crops and feed grains. Sorghum grain and maize for silage are the two most promising crops. Increased production of feed crops will be one of essential conditions for improving the present low productivity stock raising practices.

The emphasis on these three groups will increase the crop diversity and cropping intensity in the irrigated areas.

Crop rotations

The cropping patterns to be proposed are at best notional, as solid research results in the Region on irrigated crop rotations are very limited. It is proposed to plant cotton on land which either was fallow in winter or produced quick maturing crops that could be harvested in time to plant cotton, i.e. winter vegetables, oil seeds or pulses.

After the winter wheat, it is proposed to plant oil seeds, maize or summer vegetables. The exact mix will depend on yields, market demand and costs. However, the experience in other countries shows a wheat/soya rotation has been very profitable since the same machinery can be used for both crops, and it is possible to plant soybean into the wheat stubble without further land preparation (minimum tillage system). Maize has been successfully grown in the GAP region with plantings in the first week of July and high yields.

To reduce fertilizer requirements, it is important to have a leguminous crop in the rotation. Thus cotton and maize should be followed by a winter growing leguminous crop - i.e. pulses or oil seeds such as rape or safflower. Wheat would be followed by oil seeds or pulses in most cases but by maize or summer vegetables when the harvest is late. Vetch can be planted right after cotton followed by maize. Beneficial effects of vetch have been observed for two years following the vetch harvest raising yields on subsequent maize and cotton. A notional cropping pattern at full development is shown in a simplified form (Table 3.2.).

3.3. Industrial Development Scenarios

(1) Industrialization process

Successful development of the strategic industries will be the first substantial step of the industrialization in the GAP region. This will provide a basis for subsequent industrial development in terms of capital, entrepreneurship, technical and managerial skills. This, combined with the trend development of consumer goods and construction materials industries, will lead to the inducement of other industries through forward and backward linkages and related economic activities.

The increase in income as a result of this initial development will set the stage for further industrialization in the Region. The strategic industries will grow with more establishments, taking advantage of expanding markets as well as demonstrated production and management technologies. Trend acceleration of consumer goods and construction materials industries will also take place, as the urbanization proceeds.

As the Region's socio-economic and income levels are enhanced, new industries will emerge to meet the increasing demands from other sectors. The fertilizer industry will be established, followed by agricultural machinery and equipment industry, as the Region's agriculture improves. Eventually, the general machinery industry will be established.

(2) Industries of strategic importance

Assessment of industries

Prospective manufacturing industries that may be newly introduced or much enhanced in the GAP region were first enumerated (Appendix B-2). For those industries, a preliminary assessment has been made by using the following five criteria:

1) Procurement of raw materials,
2) Labour requirement and required skill levels,
3) Capital requirement,
4) Marketing prospect, and

5) Need for utilities - electricity, water supply and wastewater treatment.

For each criterion, the degree of sufficiency and insufficiency in the Region has been assessed respectively in five ranks.

Degree of sufficiency

1) Not sufficient but promising for the future,
2) Not sufficient but promising in the near future,
3) Sufficient,
4) Sufficient and promising for the future,
5) Sufficient and promising for the near future.

Degree of insufficiency

1) Insufficient but promising in the near future, if some promotion measures are taken,
2) Insufficient but promising in the future, if some promotion measures are taken,
3) Insufficient,
4) Insufficient and slow deterioration,
5) Insufficient and rapid deterioration.

The score of 1 to 5 was given to the degree of sufficiency and the score of -1 to -5 to the degree of insufficiency, and the total score has been found out for each sub-sector industry. The results are summarized in Table 3.3.

Prospective industries

Based on the ranking in Table 3.3 and other considerations such as environmental effects prospective industries can be identified. Those sub-sector industries having the highest scores should be selected. Those sub-sector industries mutually related should be selected even if some of them have relatively small scores. Some having medium scores should be selected as they may have comparative advantage, because they are concentrated in a few provinces causing a low overall score.

Thus the following sub-sector industries may be selected as promising.

Wheat-related industry

- Wheat flour
- Macaroni/semolina

Cotton-related industry

- Ginning
- Corded cotton yarn/Mercerized cotton yarn
- Cotton fabrics
- Cotton wool
- Wearing apparel

Edible oils industry

- Raw edible oils
- Refined edible oils
- Animal feed

Livestock industry

- Slaughtering
- Tannery (hides and skins)
- Meat processing
- Leather shoes
- Milk processing

Construction materials industry

- Concrete blocks/Ready made concrete products
- Tiles and bricks
- Pipes made of cement

Others

Printing and publishing

Of the industries listed above, those in the first four groups seem to be more promising in terms of impact on the Region's economy and conformity to the basic strategy for industrial development. Construction materials industry and printing and publishing industry will grow only following the trend, as the income in the Region increases and the urbanization proceeds. Other industries that deserve further investigation include vegetables/fruits processing, canning and bottling, packing materials, pistachio processing, fish processing and canning/packaging.

Other kinds of industries were also assessed qualitatively. Tourism related industries conform to the basic strategy, especially if a variety of potential tourism resources within the Region are effectively developed for foreign tourism. No mining industries seem to be qualified as strategic industries. Although the petroleum refinery, copper products, fertilizer, cement and ceramics are important mining-related industries, the known reserves are small, and products are domestic market oriented.

Another set of industries that will develop in the Region will be those serving the primary production/processing oriented industries. These include casting, turning, and spare parts producers. Another set of industries are those producing consumer goods such as furniture, utensils, and chemicals. These two sets of industries will develop at a later stage following the establishment of industries detailed above, and the growth of population and income in the Region.

Selection of strategic industries

The following industries have been selected as the industries of strategic importance for five GAP provinces, except Gaziantep.

Adıyaman : Tourism-related industries;
Diyarbakır : Edible oils (main) and animal feed industries;
Mardin : Semolina/pasta, ginning and fruit processing;
Siirt : Meat Processing and leather industries;
Şanlıurfa : Textile-garment (main) and edible oils animal feed industries.

These industries already exist in the Region but will be much enhanced and expanded in the future. The selection should not imply that other industries could not be strategic industries nor that the strategic industry in one province should not be established in another province. Rather it implies that at least these industries should be established in the respective provinces. Conditions for development are described below for each of them.

(3) Tourism-related industries in Adıyaman

Resources/raw materials

Tourism-related industries include construction industries for tourism facilities and various service industries. Raw materials for these industries can be mostly procured within the province, including most construction materials, foodstuffs for hotels, restaurants and catering services and some materials for souvenir such as black stone. Some specialized construction materials for tourism facilities will be imported from other provinces.

The province of Adıyaman is the richest in potential tourism resources, including Mt. Nemrut and other historical ruins. The reservoir to be created by the Atatürk dam will provide additional significant opportunity for tourism. Distance is short from potential access points such as Malatya, Diyarbakır, Şanlıurfa and Gaziantep.

Conditions for development

In order to develop the tourism related industries in Adıyaman, the following conditions will have to be satisfied:

- improvement of access from Malatya outside the Region, Şanlıurfa and Gaziantep,
- better passage of the reservoir in the north to improve access from Diyarbakır,
- afforestation around the reservoir and creation of a water-based recreation area, and
- supporting facilities including a tourism training/information center as well as improved accommodations and restaurants.

(4) Edible oils and animal feed industries in Diyarbakır

Raw materials

The production of oil seed in Diyarbakır at present is 22,000 tons cotton seed, 5,500 tons sunflower, and 2,000 tons sesame. With this production quantity, an edible oils industry of 4,000 tons/year capacity can be established. With the implementation of the GAP irrigation schemes, the production of these kinds of oil seed will increase two to four times. In addition, large amount of soybean and maize will become available as additional raw materials.

Conditions for development

Diyarbakır satisfies the requirements for establishment of edible oil extraction and refining. This includes availability of labor, utilities, and support services/industries.

Markets

Export markets for edible oils are potentially large. The annual rate of increase in 1960-80 of edible oils export from developing countries to OECD countries was 11.4 %. Turkey is still a significant importer of edible oils (140,000 tons in 1982/83), but exports are also increasing (60,000 tons in 1982/83) due primarily to olive oil. Domestic production is currently constrained by the shortage of raw materials.

(5) Industries in Mardin

Raw materials

A set of smaller manufacturing establishments are envisaged in Mardin for short to medium term on the basis of raw materials availability. Flour mills have relative advantage in the province in view

of present production of wheat contributing to 20 % of the regional production and the existence of priority irrigation schemes. Seed cleaning can be established as the production of various grains increases and soybean introduced.

Fruits production in Mardin is generally larger than in Adıyaman, Siirt and Şanlıurfa, and comparable to the level in Diyarbakır. The province at present is the largest producer of apricot in the Region. It is also a larger producer of grapes comparable to Diyarbakır and only next to Gaziantep.

More than 100,000 ha of land will be irrigated in Mardin at full development. A significant portion of this land is expected to be used for cotton production, which will support a number of ginning plants and possibly cotton yarn production.

Conditions for development

Flour mills and ginneries can be established in the near future. For subsequent establishment of pasta industry and cotton yarn production, the successful implementation of major irrigation schemes is the prerequisite. For the former, the province will have to specialize in the production of hard wheat.

For the establishment of fruits processing industry, the production within the province will have to increase for selected fruits or more raw materials will have to be transported from the neighbouring provinces. If stone covered and slope land of the province can be effectively utilized, the grape production can be significantly increased to justify a winery.

Markets

Wheat flour, pasta and cotton products are primarily for domestic markets. Processed fruits and wine should aim at international markets. Nectar drinks may find their markets in the neighbouring Middle East countries, for which Mardin has locational advantage.

(6) Meat processing and leather industries in Siirt

Raw materials

Siirt has the largest number of goats, although the population of other livestock is relatively small. The population of cattle can be significantly increased by intensive stock raising methods such as non-grazing and stall grazing initiated recently within the province. However, the present livestock population is sufficient for establishing a major livestock industry in the province. Inputs that have to be imported from the western part of Turkey are chemicals for leather processing.

Conditions for development

Two important points for successful establishment of meat processing are assurance of sanitary conditions and improvement of product lines. For sanitation, the following conditions will have to be satisfied:

- improvement of veterinary services,
- establishment of sanitary slaughterhouses,
- installation of chilling facilities at slaughterhouses and vehicles, and
- packaging (with plastic containers).

The product lines should be improved from carcase base to prime cuts of meat to reduce transport costs, for ease of packaging, and for full utilization of materials within the province.

Another important consideration is to establish a complete system of all the related facilities, including the slaughterhouse, meat processing, processing for animal feed materials, leather processing and other ancillary facilities. In this way, total investment costs can be minimized and production processes will be designed in a most efficient way and regional value-added maximized. Also, more complete pollution control can be realized minimizing organic wastes and installing as an integral component, a wastewater treatment facility.

Markets

Despite the severe competition in international markets, export prospects for processed meat are high, provided that the sanitary conditions are observed and product lines are improved as described above.

The main export market for meat from Turkey is the Middle East. Competition is very severe with suppliers of Australia and New Zealand. However, Turkey has the following advantages:

- low transportation costs due to the vicinity to the market,
- cultural and religious ties with the market countries,
- large share of mutton meat and preference for the fat tailed sheep meat,
- less stringent inspection standards in the market countries.

Export of hides, skins and furskins from Turkey has been rapidly increasing as indicated below:

	1982	1985
Volume (tons)	13	915
Value (million US$)	0.08	1.7

Source: Statistical Yearbook of Turkey, 1987

Promising leather products include coats and shoes, aiming at exports to the OECD and other developed countries.

(7) Textile-hygienic products in Şanlıurfa

Raw materials

The production of cotton lint in the province of Şanlıurfa is at 25,000 tons/year. Several-fold increase is expected as the GAP irrigation schemes are implemented. Thus the establishment of this strategic industry is justified.

Conditions for development

As the product lines, hygienic products such as absorbent cotton, gauze and non-woven cloth are conceived in addition to the main product line for cotton yarn and fabrics. Such product diversification should take place in steps.

A large amount of clean water is required to bleach inputs for hygienic products (about 10 tons water per ton of hygienic products). Effluent water treatment is also required. Sanitary and complete packaging is another condition in the case of hygienic products.

Markets

Export prospects are fair. Demand in domestic and export markets, however, is slow growing, and thus the expansion of production capacity should be planned in due consideration of demand for different products. The OECD countries adopt quota systems for these products, but export in

excess of the quota is allowed with the payment of surcharge.

Turkish textile exports have increased rapidly from US$ 10 million in 1979 to US$ 2.7 billion in 1987.

Export to production ratios are high: 54 % for cotton yarn and 75 % for knitted cotton. Import of textile products is comparatively low (US$ 145 million in 1985). These facts indicate that the domestic market is nearly saturated with domestic supply of textile products and that the expansion of this industry will be conditional on the increase in raw materials supply and the expansion of export markets.

(8) Industries in Gaziantep

A full range of manufacturing and trade industries exist in Gaziantep with many large scale establishments and subcontract enterprises. No serious problem is observed in procuring raw materials and marketing products as 13 provinces in the eastern Turkey are considered the hinterland of Gaziantep. Industrial agglomeration has already been established, and the manufacturing industry is in a self-growing cycle. The trend development and the trend acceleration of consumer goods industry and some construction materials industry will take place mainly in Gaziantep with increasing demand in this and other provinces.

A challenge for the Gaziantep industries is how to re-organize them to cope with the international markets. The tendency to avoid cooperation among related enterprises and insufficient capacity of the trade sector are the problems here. However, in view of the fairly established status of the manufacturing industry in Gaziantep, what will be needed is guidance and technical support to improve product quality and assistance in export marketing.

Table 3.1: DSI Original Schedule for Completion of GAP Irrigation Projects

Irrigation Schemes	Irrigation Area (ha)	Completion Date
1. Urfa-Harran	141,535	1992
2. Mardin-Ceylanpınar 1st stage	230,130	1996
3. Mardin-Ceylanpınar 2nd stage	104,809	2000
4. Siverek-Hilvan pumped	160,105	2002
5. Bozova pumped	69,702	1995
6. Suruç-Baziki	146,500	2000
7. Adıyaman-Kahta	77,409	1994
8. Adıyaman-Göksu-Araban	71,598	1997
9. Gaziantep	81,670	1997
10. Dicle right bank	52,033	1993
11. Dicle right bank-pumped	74,047	1993
12. Batman right bank	18,758	1993
13. Batman left bank	18,986	1993
14. Batman-Silvan	213,000	2001
15. Garzan	60,000	2002
16. Silopi	32,000	2002
17. Nusaybin-Cizre-Idil	89,000	2002
Irrigated Land Total	1,641,282	
Dryland Total	1,439,900	

Source: DSI

Table 3.2: Notional Cropping Pattern for the Master Plan

(Unit: %)

Crop	share in total area
Primary crops	
Wheat	25
Barley and other feed grains	15
Lentil and dry bean	8
Cotton	25
Winter vegetables	2
Perrenials*	20
Sub-total	95
Secondary crops	
Soybean	10
Corn and fodder crops	8
Groundnut	5
Sunflower	5
Sesame	5
Vegetables, including tomatoes and potatoes	6
Sub-total	39
Total (Crop intensity)	134

* Include pistachios, grapes, fruit trees, poplar and tree nursery

Table 3.3: Ranking of Prospective Industries for the GAP Region

Subsector	Score	Subsector	Score
1 Wheat flour	89	36 Semi-kamgharn yarns	23
2 Ginning	73	37 Slippers and sporting shoes	23
3 Raw edible oil	64	38 Plastic shoes	21
4 Pistachio	62	39 Canned vegetables	18
5 Macaroni	48	40 Dried Food	18
6 Corded cotton yarn	47	41 Sewing thread	18
7 Hand made carpets (wool)	47	42 Jute yarn	18
8 Refined edible oil	46	43 Embroidered fabrics	18
9 Slaughtering	43	44 Fertilizer	18
10 Concrete briquette	42	45 Plastic receptacle (bucket etc.)	18
11 Ready made concrete	42	46 Nails	18
12 Knitting fabrics	40	47 Bottle cap and lids	18
13 Cotton fabrics	38	48 Asbestos cement sheets	18
14 Tannery	37	49 Auto parts	18
15 Poultry meat	35	50 Kamgarn yarn	17
16 Bijouterie	34	51 Sacks textile bag	17
17 Tiles and brick	34	52 Pure cotton knitting yarn	17
18 Pipes made of cement	34	53 Chip plate	17
19 Shoes made of leather	33	54 Tomato sauce	16
20 Printing and publishing	33	55 Air condition equipment	16
21 Knitting ready made clothes	32	56 Tin boxes	16
22 Quick lime	32	57 Mixed cotton yarn	15
23 Refined salt	31	58 Pipes made of asbestos cement	15
24 Hand made carpets silk	31	59 Marble plate	15
25 Soinary products	31	60 Mineral water	13
26 Cotton wool	31	61 Rose water and oil	13
27 Wearing apparel	30	62 Tobacco processing	11
28 Felt and felt products	30	63 Leather clothes	11
29 Concrete columns	30	64 Furniture	11
30 Soft drink bottling	28	65 Towel and similar fabrics	10
31 Seeding machine	28	66 Ready made towel and bath robe	10
32 Mercerised cotton yarn	28	67 Tanks for water gas and fuel	9
33 Milk processing	26	68 Agricultural insecticides	—
34 Hard pipes made of plastic	26	69 Barby wire, brided wire	—
35 Furniture and fixture	25		

* Ranking by the Consultant

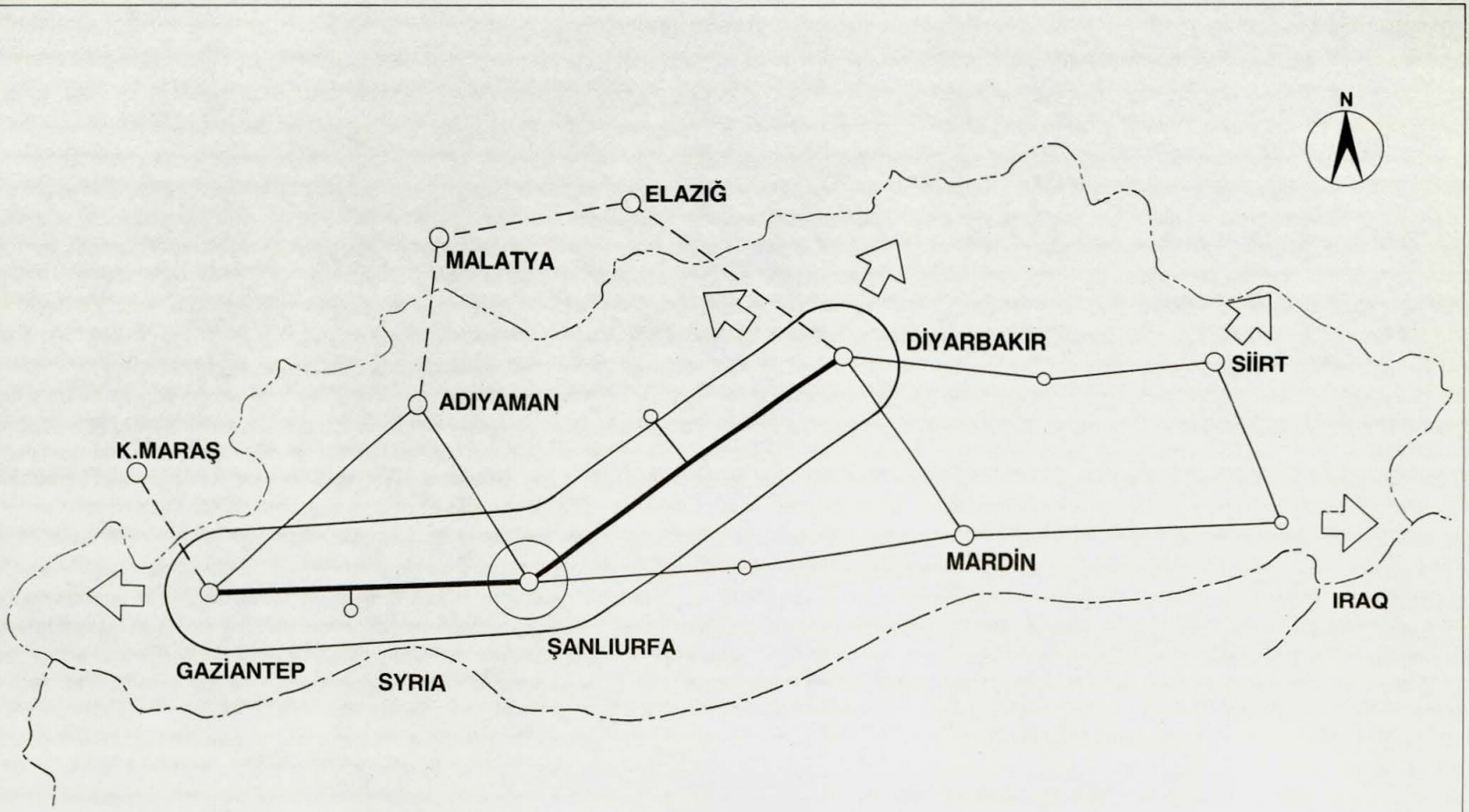

Figure 3.1: Schematic Presentation of Envisaged Spatial Structure with the "Kinked Development Axis"

REPUBLIC OF TURKEY
SOUTHEASTERN ANATOLIA PROJECT
NIPPON KOEI CO. LTD. & YÜKSEL PROJE A.Ş.

4

Chapter IV

DEVELOPMENT FRAMEWORKS

4.1 Socio-Economic Framework

4.1.1 Method and data

(1) Method

A socio-economic framework or macro-frame for regional development planning specifies development targets or the level of development in some target year by selected socio-economic indices projected in a mutually consistent way. A simple model is used for such projection. Main indices used in the model are the gross regional product (GRP) and its breakdown into agriculture, industry, construction and services, the population broken down into urban and rural, the total employment and the per capita GRP.

Value-added

Value-added due to the planned GAP irrigation schemes is estimated by adopting simplified cropping patterns and the unit value-added per ha by crop obtained from the crop budget analysis. Value-added on dry land is estimated by determining the total dry land area after irrigation development and incorporating future increase in productivity on dry land.

Value-added in livestock sector is estimated separately by specifying productivity level in the future. Value-added of inland fishery, forestry and other related activities has been roughly estimated and added to make the total agriculture value-added.

Prospective manufacturing industries that will be established or much enhanced in the GAP region have been identified (Section 3.3). Value-added of these industries has been estimated individually. For each industry, the availability of raw materials has been examined on the basis of the envisioned increase in crop and livestock production, the input-output ratio and prices of both main inputs and outputs are determined, and the value-added is calculated (Appendix A-2).

The utility sector in the GAP region will be dominated by the electricity subsector, as the planned GAP hydropower schemes are implemented. The utility value-added is estimated from the amount of hydroelectric energy to be generated.

Construction activities are determined by public investment, housing expenditure and industrial development. The construction sector value-added in the GAP region is estimated by assuming the public investment allocation to different types of projects to be implemented within the Region and estimating investment requirements for housing and industrial development.

The services sector value-added is estimated simply by applying service multipliers to agriculture, industry and construction sectors.

Population and labour force

For each broad sector, the unit value-added per person engaged in the particular sector or the employment coefficient has been determined based on the past relationships between the

production, value-added and employment. The model incorporates the future increase in labour productivity specified by sector. From the value-added and the employment coefficient, the model calculates labour requirements or employment opportunities to be generated by sector.

The total labour requirement in the future is converted to population by multiplying the labour force participation ratios with the ratio of working age in the total population. The former is the ratio of those actually working in the working age population.

The urban population is estimated on the basis of employments in industry, construction and services. The rural population size is derived from employments in agriculture, though some agricultural employees may live in settlements officially classified as urban.

(2) Data

The base year is taken to be the year 1985 and the target year 2005. All the variables and parameters expressed in monetary terms are in June 1988 prices. Base year conditions are taken from the available estimate for value-added (Table 2.4) and SIS census results for population and employment. Coefficients are estimated from the recent statistics to the extent available. In other cases, assumptions had to be made. Data used in projecting value-added, population and labour force are given in Appendix C.

4.1.2 Alternative socio-economic frameworks

(1) Trend projection

The trend projection represents what the socio-economy of the Region will be in the future, if things go as they have been. It has been conducted by taking the trend population projection as a basis, and such levels of economic activities that would support the projected population are found out.

According to the trend projection, the Region's economy will grow at the average rate of 4.7% per annum with agriculture growing at 2.7%, industry at 6.0%, construction 4.6% and services 5.8%. This result may be compared with the available estimates of provincial value-added by sector, which give the average annual growth of 4.6% for the overall economy of the six GAP provinces, and 2.6% for the agricultural value-added during 1980-85.

The total population will grow at the average annual rate of 2.9% to reach 7.7 million in 2005, with urban population growing at 4.2% and rural population at 1.2% per annum. The per capita GRP will grow from TL 862 thousand in 1985 to TL 1,232 thousand in 2005 at the average annual rate of 1.8%.

(2) Scenario projections

Development projections for the Region are made for three separate cases. In one case (Alternative A), all of the initially planned area will be irrigated. This will result in some reduction in the energy generation. As a second alternative (Alternative B), the Government may aim at maximum power generation subject to the implementation of priority irrigation schemes.

GAP implementation may be constrained by the limited availability of public funds and other resources, or slower development may be preferred for reasons discussed at the end of this section. In this case, only the priority irrigation and hydropower schemes (Section 5.1) will be implemented (Alternative C)

The results of scenario projections are summarized in Table 4.1. The trend projection is also shown for the purpose of comparison.

4.1.3 Evaluation

(1) Policy framework

The development of the GAP region will have to be planned and evaluated within a framework consistent with the development of national socio-economy and resource allocation policies of the Government. The following are envisaged at the national level.

The current public sector deficit is expected to be reduced in line with the Goverment policy to control high inflation rates. Since the rapid economic growth in recent years has been generated primarily by domestic demand fueled mainly by the public sector, the public fixed capital investment growth will have to be slowed down.

The public fixed investment growth needs to be suppressed substantially over the medium term, and the economic growth will have to be lowered than the average attained during 1980-85 (4.8 % per annum). In the longer run, the real GDP will resume higher growth with public fixed investment also growing at a slightly higher rate.

For the regional plannig purposes, the average growth rate of the national economy is taken to be 5.4 % per annum during 1985-2005, and the growth of public fixed investment 4.0 % per annum.

(2) Additional criteria and data

In addition to the socio-economic indices used in the projection model, the following criteria are used to evaluate the development alternatives.

Public investment

Public investment requirements under Alternatives A,B and C are estimated by project for agriculture and energy sectors in each project. For other sectors, overall regional estimates are made.

Investment costs of the original GAP irrigation and hydropower schemes have been taken from existing study reports or estimated on the basis of data contained in such reports. On-farm development costs are calculated by determining the unit cost per ha for each scheme. Cost of power transmission and distribution as well as other related costs are added to investment requirements for energy sector.

Public investments in housing, education and health services are estimated on the basis of projected population and assumed service levels. In principle, the attainment of the present national average is the target.

For manufacturing and mining sectors, the public investments will increase at 2.0% per annum. Growth in public investments in transportation and other services will derive from the growth of regional economy.

Investment efficiency

The efficiency of GAP investment is measured by the incremental capital-output ratio, i.e. the ratio of total investment including both public and private investments required to the increase in the total value-added to be attained. The private investment has been 65 - 75% of the total public investment in Turkey in recent years. This ratio is lower in the GAP region at around 45%. For the projection purposes, it is assumed that this ratio in the Region will increase steadily to reach 65% by 2005.

External finance requirements

External finance requirements for GAP are estimated by determining foreign currecy portions of investment costs individually for the GAP irrigation and hydropower schemes and overall for the other sectors investments. The foreign currency portions are 25% for irrigation facilities, 60% for power plants and 40% for dams. The overall foreign currency portion of the GAP hydropower and irrigation schemes is 31%. For other sectors, it is assumed to be 30% for transportation, 25% for manufacturing and mining and 10% for all other sectors.

(3) Evaluation

The development alternatives are evaluated by several criteria (Table 4.2).

Economic growth

The highest economic growth, 7.7 % per annum during 1985-2005, can be attained under Altarnative A by implementing all the GAP irrigation and hydropower schemes by 2005. The per capita GRP figures, however, should be interpreted with caution. The alternative projections vary in their emphasis on different national and regional objectives. They imply different productivity, employment and population levels.

Public investments

Public investment requirements are generally in line with the expected economic growth, TL 28,800 billion under Alternative A, TL 22,400 billion under Alternative B, and TL 20,600 billion under Alternative C during 1990-2005. Efficiency of public investment will be highest under Alternative C as indicated by the incremental capital-output ratio of 3.24 as compared with 3.71 under Alternative A and 3.27 under Alternative B.

External finance

External finance requirements are also generally in line with the expected economic growth. However, foreign currency portion of investment costs becomes slightly higher comparatively as only priority projects are selectively implemented.

Social services

Under any alternative, the same social service levels have been assumed on per capita basis. In principle, enrollment ratios at different education levels and levels of health facilities and personnel will attain at least the present national average levels.

(4) Recommended framework

Development alternatives attaining higher growth of the GAP region's economy will require larger public investment allocation. Efficiency of public investments into the GAP will be improved, if only priority schemes are selectively implemented, although the output levels will be lower. Thus a trade-off exists between the higher growth of the GAP region's economy and the national economic efficiecy for public investments. This is a policy issue.

However, in view of sizable public investment required for the GAP implementation and inherent uncertainties involved in long-term investment decisions, the deferment of non-priority projects (Alternative C) is presently recommended. Under this alternative, the implementation period of the original GAP schemes will be extended over a longer period. This will have the following favourable effects.

First, the allocation of public sector resources -financial, human and other- to GAP will be more compatible with the requirements of other regions. Also, initial investments will be more cost-effective, as only the priority schemes will be implemented. Second, on-farm development can keep better pace with the development of irrigation facilities. This in turn will help to minimize the salinization and water logging problems due to lack of sufficient drainage.

Third, future advance of technology can be incorporated in those schemes to be implemented in a later stage. In particular, those irrigation schemes which do not appear viable at present may be reformulated into viable ones. Thus the overall efficiency of GAP investments will be further enhanced.

According to the recommended framework, the Region's economy will grow at 6.8% per annum, with the agriculture and industry sectors growing respectively at 4.0% and 9.1%. The projected value-added of these two sectors is given in Tables 4.3 and 4.4, respectively. The average annual growth of population will be 3.0%. The per capita GRP will grow at 3.7% per annum to attain TL 1,784 thousand by 2005. This is the average growth rate over the period. Initially, up to mid 1990's, the growth will be around 5.5%, increasing to around 12% by 2005.

4.2 Spatial Development Framework

4.2.1 Land capability

(1) Land classification

The GAP region is composed mainly of the Lower Fırat and the Dicle river basins, and the upper Mesopotamian plains. The plains cover 20,000 km^2 and are encircled by mountainous terrain on the east, north and west.

Of the total land area of 72,956 km^2, the cultivated land occupies 30,812 km^2 or 42.2% of the total, consisting of 26,287 km^2 or 36.0% dry farming land, 1,207 km^2 or 1.7% irrigated and the rest for horticulture and others. Pastures occupy 33.3% and 0.008% is used as meadows. Forest and bush cover 20.5%, and the settlements, marshes, river beds, rocks and water surfaces make up the balance. Present land use pattern has been analyzed based on 1978 data, as no recent data are available, and is schematically shown in Figure 4.1.

The land in the Region is classified into eight soil classes. Classes I, II and III are considered most suitable for cultivation. According to MAFRA (TOPRAKSU) classification, class IV is also suitable for cultivation with some improvement measures. Of the total GAP land, 42.8% is suitable for cultivation within these four classes (Appendix D-1). Over 90% of the land in classes I, II and III and some 65% of the land in classes IV have already been cultivated. About 445,000 ha in these classes are presently used as meadows, pastures, settlements or under bush covers.

Surface stone coverage is a major problem. In classes II, III and IV of soil, 37.1% of land is covered with stones. The problem is especially severe in Mardin, Şanlıurfa and Diyarbakır where approximately half of the cultivable land is covered with stones (Figure 4.2).

The land of slope below 12% gradient is considered suitable for cultivation. In the Region, 94% of the total land is in this category. The areas with slopes greater than 6% are located at the northern fringes of the Region and cover most of the Siirt province (Figure 4.3, Appendix D-1).

Distribution of problem areas associated with land is summarized in Appendix D-1. Salinity and alkalinity problems are minor, except the salinity problem in a small area in Adiyaman and in the Akçakale irrigation area. Drainage problems are also minimal with 4,408 ha of land of classes II, III and IV soil having insufficient drainage.

Wind erosion is observed in limited areas. Water erosion is a major problem. Moderate and strong water erosion is observed on classes II, III and IV soil in all the provinces. In these soil groups, 61-79 % of the land has moderate and 4-18 % has strong water erosion (Figure 4.4).

(2) Threshold analysis

The criteria selected for land capability evaluation are slope, soil capability, erosion, irrigation projects and stone coverage. The following thresholds have been identified in the study.

Slope

An overall threshold of slope is considered to be 12% gradient. An intermediate threshold is identified as 6%. The land of slope 6 - 12% will be used for industrial and certain agricultural purposes.

Soil capability

On the basis of soil capability classification by TOPRAKSU, classes I, II and III soil is considered to constitute a threshold and reserved for agriculture.

Erosion

The TOPRAKSU classification is used, and severe and very severe levels of erosion are taken as erosion thresholds.

Irrigation projects

Areas under planned irrigation schemes are considered in principle as sites to be reserved for cultivation. However these areas have also been examined by other criteria for identification of erosion and other problems.

Stone coverage

Areas of classes II and III soil under stone coverage may be considered as future agricultural land.

(3) Land use plan

Based on the examination of present land use and the threshold analysis for land capability, a set of broad criteria have been established to guide the future land use decisions. Applying these criteria, a land use planning map has been prepared to show in an indicative way the land use pattern in the GAP region in the long term (Figure 4.5).

The ownership of forest areas and communal pastures have major implications for the analysis presented below. These could not be incorporated due to lack of data. In the following, controlled grazing is proposed for communal pastures while afforestation is recommended for publicly owned land.

The following summarize the general criteria for future land use incorporated in the indicative land use planning map.

Agricultural land

Plain areas of classes I, II and III soil should be reserved as the prime agricultural land. These areas

correspond largely to the DSI planned irrigation areas. Other areas of this category exist in small scale. They are also for agriculture under irrigation either extending the planned irrigation network or by individual wells.

Present cultivation areas of lower class soil should be for less intensive agricultural uses. Existing pastures on lower class soil should be preserved in principle but improved if erosion problems exist.

Certain parts of good quality soil are covered with stones, especially in Mardin, Şanlıurfa and Diyarbakır. Stone coverage by itself does not preclude the use of land for agricultural purposes. It is reported that out of total stone covered area (820,000 to 970,000 ha depending on sources) 367,000 ha may be improved economically (Şanlıurfa Provincial Directorate for Rural Services). A further study is necessary to establish feasibility of stone removing projects, carefully analyzing soil depth and other soil characteristics and alternative land uses other than cultivation.

Forestation/plantations

Land covered under the slope and erosion thresholds should be used for either forestation or plantations, depending on the present land use and soil quality. If such land is at present planted with special crops such as pistachios and grapes, or the soil is of the fourth class, such land is proposed for plantations with mandatory erosion control measures. Otherwise, the land should be designated for forestation.

Present pastures on land of low quality soil with very severe erosion should be turned into forests. Plantations may be an alternative, if soil is fairly deep.

Land having the gradient over 12 % would be the areas for forest preservation if forests already exist or for afforestation.

The proposed forestation areas are encircling the Region. There are some patches of forests proposed in the interior, too. The existing land use of these areas is primarily pastures, followed by bush land. A considerably large pasture area is proposed to be converted to forests, as such land use is not efficient due to soil quality and existence of very severe erosion.

Forestation around dam reservoirs is a must as described below. However, on the land use planning map, only the areas of very severe erosion are shown for forestation.

(4) Land use measures

More important issues in future land use decisions, clarified through the preparation of the indicative land use planning map, are:

1) enhancement of land productivity for agriculture,
2) tree planting and erosion control, and
3) land take for urbanization and infrastructure.

By comparing the land use planning map with the present land use map, main directions of future land use related to these issues may be clarified as follows.

Chief means for enhancing the land productivity for agriculture are the management of irrigated land, destoning, and erosion control. In the case of irrigated land, drainage and land levelling will be of critical importance.

For forestation and erosion control, substantial areas of both bush land and pastures will be turned into forests. In mountainous areas, existing pastures will be used for this purpose. Other areas of severe erosion will also be for afforestation.

Soil conservation measures should be introduced to the cultivation areas having erosion problems such as terracing, buffer strip cropping and mulching. By the buffer strip cropping, alternate strips are planted with annual crops and grasses along contours. Even in absence of annual crops, permanent grass strips will trap the eroded materials and reduce the surface erosion. By mulching, chopped stubbles will be spread on land to protect soil from splash erosion and wind erosion.

Main infrastructure-related land issues are the realignment of highways due to inundation by reservoirs, urban land take and land for other new kinds of infrastructure such as organized industrial sites, international class airports, container depots and grain storage facilities. These issues should be addressed on individual project basis within a broad framework of land use proposed by the Master Plan.

The Master Plan envisions the concentration of development activities first in the areas better served with existing infrastructure. In particular, more industries and population will concentrate along the kinked development axis connecting Gaziantep, Şanlıurfa and Diyarbakır, and subsequently expand into other corridors. Such spatial development would provide opportunities to guide urban development in such a way that conflict with agriculture on land use will be minimized as compared with the case where development efforts are more dispersed.

Two key measures will be prerequisites to promote such spatial development.

1) Detailed land use planning should be conducted for major urban areas within the corridor in the consistent framework of regional spatial development.

2) Policy measures should be introduced to enforce environmental impact assessment and social/economic cost-benefit analysis for all the major investments on prime agricultural lands.

4.2.2 Transportation network

(1) Present transportation - overview

Road network

The road network of the GAP region contains nine percent of Turkey's roads, including 138 m/km^2 of asphalt/gravel roads and 165 m/km^2 of unpaved and/or unstabilized roads, respectively higher than Turkey's average.

Focal points in the Region's road traffic are Gaziantep, Şanlıurfa, Mardin - Kızıltepe, Diyarbakır - Batman and Silopi.

The Gaziantep Silopi corridor carries most of the Middle - Eastern trade and transit traffic. Daily traffic along this corridor are estimated at 4,000 vehicles, the majority being trucks (Figures 4.6 and 4.7).

The second heaviest demand is along the Şanlıurfa - Diyarbakır - Silvan highway with a daily traffic of 1,500 vehicles. This route carries mainly domestic traffic.

Other major roads linking district centers are mostly all weather asphaltic roads with a local gravel base. District roads connecting Gaziantep - Kilis, Gaziantep - Yavuzeli - Araban - Besni, Diyarbakır - Bismil, Gercus - Midyat - Ömerli, Mardin - Cizre, Şanlıurfa - Akçakale, and Viranşehir - Ceylanpınar are second class asphalt covered gravel roads. The remaining district centers are interconnected by a network of third class roads.

Rural roads

By the efforts initiated by the YSE (Yol Su Elektrik) program, 98% of villages and hamlets in the Region have been linked to the State and provincial road system. The existing roads serve 2.1 million people in the rural areas by reaching 3,435 villages and 4,879 hamlets. Of this, 135,000 citizens are served on unprepared tracks. Less than 5% of the total population may be considered devoid of good road links.

Railway transportation

There are two TCDD railway mainlines within the GAP region. One passes in an east-west direction along the southern border of the Region, linking Turkey to eastern Syria and northwestern Iraq. The other line links Malatya to Diyarbakır and Kurtalan. The total length is 805 km.

The TCDD railway shares of passenger and freight movement are 4 % and 10 % of the total national demands, respectively. The railway data for the GAP region suggests that its role is less than found for the Country.

Of the major GAP cities, only Gaziantep, Diyarbakır and Batman have direct access to railway facilities. Major rail users are the petro-chemical and refining center at Batman, and steel and coal distribution agencies.

Aviation

Within and contiguous to the GAP region, there are six airports available to commercial civilian services: viz. Gaziantep, Diyarbakır, Şanlıurfa, Elazığ, Malatya and Adana. All the airports, except ones at Şanlıurfa and Elazığ, have adequacy for use of DC-9 and B-727 aircrafts. Adana has capacity for B-727 and A-320. All the airports, except Adana, have only one commercial flight per day at most. No intra-regional services exist.

Pipelines

Small volume pipelines have been installed between various well heads and local collection points. Medium volume pipelines are radiating from the Batman refinery for collection of crude oil. Two pipelines exist for international throughout of petroleum from locations east and south of Turkey.

Ports

Two ports are available at Mersin and Iskenderun just outside the Region for inter-regional and international shipping. These ports at present function well without severe time delays or unduly high costs for handling. However, cargo tonnage handled at these ports have not been increasing significantly in recent years, reducing the relative importance in the total national shipping.

(2) Trends and prospects of the Region's transport

Overall prospects

Railways at present contribute less than one percent to the passenger and cargo haulage within the GAP region. For commodity haulage into and out of the Region, TCDD handles less than three percent, based on grains, cement, fertilizer, steel products, cotton, petroleum, coal and minerals. With the existing organization and physical conditions, the future penetration of the railway into greater haulage is not apparent.

Aviation may handle 5 % of the selected passenger markets involving major cities. In intra-area cargo, it will not reach one percent of the tonnage offered.

Various equipment and organization methods of haulage by road transport will continue to be the dominant means of commerce. Roads will account for more than 95 % of passenger mobility and 98 % of non-liquid cargo movement.

Trends in road traffic

Road transportation in the GAP region can be analyzed to some extent based on the past traffic survey data. TCK regularly publishes the results of its traffic and transportation surveys, which include the number of vehicles of different kinds on main road sections in the Nation. Older publications contain also the data on freight transport by goods category and passenger movements. TCK is carrying out origin-destination (O-D) surveys by selecting several points every year, but unfortunately the results of recent years are still in the form of raw data, and no O-D table is available.

The number of vehicles by kind on main sections of the road network in the GAP region is shown in Figures 4.6 and 4.7 for three recent years - 1975, 79 and 85. For a few sections, the points of surveys are slightly different by year, making the comparison difficult. It is observed that the traffic on E-24 highway increased significantly, especially for trucks. This is primarily due to international freight movements caused in part by the recent hostilities in the neighbouring countries.

No other sections of the main roads show significant increase in freight traffic. Decrease in trucks on the Diyarbakır-Ergani road reflects the reduction in copper production in Ergani. Decrease in trucks on the Diyarbakır - Şanlıurfa road may reflect more the diversion of traffic to E-24 than the decrease in the copper-related traffic.

In all the sections shown in Figures 4.6 and 4.7 except these two roads, agricultural products and manufactured goods constitute the main portion of goods carried in terms of tonnage. Shares of manufactured goods are higher on sections west of the Diyarbakır - Şanlıurfa road, while agricultural products have larger shares in the east for both 1975 and 1979. Livestock transport is concentrated mostly on the Siirt - Diyarbakır - Adıyaman route and the Diyarbakır - Ergani road, and animal products on the eastern portion of E-24 highway leading to the Iraqi border. Bus traffic around Diyarbakır increased significantly, while automobile movements decreased on such sections.

Detailed data and analysis on the past and present transportation in the GAP region are contained in Appendix D-2.

Passenger traffic growth

Future passenger traffic on road will grow in line with the population increase and economic growth. The latter is reflected in traffic generation per capita. The per capita GRP is expected to grow at 3.7% per annum. Assuming the elasticity of 0.8 with respect to per capita GRP, the traffic generation per capita may grow at 2.96 % per annum. Combining the effects of population increase at 3.0 % per annum, the passenger traffic on road may grow on an average at the annual rate of 6.0 %.

(3) Future traffic pattern analysis

Objective and method

Future traffic in the GAP region will not necessarily follow the trends and prospects outlined above. A large amount of agricultural products and processed goods to be generated by GAP implementation may change the traffic pattern in the Region.

In order to analyze main directions of GAP related commodity flow in the future, a simple network model has been used. Demand and supply for main goods involved in GAP are specified by province and for major export directions. Main locations of processing facilities are specified with possible maximum capacity. Such traffic pattern that will minimize the total ton - kilometers has been found out by linear programming. The objective of this analysis is to clarify general traffic pattern that will likely prevail in the future rather than to project future traffic on particular road or railway section.

Traffic pattern by commodity

Main GAP related goods analyzed are cereals and their products, live animals and meat, cotton and its products, oil seed and edible oils, and vegetables and processed vegetables. The total regional production and regional/export demand for these commodities, used as inputs to the model, are summarized in Table 4.5. The results of optimization shown in Figure 4.8 reveal the following.

For cereals and their products, major outflow of products from Mardin to Siirt and from Şanlıurfa to the west are observed. Exports of cereals are represented by feed grains to the neighbouring countries and wheat to the Eastern Anatolia.

Flow of meat is generally from the east to west with Diyarbakır and Siirt as the main processing centers. Small amount of meat export from Siirt and export of animals from Mardin are observed.

For cotton and its products and raw/processed vegetables, major flow is along the main corridors: Diyarbakır - Şanlıurfa, Şanlıurfa - Gaziantep, and Mardin - Şanlıurfa. Oil seed flows from Mardin to Diyarbakır and the southeast for export. Major flow of both oil seed and edible oil is observed from Şanlıurfa to the west.

Traffic loads by GAP

The flow of GAP related commodities may be converted to traffic volume. The total annual tonnage transported on each road section is converted to the average daily traffic (ADT) by truck, assuming the average payload capacity of large trucks being 12 tons per vehicle. The ADT in turn is converted to passenger car units (PCU's) by applying the automobile equivalent of a truck. The results are given in Table 4.6.

Daily traffic shown in Table 4.6 should not be taken as projection of future traffics associated with GAP implementation. However, it indicates the relative importance of different network links in handling the GAP related traffic, which is not marginal in expected total traffic. The Gaziantep-Şanlıurfa link will be most important, followed closely by the Şanlıurfa-Hilvan and the Hilvan-Diyarbakır links. The Kızıltepe-Mardin link follows, and the Nusaybin-Cizre and the Cizre-Silopi links are more important than all the rest.

(4) Strategy for transport development

Through the analysis of existing conditions, trends and prospects, and the future traffic pattern analysis, the overall strategy for the transport system development in the Region has been clarified as follows.

1) To further improve the road network as the prime mode of transportation in the Region for both inter- and intra-regional traffics first by improving the maintenance and upgrading trunk roads, second by correcting network deficiencies and third by improving access to selected rural centers;

2) To establish and consolidate export corridors for GAP related commodities by selectively improving trunk roads and the railway system, upgrading the outer ports, and providing associated facilities;

3) To improve the air transport by upgrading selected airports, establishing local aviation networks which may be extended to neighbouring countries, and increasing inter-regional services aiming primarily at domestic and foreign tourism and industrial development; and

4) To meet specific local transport needs such as rural access roads for all the villages, extension of small pipelines, storage facilities and truck/bus terminals in some urban centers.

4.2.3 Settlement patterns and corridors

(1) Changes in settlement pattern

Of the 3,610 settlements, small ones dominate in the Region. Of the total regional population, 44 % live in settlements with populations smaller than 2,000, and 31 % in settlements having populations greater than 50,001.

Most significant population changes during the past 20 years have occurred in settlements with populations smaller than 2,000 and greater than 50,001. The total population of places in greater than 50,001 category increased its share in the regional population from 14 % in 1965 to 31 % in 1985. During the same period, the share of settlements smaller than 2,000 category decreased from 64 % to 44 %. The population of the eight major centers (Nizip, Siirt - Merkez, Kilis, Adıyaman - Merkez, Batman, Şanlıurfa - Merkez, Diyarbakır - Merkez and Gaziantep - Merkez) increased from 469,696 in 1965 to 1,325,051 in 1985, an increase of 5.3 % per annum. The population of the remainder of the Region had grown only by 2.2 % per annum during the same period.

With the gradual increase of irrigated agriculture under the GAP and its secondary effects, the population distribution will shift in favor of Batman - Siirt, Kızıltepe - Mardin and Viranşehir - Şanlıurfa, due to their favourable locations relative to the irrigated land. The large centers of Diyarbakır, Gaziantep and Şanlıurfa will maintain their regional and sub-regional dominance due to their existing advantages and strategic locations.

Patterns of rural settlements will also change from the present dispersed pattern with very small settlements dominating in most rural areas except along main roads. This is a reflection of changing rural activities. In the future, rural activities will be more diversified, including new kind of mixed farming with poultry and zero-grazing stock raising, greenhouses and horticulture. As a result, land use for agriculture will become much more intensive, especially near large urban centers. More clustered settlement patterns will be observed, with large clusters around major urban centers and smaller ones around lower tier towns where a set of rural oriented service activities and marketing opportunities are found.

The clustered settlement patterns would allow more efficient provision of various rural infrastructure. Distributive capacity of electricity and telecommunication capacity can be increased more efficiently, and the provision of adequate water can be planned taking the clustered settlements within the same supply system. These in fact can be effective measures to guide the changes in rural settlement patterns. The priority in rural infrastructure should be given to these as well as the extension of rural roads and the provision of drainage associated with new irrigation development.

(2) Corridor development

Evaluation of corridors

Important corridors in the GAP region have been analyzed, based on population potential, density, transportation network, land use capabilty and manufacturing activities. As a result, 23 such corridors have been determined (Figure 4.9). Within the GAP region, areas outside the corridors are predominantly small village settlements with average population of about 500. Most of them have road access to the corridors, except some of the isolated villages in Siirt province.

Evaluation of these corridors has clarified that two major corridors of regional importance are Corridor A extending from Gaziantep to Mardin, and Corridor B along the kinked development axis. In particular, Corridor B contains the highest percentage of regional population with a fewer number of settlement points (details in Appendix D-3).

Phasing of corridor development

The 23 corridors have been ranked and their development has been phased. Phasing strategy consists of the following:

1) To establish an economically viable corridor in the short run, capitalizing on existing economic activities and locational advantages,

2) To extend Corridor B to establish a star shape corridors centering on Şanlıurfa, and

3) To interconnect the remaining corridors with the main ones.

The results are shown in Figure 4.9. In Phase I, major regional public works, urban and rural infrastructure along Corridor B will be planned and their implementation started. Phase II involves the integration of the Batman - Siirt, Adıyaman - Şanlıurfa,and Şanlıurfa - Mardin - Silopi axes with Corridor B. During this phase, main corridors leading into and out of the Region, Islahiye - Gaziantep and Elazığ - Bingöl - Diyarbakır, are also scheduled for development. Phase III will complete the matrix of corridor development.

4.2.4 Urban growth

(1) Growth characteristics

Envisioned regional development involves significant in-migration and increase in urban population. Careful planning for urban development will be all the more important to create a more pleasant urban environment by providing such levels of infrastructure and services as to attract potential investors and in-migrants.

In the GAP region, relatively fast growing urban centers are concentrated within the main transportation corridors (Figure 4.10). Not all of this growth can be attributable to production activities. Many of smaller centers are predominantly service sector oriented, and some others have grown primarily due to their administrative functions.

Urban centers which need immediate reviewing and updating of their development plans have been identified. They include Hilvan, Birecik, Siverek and Suruç in the provinces of Şanlıurfa as well as its Merkez, Nizip and Merkez - Gaziantep, and Merkez-Diyarbakır.

(2) Urban land take

Urban centers in the GAP region are densely populated. The average density for the 20 urban centers closely studied this time has been estimated to be 213 persons/ha. Of these centers Şanlıurfa - Birecik and Merkez-Diyarbakır have the highest densities while Akçakale-Şanlıurfa and Siverek-Şanlıurfa have the lowest densities. Geographical caharacteristic of these centers is the major determinant of their respective densities. Both Akçakale and Siverek are located on a flat plain allowing a horizontal expansion of those centers while Birecik and Diyarbakır are bounded by rivers, forcing them towards a more concentrated growth.

Estimates of urban land take, for the 36 centers which will be larger than 10,000 in the year 2005, based on a 213 persons/ha indicate that additional 17,000 ha of land will be required for urban purposes. Even if more dense population is allowed in the future, extra urban land requirements would be no smaller than 12,000 ha by 2005 (Appendix D-3).

Urban land take and density policies for urban settlements must be taken in the light of trading-off between urban activities and agricultural land uses. Urban expansion areas need to be carefully selected, especially when the urbanization is already infringing upon the first and second class agricultural lands. Based on the on-site observations of 20 urban centers, those in need of immediate policy decision concerning such an infringement are: Suruç, Viranşehir, Akçakale and Siverek in the Şanlıurfa province as well as Merkez-Şanlıurfa, Merkez-Gaziantep, Ergani, Silvan, Bismil and Merkez-Diyarbakır, Batman in Siirt, Kızıltepe in Mardin, and Merkez-Adıyaman.

(3) Urban infrastructure

Present conditions

Urban infrastructure development needs to be phased with the expected growth of the GAP region. An inventory conducted by SPO/PMU in 1987 determined that of the 89 municipal centers only two had sewerage and 17 had drinking water infrastructure completed. In the remaining municipalities, construction works were going on or projects prepared, or no infrastructure existed.

In the GAP region, 60 % of all the urban households have water connections provided by the municipal administrations. Amount of water that reaches households is estimated at 64 % of the total water supplied from sources. The system losses are large due to aged structures and insufficient maintenance.

For those households with water connections, the usable water of 33 municipalities surveyed in 1985 was estimated to be 109 liter per person per day. This is only 60 % of the water supply standard set by the Iller Bank.

Based on the information for the 33 municipalities provided by the İller Bank, sewerage construction has completed only in one municipality (Kızıltepe, 1982). No municipality has sewage treatment plant.

Constraints

The İller Bank provides technical and financial assistance for municipal water and sewerage facilities, and many projects were initiated in the past decade. The period from the project preparation to the initiation of construction varies as well as the construction period. There are some projects that are still uncompleted after 15 years from project initiation.

In the GAP provinces, most municipal policies for project planning and implementation are oriented towards newly expanding urban areas. Most central parts of the municipalities are

neglected and existing systems are over used. Financial capacity constrains the renovation of the entire urban infrastructure systems.

Needs

Needs for municipal water supply have been determined on the basis of project summaries provided by the İller Bank. The population figures have been adjusted to reflect the GAP targets in 2005. Water supply and demand estimates have been made using the information obtained from the İller Bank, SIS and municipal contacts.

In the year 2005, the total daily municipal water consumption is expected to reach 1.0 million m^3/day to serve the population of 5.4 million. This will require the investment of TL 169 billion.

Three different methods of sewage treatment have been analyzed: viz. aeration lagoon, activated sludge and trickling filter. If land availability is not a restrictive factor, the aeration lagoon offers the best solution as it is least costly. For larger municipalities, the adoption of activated sludge process should be a part of their long-term plans in view of environmental regulations to be enforced.

The GAP Master Plan calls for the immediate development of infrastructure required for major settlements along the kinked development axis. Seven municipalities with population greater than 10,000 (1985) are found along this axis. The second priority should be given to those municipalities having a high population growth index. Including other municipalities, the total investment requirements for the municipal infrastructure are TL 857 billion (Appendix D-3).

4.2.5 Spatial development potential

(1) Factors for potential evaluation

Spatial development of any region is prescribed to an extent by transportation network, settlement patterns and land capability. Availability of water is another factor that often affects the spatial development pattern. In the GAP region, however, this will be greatly modified as the result of implementing major infrastructure projects involving water storage and conveyance facilities.

The transportation network and settlement patterns predominantly affect the accessibility to urban services, an important factor in determining development potential. This is measured by the distance from selected urban centers directly or by means of main transport routes. In line with the basic strategy for spatial development and the results of corridor analysis, the highways connecting Gaziantep, Şanlıurfa and Diyarbakır are taken as arteries and the corridor band on both sides of the highways is considered of high potential. For other main roads connecting the selected centers, a narrower band is taken as high potential area. Also defined as high potential areas are within a certain radius of the sub - regional centers, secondary centers and other district centers. Areas of high potential decrease in this order.

Land capability is another dominant factor to determine development potential. Plain areas where the GAP irrigation schemes are planned have been found to coincide largely with areas of good quality soil having little erosion nor slope restrictions.

(2) Evaluation of spatial development potential.

By using as criteria the accessibility to urban services and land capability as defined, lands in the GAP region can be classified into four zones (Figure 4.11). Areas of high potential identified and implications to the development of each zone may be summarized as follows.

Zone 1: (High accessibility to urban services, high land capability)

Three areas may be identified in this zone: (a) Diyarbakır-Batman area, (b) Greater Şanlıurfa area and (c) Cizre-Silopi area. Highest economic performance can be expected, if the provision of water is ensured. Irrigated agriculture in these areas is likely to be very intensive and commercialized. These areas are also prime candidates for location of agro-industries. Conflicts in land use between urbanization and agriculture need to be carefully dealt with.

Zone 2: (High accessibility to urban services, low land capability)

Two areas may be identified in this zone: (d) Gaziantep area and (e) Siirt area. Due to low land capability, the emphasis should be on industrialization: livestock industry for Siirt and a range of industries for Gaziantep. The development of these areas should be oriented to less intensive utilization of land. Water supply for industries and livestock as well as for domestic use will be a prerequisite.

Zone 3: (Low accessibility to urban services, high land capability)

This zone is the hinterland of Zone 1. Enhancing land productivity will be most essential for these areas relatively remote from major urban centers. With this respect, the establishment of marketing channels and provision of agricultural inputs and extension services will be as important as the improvement of rural roads and other infrastructure.

Zone 4: (Low accessibility to urban services, low land capability)

These areas encompass those which are outside of Zones 1 to 3. Low priority is to be accorded to the development, unless other conditions are found to be exceptional such as endowment of mineral resources or existence of potential tourism sites.

In addition to the areas identified above, two areas exhibit the mixed characteristics of Zones 1 and 2: viz. (f) Adıyaman area and (g) Mardin - Kızıltepe area. In line with the basic strategy for spatial development, the development potential of Zone 1 areas (a) and (b), and Zone 2 area (d) will be utilized to consolidate the corridor. The development of Zone 2 area (e) and area (f) will expand the corridor. Additional development areas are provided by Zone 1 area (c), and area (g). The development of areas in Zone 3 will be induced, if supporting services are concomitantly provided.

(3) High potential areas

By capitalizing on the areas of higher potentials identified above, six broad development areas may be defined (Figure 4.11):

1) Diyarbakır - Batman Development Area,
2) Greater Şanlıurfa Development Area,
3) Gaziantep Gateway Development Area,
4) Siirt Development Area,
5) Adıyaman Development Area, and
6) Mardin Frontier Development Area.

Table 4.1: Projections of GAP Socio-Economy under Alternatives A,B and C

	1985	2005 Alternative Scenario Projections		
		Trend Projection	A: Max. irrigation	B: Max. power	C: Slower development
GRP TL 10^9	3,709	9,329 (4.7)	16,503 (7.7)	15,158 (7.3)	13,929 (6.8)
Agriculture	1,467	2,499 (2.7)	3,810 (4.9)	3,186 (4.0)	3,186 (4.0)
Industry	582	1,867 (6.0)	3,922 (10.0)	3,790 (9.8)	3,307 (9.1)
Construction	276	680 (4.6)	987 (6.6)	956 (6.4)	864 (5.9)
Services	1,384	4,283 (5.8)	7,783 (9.0)	7,225 (8.6)	6,572 (8.1)
Population 10^3	4,304	7,575 (2.9)	9,284 (3.9)	8,228 (3.3)	7,809 (3.0)
Urban	2,148	4,859 (4.2)	6,299 (5.5)	5,732 (5.0)	5,313 (4.6)
Rural	2,156	2,716 (1.2)	2,986 (1.6)	2,496 (0.7)	2,496 (0.7)
Employment 10^3	1,528	2,355 (2.2)	3,324 (4.0)	2,942 (3.3)	2,796 (3.1)
Per capita TL 10^3 GRP	862	1,232 (1.8)	1,778 (3.7)	1,842 (3.9)	1,784 (3.7)

* Average annual growth rates in % during 1985-2005 are in parentheses.

Table 4.2: Evaluation of Development Alternatives by Selected Economic Indices

Index	Alternative A Max. Irrigation	B Max. Power	C Slower Development
Incremental Capital-Output Ratio	3.71	3.27	3.24
GRP Growth % p.a.	7.7	7.3	6.8
Per Capita GRP in 2005 10^3 TL	1,778	1,842	1,784
Total Public Investment Requirements 10^9 TL	28,800	22,400	20,600
Foreign Currency Requirements* 10^6 US$	6,100	5,400	4,900

* Converted at the mid-1988 rate of 1,350 TL/US$

Table 4.3: Estimated Production and Value-Added in Agriculture

Crop/activity	1985 Production 10^3 tons	1985 Value-Added 10^9 TL	2005 Production 10^3 tons	2005 Value-Added 10^9 TL
Crop Cultivation				
Wheat	1,748.8	63.5	3,270.2	150.7
Barley	1,103.8	32.3	1,624.6	51.7
Drybeans	2.0	1.7	53.3	45.3
Lentils	464.7	231.0	704.6	308.7
Cotton	160.6	46.1	477.8	193.1
Sesame	18.3	19.6	70.3	89.0
Tomatoes	192.7	54.6	1,024.4	259.9
Potatoes	4.6	1.4	325.4	38.6
Other vegetables	1,092.1	118.6	1,181.5	225.9
Maize	8.3	0.6	150.0	12.2
Rice	6.4	5.0	96.4	51.3
Feed grains	6.4	1.6	265.4	21.9
Soy bean	—	0.1	158.0	32.0
Groundnut	—	0.0	85.1	59.4
Sunflower	5.5	1.4	91.1	23.5
Pistachios	33.0	121.7	124.7	
Grapes	698.6	290.4	786.6	874.9
Others	—	78.5	—	
Sub-total	—	1,068.1	—	2,438.1
Livestock				
Milk	394.8	—	1,253.7	—
Meat	75.7	—	162.0	—
Other products*		—		—
Sub-total		365.8		648.0
Fishery, Forestry and Others		33.2		100.0
Total Agricultural Value-Added		**1,467.1**		**3,186.1**

* Includes egg, wool, mohair, hair, raw leather, intestine, animal manure and leather of mort animals.

Source : Appendix A - 2

Table 4.4: Estimated Value-Added in Industry

(Unit: 10^9 TL)

Sector/subsector	1985	2005
Manufacturing		
Introduced/enhanced industries		
Raw edible oils and oil cakes		70.3
Refined edible oils		5.8
Wheat flour		163.5
Semolina/macaroni		29.9
Cotton ginning		94.7
Cotton products		147.1
Slaughtering and meat processing		125.9
Hides and skins		64.0
Fruits/vegetable processing		22.8
Cement		31.9
Phosphate fertilizer		35.9
Sub-total	0	792
All other industries	433.0	1,322
Total manufacturing	433.0	2,114
Mining	95.5	306
Utilities	53.1	887
Total Industrial Value-added	581.7	3,307

Sources: Appendix B-3 (2005), Table 2.4 (1985)

Table 4.5: Total Regional Production and Regional/Export Demand for Selected Agriculture Products and Processed Goods

Province with processing facilities in the Region[1]	Agricultural product and processed goods	Total production in the Region 1000 tons	Ratio of processed within the Region %	Input-output ratio	Final demand for raw goods 1000 tons											Final demand for processed goods 1000 tons										
					GAP Region[2]						Export[3]					GAP Region[2]						Export[3]				
					A	D	G	M	S	U	E	C	W	S	I	A	D	G	M	S	U	E	C	W	S	I
A,D,G	Cereals						1,804						594					1,785.6						100		
M,S,U	Flour, Feed	4,755	49.6	0.8	162	424	425	253	244	296	286	123	95	48	42	160.7	419.6	421.3	249.9	241.1	292.8	0	0	0	50	50
	Livestock						0						43					186						8		
S,M,D	Meat	285	85	0.8	0	0	0	0	0	0	0	0	0	22	21	17	43	43	26	26	31	0	0	1	3	4
	Cotton						0						0					53						269		
G,U	Cotton products	859	100	0.375	0	0	0	0	0	0	0	0	0	0	0	5	13	13	7	7	8	10	20	169	35	35
	Oil seed						172						275					28						147		
U,D	Edible oils	1,147	61.0	0.25	15	40	41	25	23	28	13	34	101	60	67	2.5	6.6	6.6	3.9	3.8	4.6	3.3	13.4	36.1	42.8	51.4
	Vegetable						1,995						0					0						957		
D,M	Processed vege.	2,952	32.4	1.00	180	469	471	279	269	327	0	0	0	0	0	0	0	0	0	0	0	0	0	0	557	400

Note: 1 A: Adıyaman, D: Diyarbakır, G: Gaziantep,M: Mardin, S: Siirt, U: Şanlıurfa

2 Demand in each province is proportional to total provincial population in 2005 (A: 9.0%, D: 23.5%, G: 23.6%, M: 14.0%, S: 13.5%, U: 16.4%)

3 E: Eastern part of Turkey, C: Central part of Turkey, W: Western part of Turkey, S: Syria, I: Iraq

Table 4.6: Traffic Loads on Selected Roads by Major Commodities Involved in GAP*

Road Section	Annual Tonnage Transported 10^3 tons											Passanger Car Units
	Cereals	Cereal Products	Livestock	Meat	Cotton	Cotton Products	Oil Seed	Edible Oils	Vegetables	Processed Vegetables	Total	
Adıyaman - Ş. Urfa/Diyarbakır			26	17							43	44
Diyarbakır - Ergani	123					20	34	13		200	390	401
Diyarbakır - Silvan	54		45	35	60	17		7	119		337	346
Gaziantep - Şanlıurfa	169	413	7	47		169	88	86	87	557	1,623	1,667
Şanlıurfa - Nusaybin		8	52	39	225	42		29		27	417	428
Şanlıurfa - Hilvan			13	39	254	50			405	530	1,291	1,326
Hilvan - Diyarbakır			39	56	254	50			405	530	1,334	1,371
Kızıltepe - Mardin	89	92	31	39	225	7	67	23		427	1,000	1,027
Mardin - Cinar							156	27			183	188
Nusaybin - Cizre	42	171	21			35	67	51		400	787	809
Cizre - Silopi	42	50	21	4		35	67	51		400	670	688

* Estimated by the Consultant

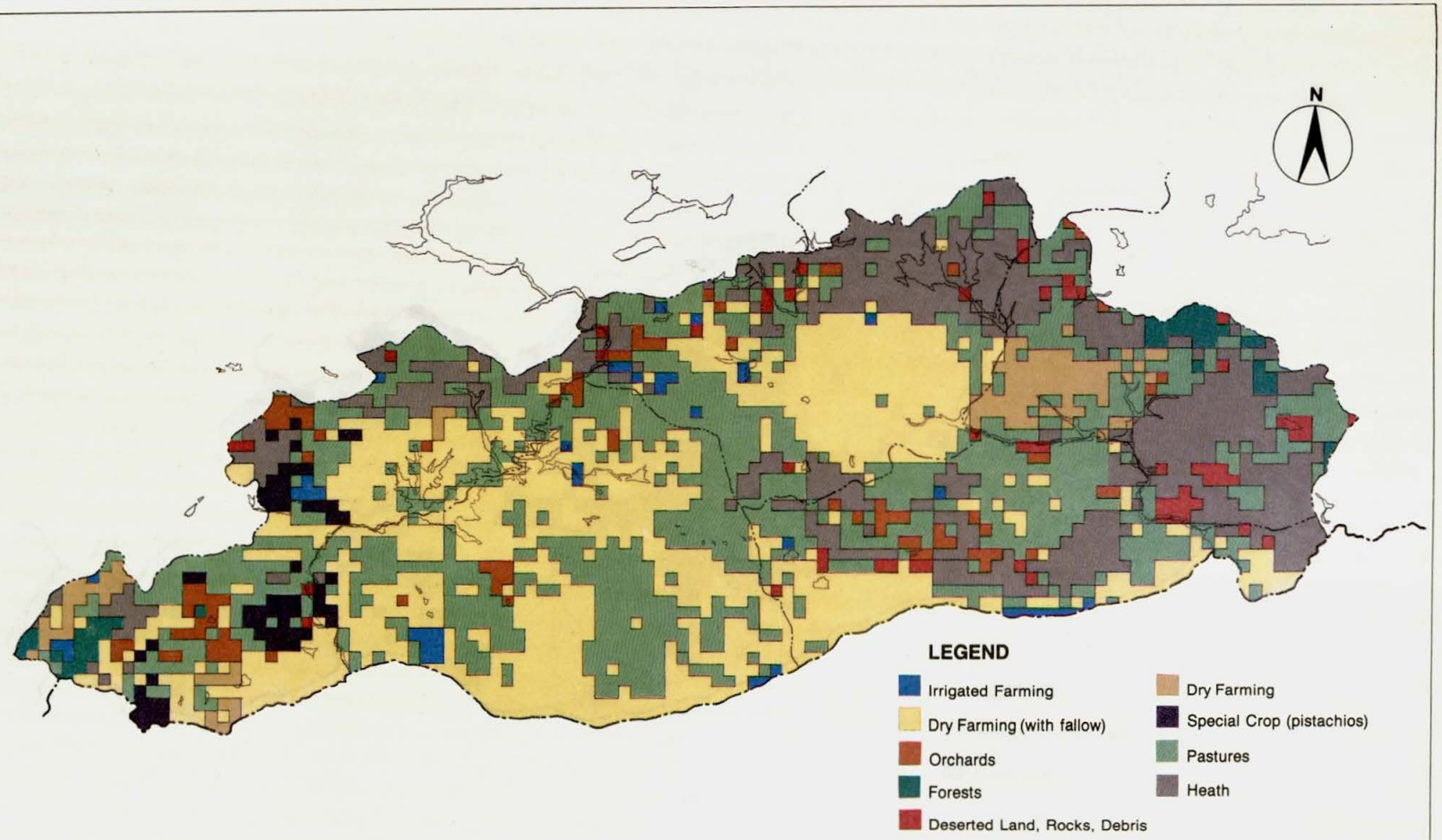

Figure 4.1: Existing Land Use Pattern in the GAP Region

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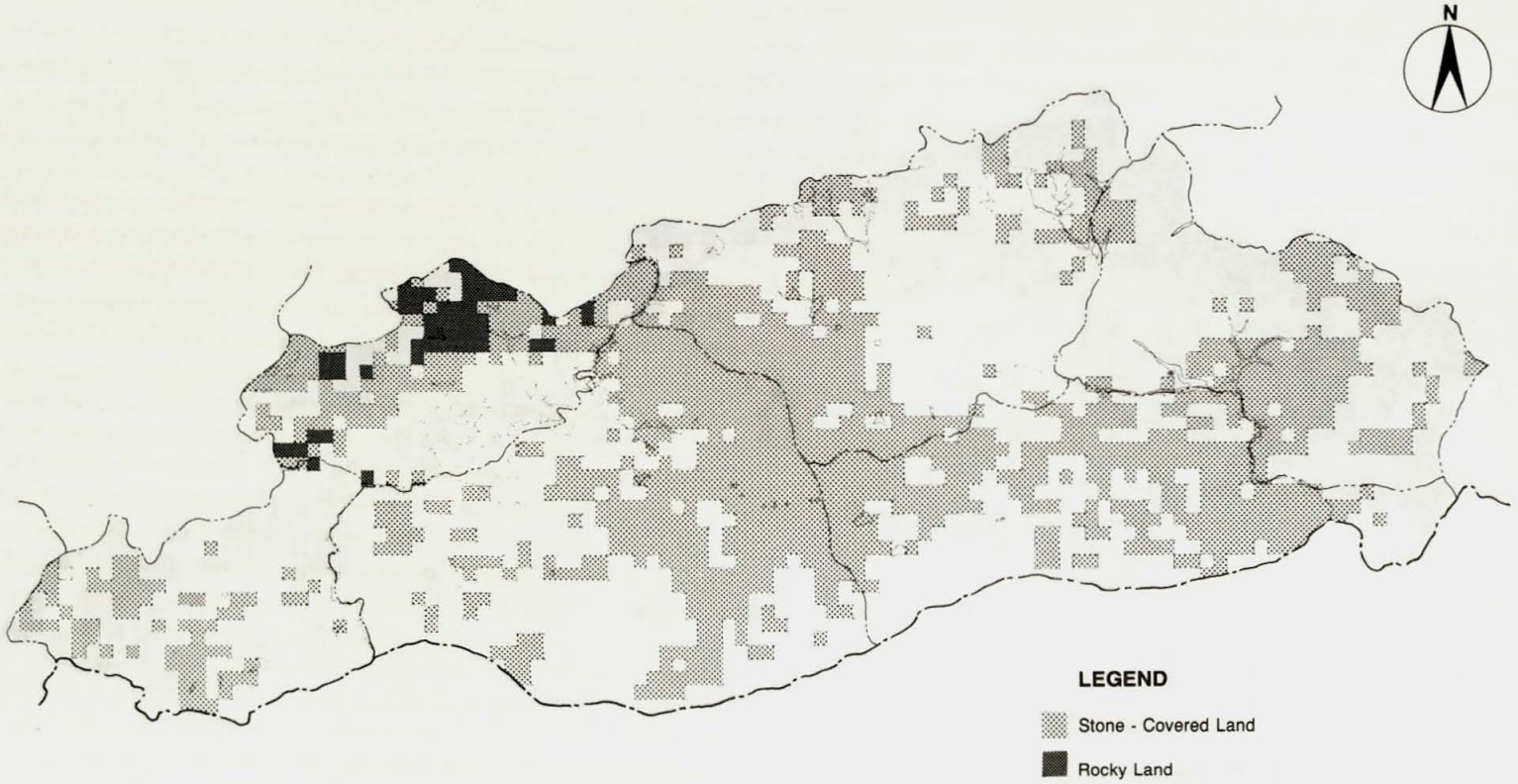

Figure 4.2: Distribution of Stone-Covered Land in the GAP Region

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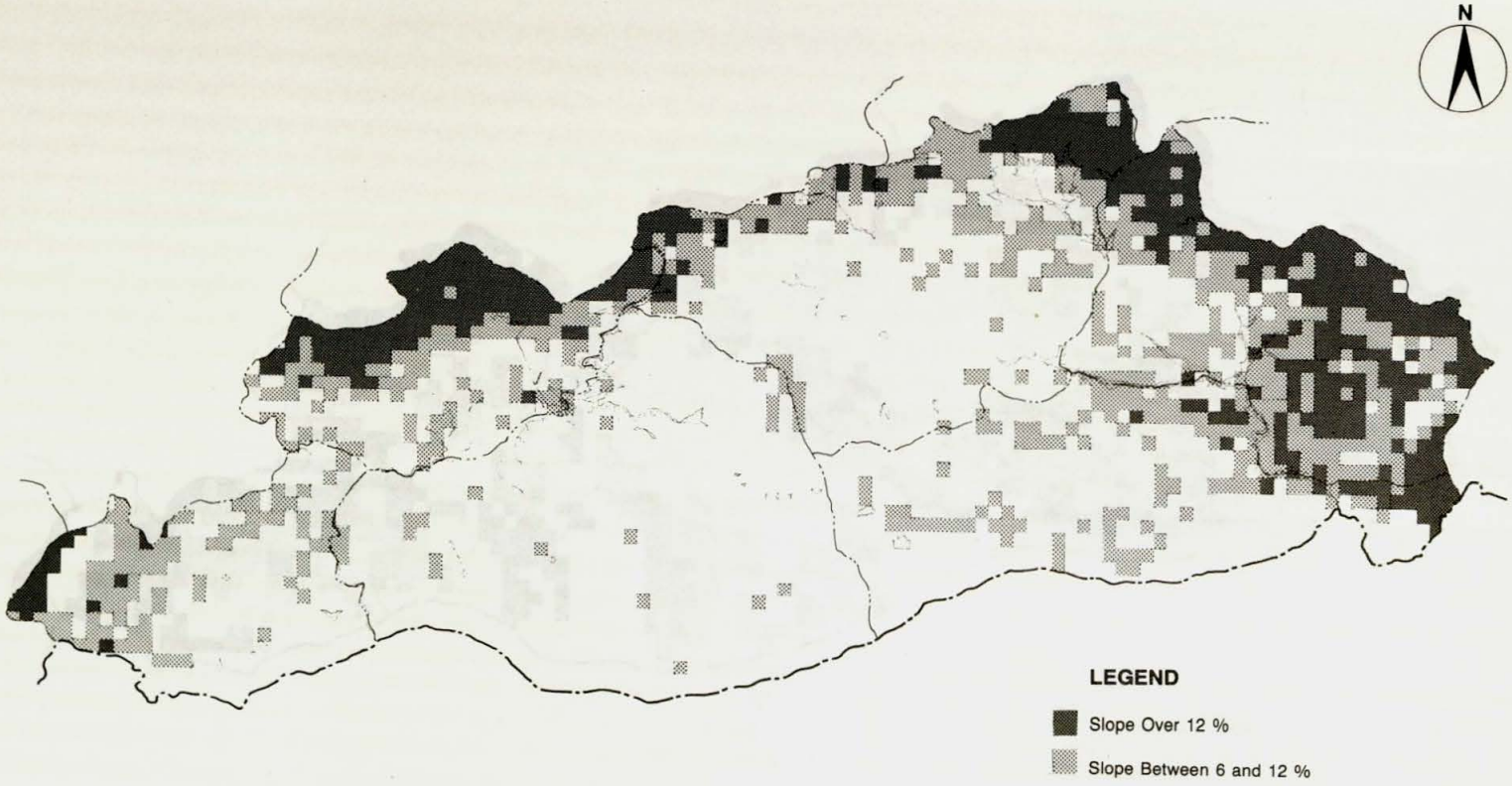

Figure 4.3: Slope Thresholds in the GAP Region

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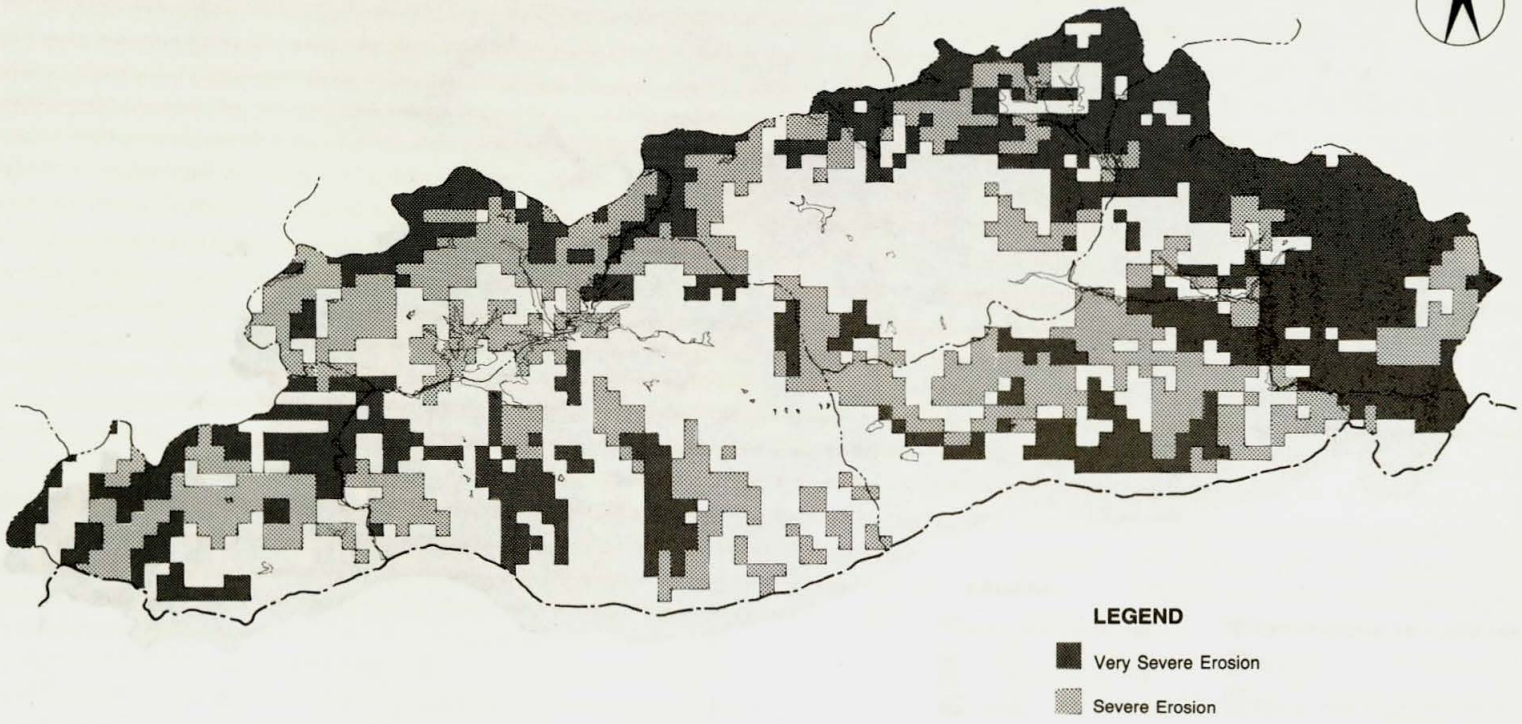

Figure 4.4: Erosion Thresholds in the GAP Region

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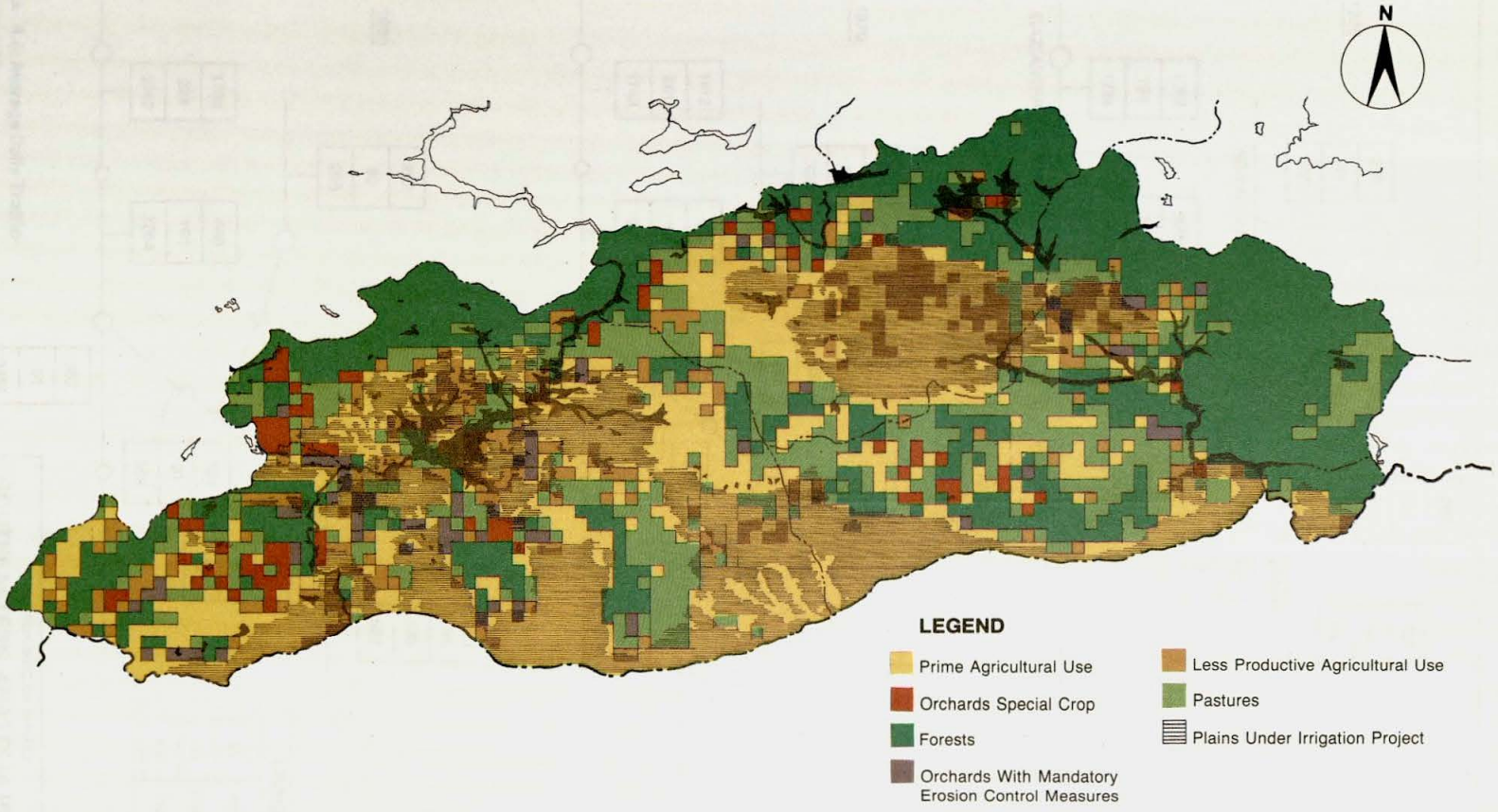

Figure 4.5: Land Use Planning Map for the GAP Region

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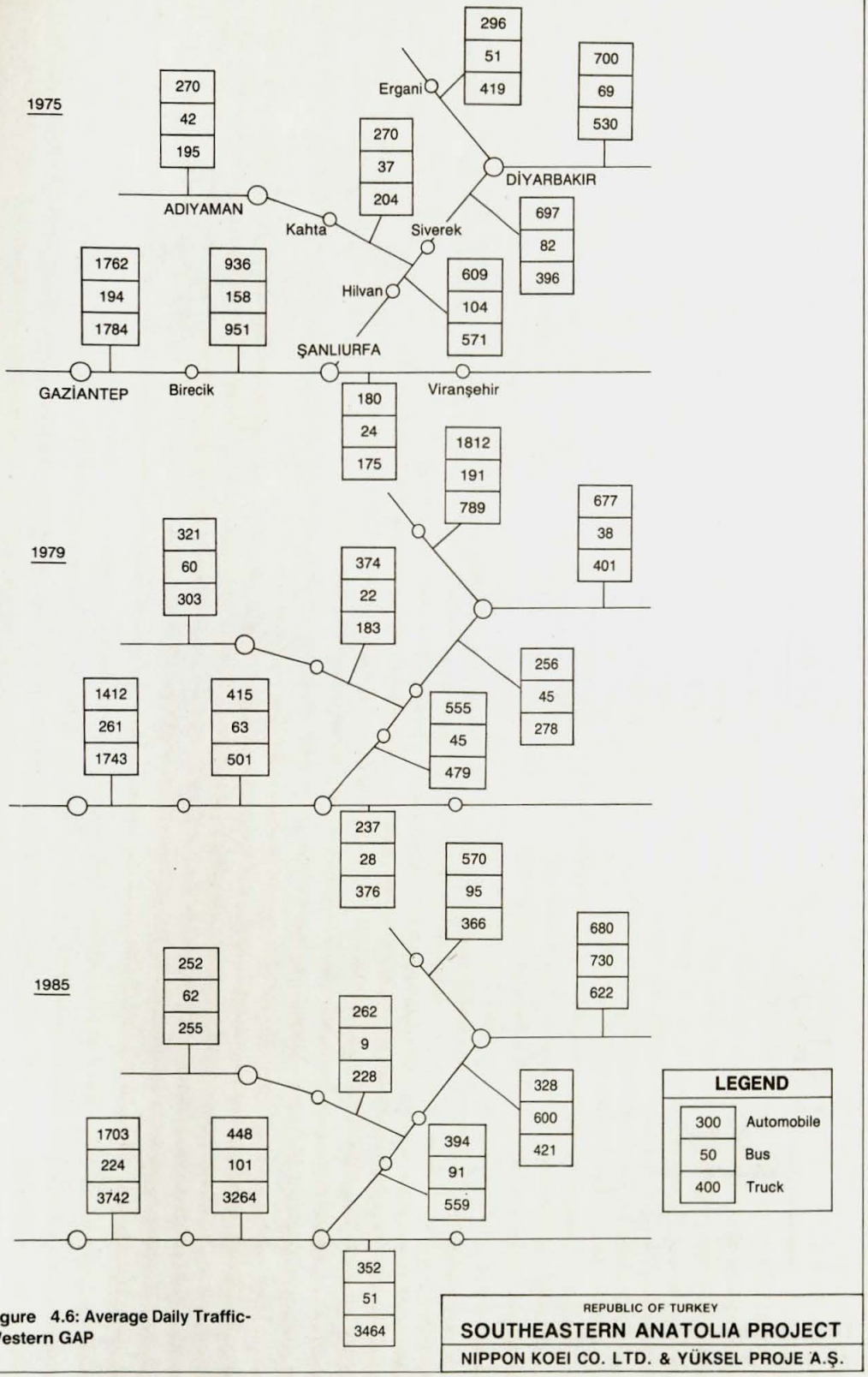

Figure 4.6: Average Daily Traffic-Western GAP

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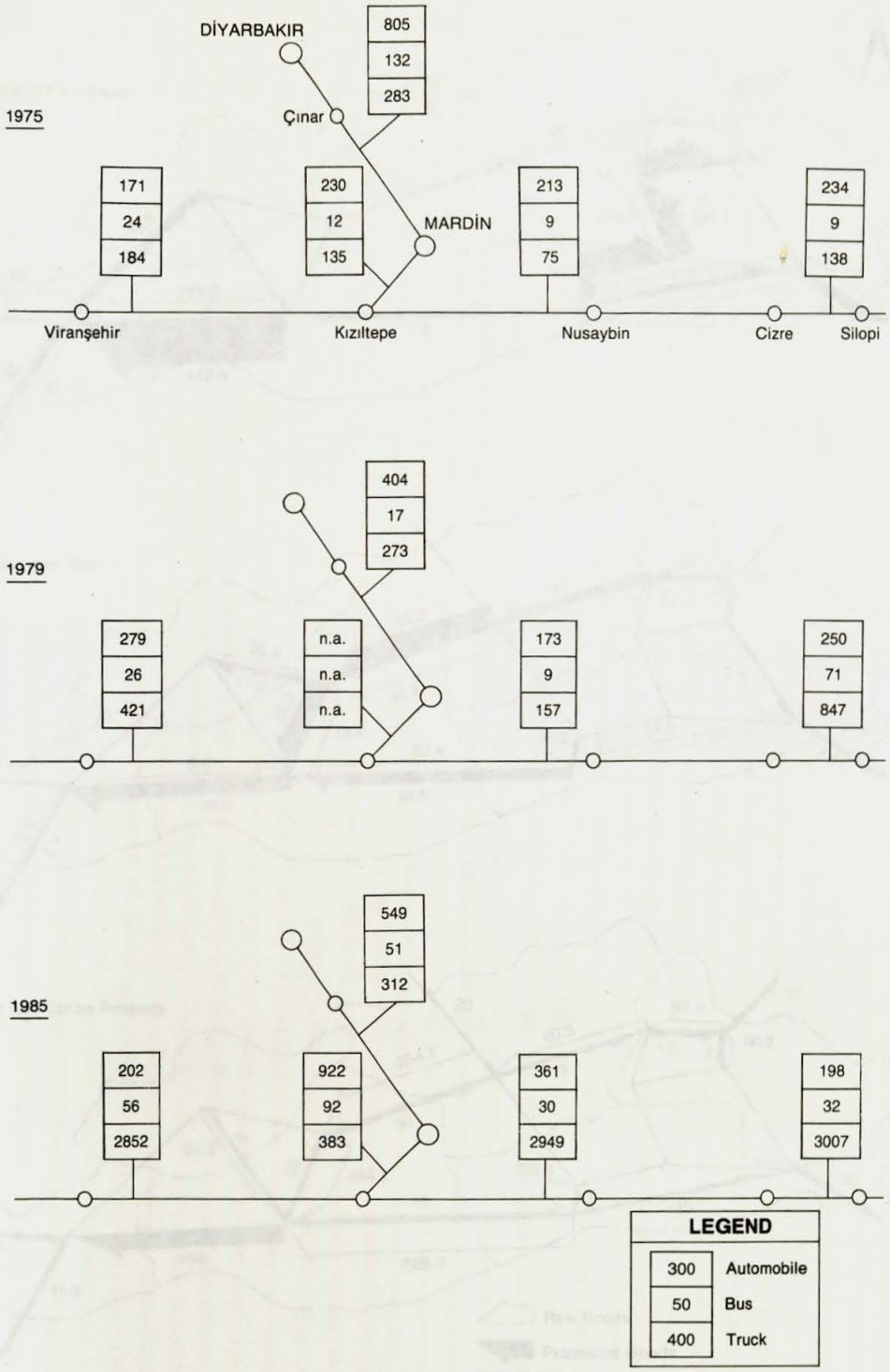

Figure 4.7: Average Daily Traffic-Eastern GAP

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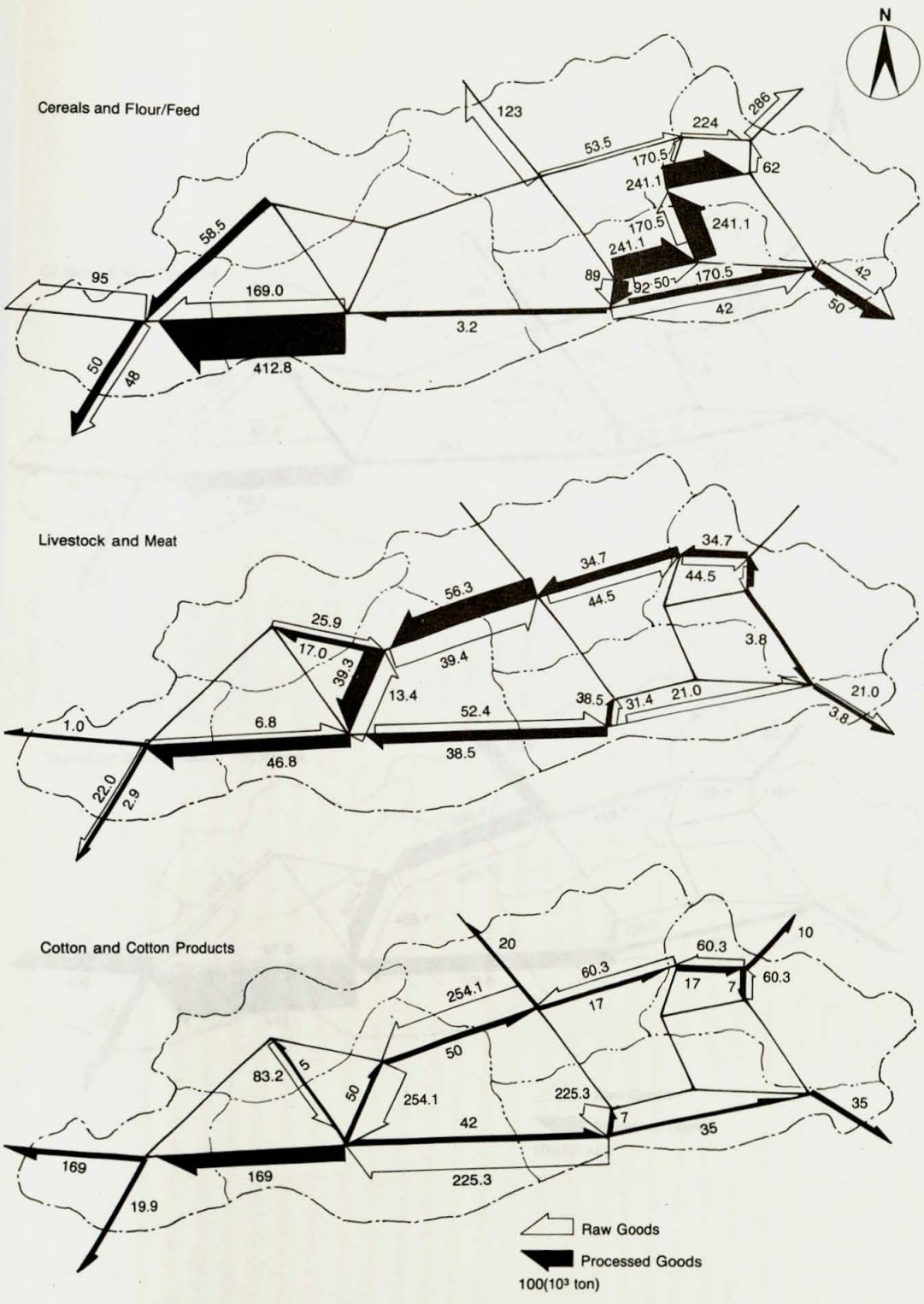

Figure 4.8: Traffic Flow Pattern by Commodity (1/2)

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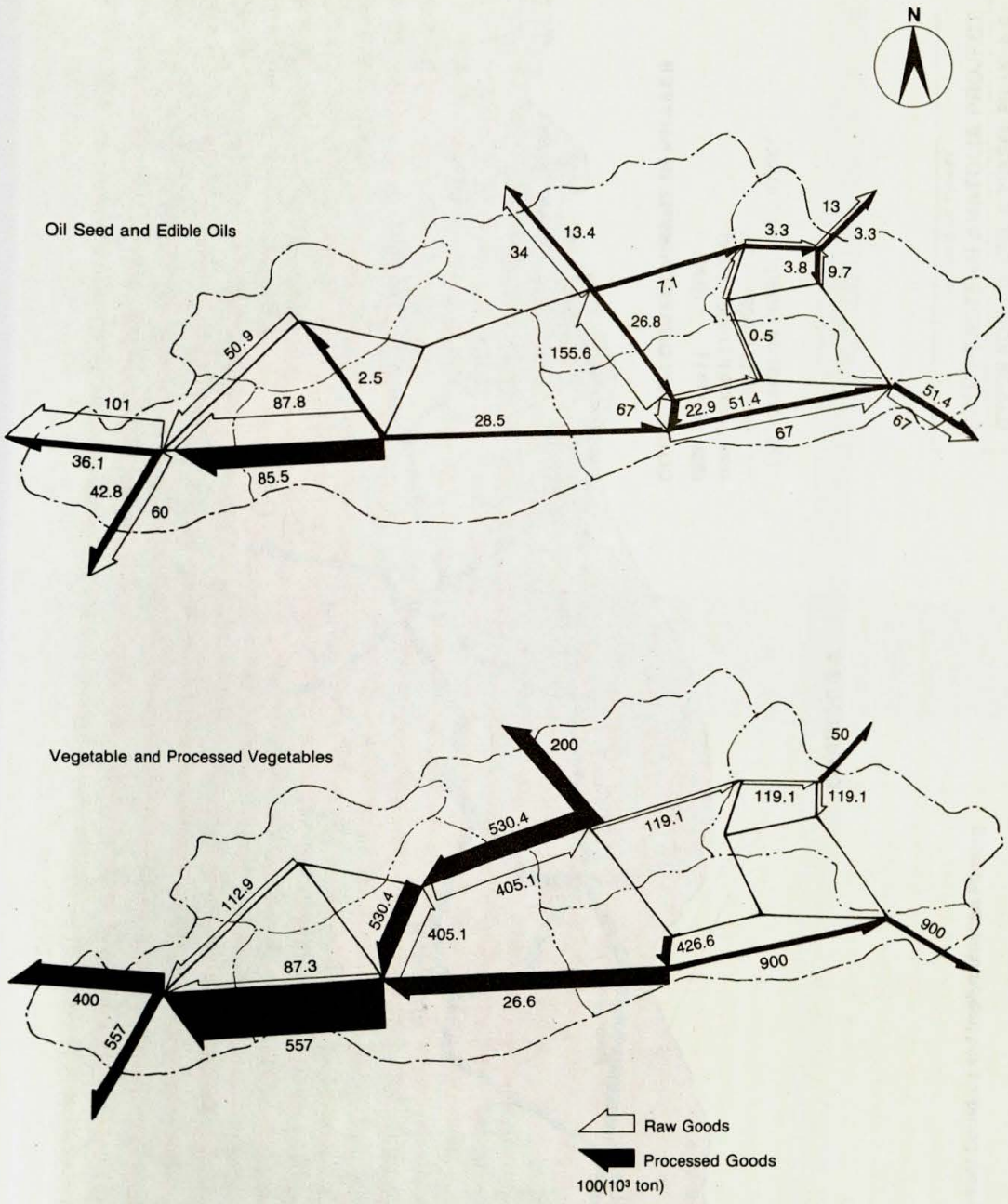

Figure 4.8: Traffic Flow Pattern by Commodity (2/2)

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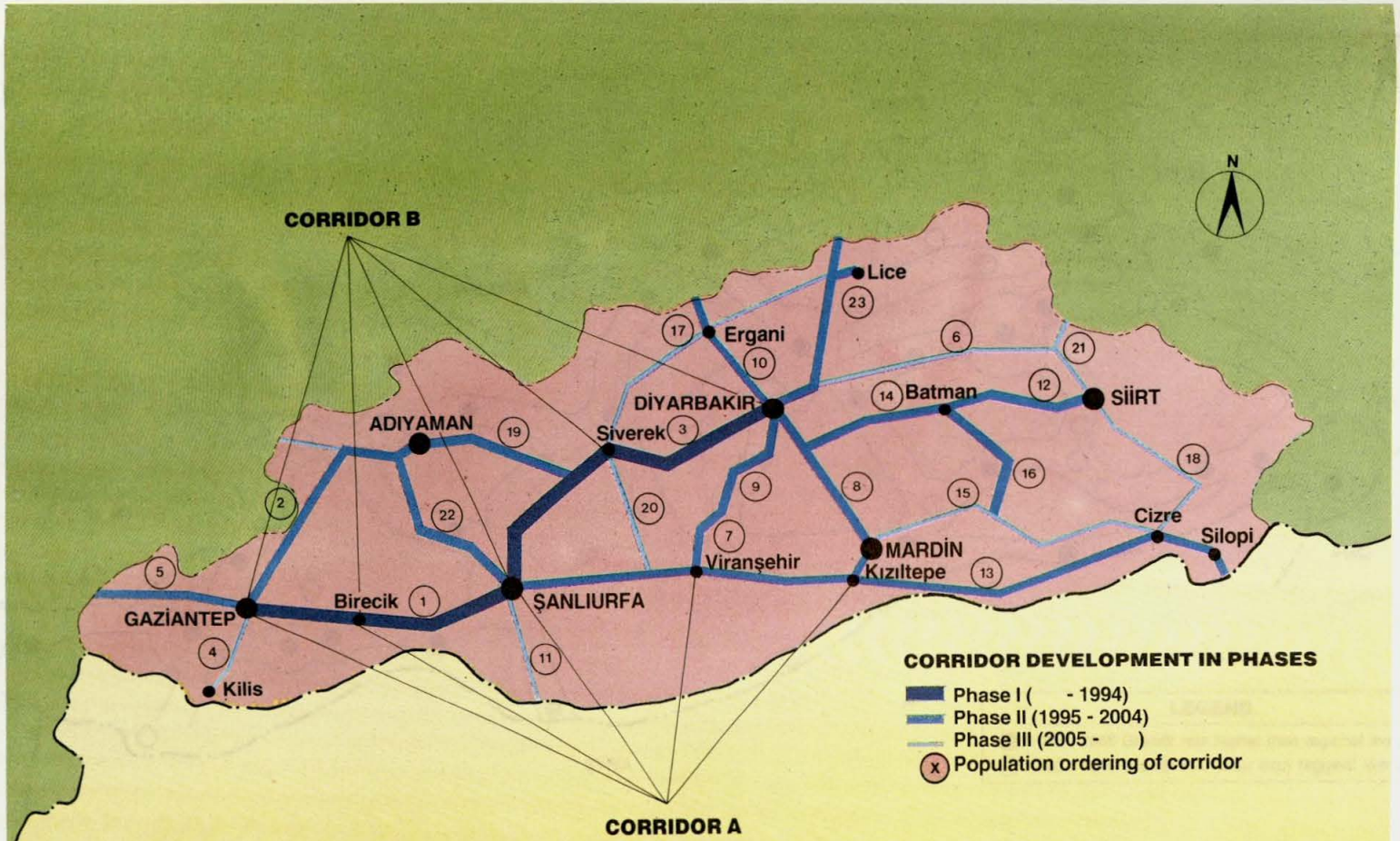

Figure 4.9: Development Corridors and Implementation Phasing

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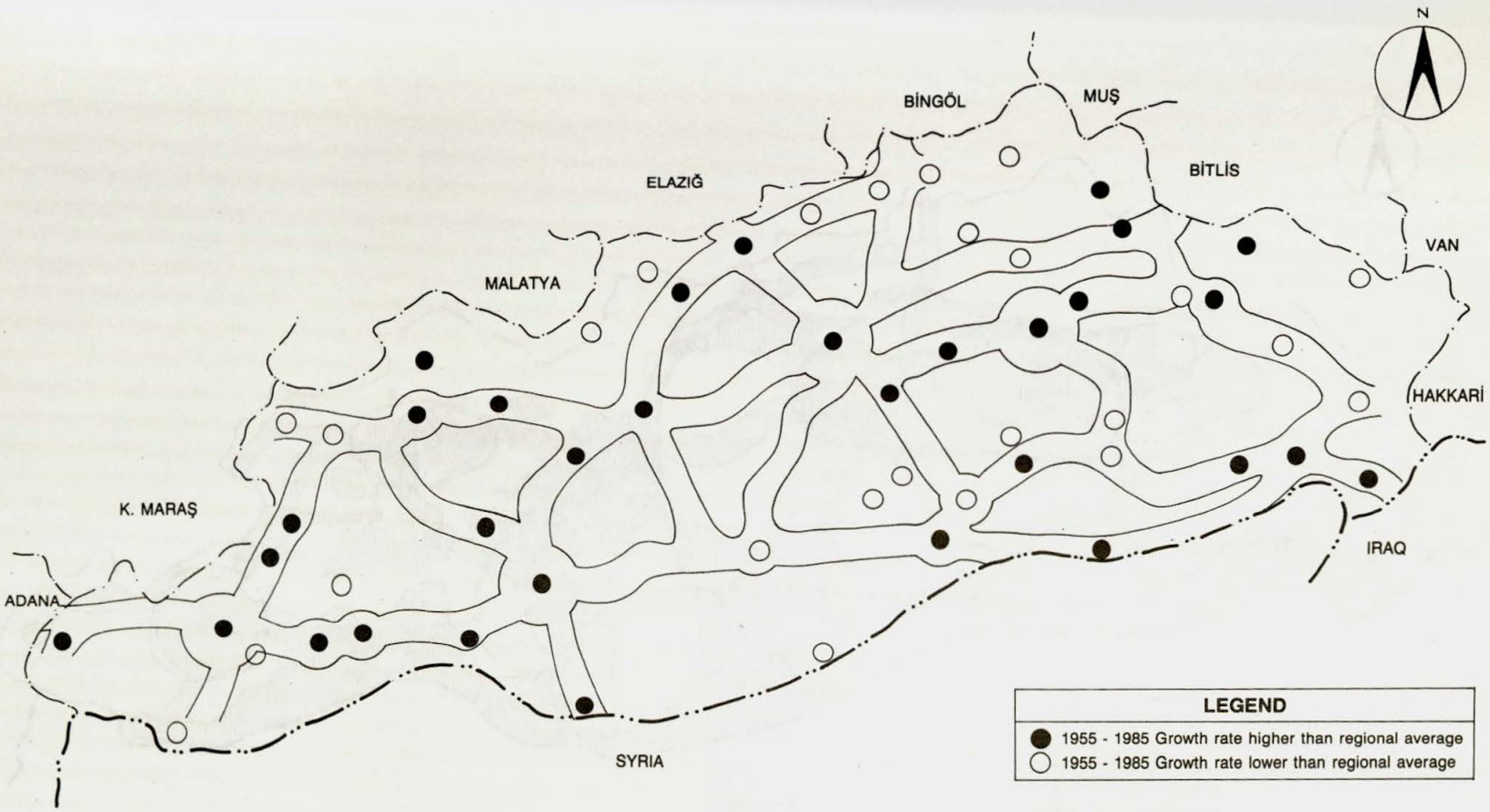

Figure 4.10: Polutaion Growth of Administrative Centers (1955-1985)

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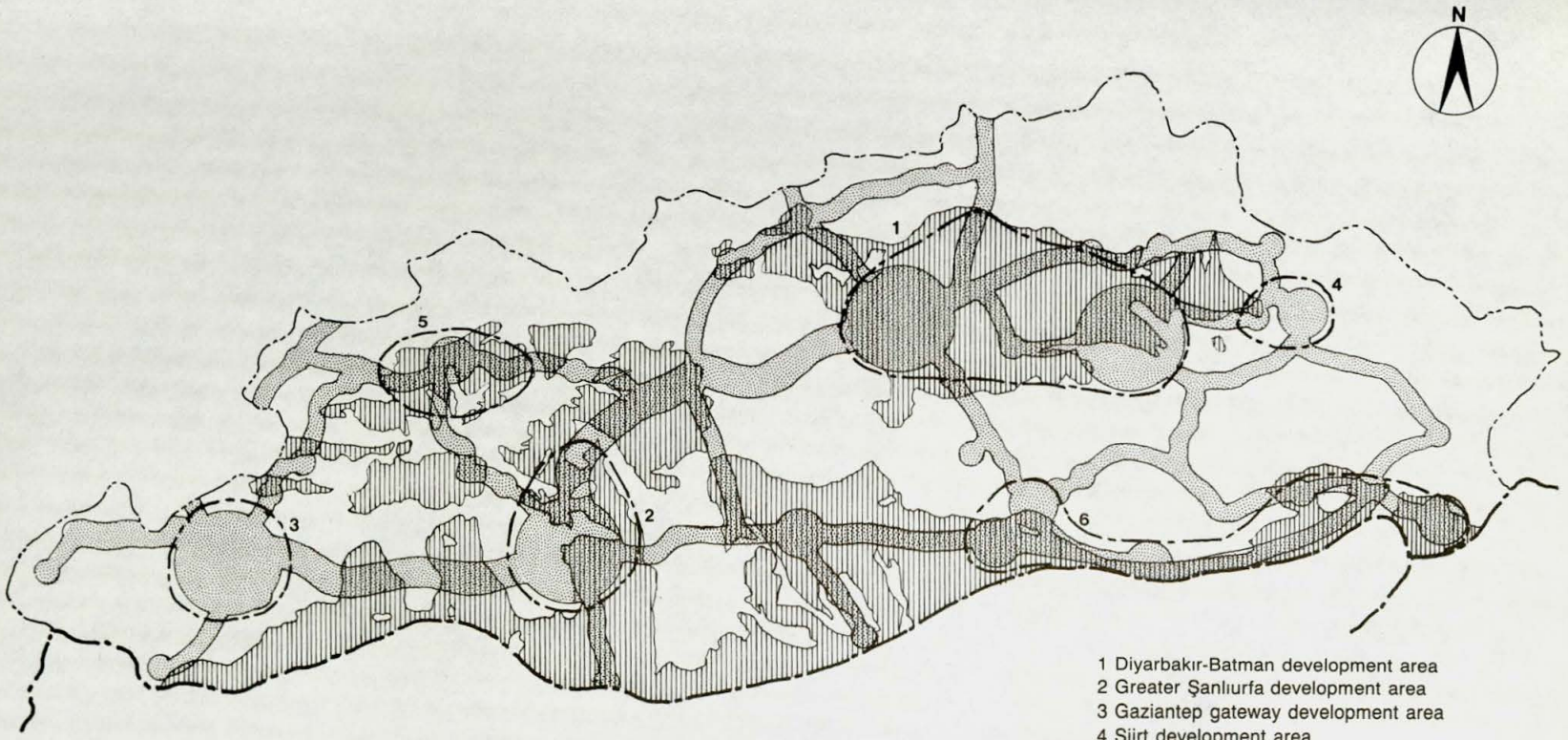

1 Diyarbakır-Batman development area
2 Greater Şanlıurfa development area
3 Gaziantep gateway development area
4 Siirt development area
5 Adıyaman development area
6 Mardin frontier development area

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Figure 4.11: High Potential Areas in GAP Region

5

Chapter V

RESOURCE DEVELOPMENT

5.1 Water Resources

5.1.1 Existing plans and projects

(1) River systems

The Fırat (Euphrates) and the Dicle (Tigris) are the major river systems running through the Region. The Fırat river system has a catchment area of 102,876 km^2 north of the Syrian border, of which 22,000 km^2 or 22 % is within the Region between Karakaya dam and the Syrian border.

The Dicle river has a catchment area of 38,295 km^2. Most of the catchment area of the Botan river, the largest tributary of the Dicle river is outside of the Region. The Dicle river drains 30,000 km^2 within the Region.

The small rivers running between the Dicle and the Fırat river basins eventually flow into these two river systems downstream the international border. The small rivers occupy a catchment area of 21,000 km^2 within the Region. A large part of the small river basins would be affected by development of the Atatürk dam and Urfa tunnel and others by Birecik dam project in the Fırat river system and the Cizre dam project in the Dicle river system.

DSI has planned 13 groups of water resources development projects in the GAP region (Table 5.1, Figure 5.1). These development projects are illustrated as a diagram separately for the Fırat and Dicle river systems (Figures 5.2 and 5.3). These diagrams are the basis to study the river systems for project screening, water allocation and investment sequence optimization in the study.

(2) DSI plans and projects

Fırat river system

There are three existing dams in the Region. They are Karakaya, Tahtaköprü and Hancağız dams. The Karakaya dam was completed in 1987 with a 900 MW power plant now in operation and an additional 900 MW is to be put into operation shortly. The Tahtaköprü dam is located on the Karasu river of the Asi river system in the western corner of Gaziantep province. It was commissioned in 1975 for irrigation and flood control with its beneficiary area located in the province of Antakya. The impacts of the dam for the Region are for fishery and recreational activities. The Hancağız dam has just been completed to serve for irrigation purpose.

The development plans of the GAP project for the Fırat river basin are grouped into seven schemes. Their major purposes are irrigation and hydroelectric power production. After full development of these projects, there would be 1,083,000 ha of irrigation area. The projects would extract about 9,000 million m^3 of water per year from the Fırat river corresponding to about 30 % of the average annual runoff volume of the Fırat river (30,000 million m^3) at Karkamış near the Syrian border. The major water resources facilities in the Fırat river system are Keban, Karakaya, Atatürk, Birecik and Karkamış dams, of which Keban and the Karakaya are in operation. The Atatürk dam is under construction and the feasibility study and final design completed for Birecik

and Karkamış. These dams are located on the main stream in a series and the potential head are fully utilized below Keban dam. Since the active storage capacity of the reservoirs on the Fırat river would become 42,000 million m^3, the natural river runoff would be largely regulated and the river water utilization ratio of 30 % would not be critical for irrigation water supply.

Dicle river system

In the Dicle river system, six development schemes have been planned by DSI. In the plans, four dams are to be located on the main stream of the Dicle river. The Kralkızı and Dicle dams are under construction. The Ilısu and Cizre dams are in the final design stage. In addition to the main stream development, tributary development is extensively planned in the Dicle river basin. The Batman, Silvan and Kayser dams are located on the Batman river. The Garzan dam is on the Garzan river. The Batman dam is now under construction and the others are in planning stage. The Botan river is the largest tributary of the Dicle river system and several hydroelectric power development projects are planned on the river. Of them, the Çetin, Alkumru and Baykan projects are in Siirt Province.

Besides these development projects, there are eleven existing reservoirs/ponds. The major ones are Devegeçidi and Gözegöl both located on the right bank tributaries of the Dicle river near Diyarbakır.

The average annual runoff of the Dicle river is 16,700 million m^3 at Cizre dam site north of the Syrian border. Among six development schemes, the Ilısu project is solely for hydroelectric power. Others are for hydroelectric power and irrigation. The total irrigation area amounts to 558,000 ha. They would extract 3,700 million m^3 of water per year in net from the Dicle river system with 20 % of return flow ratio assumed. This amount would correspond to 22 % of the average river runoff. The potential irrigation areas in the basin are to be almost fully covered by these development plans, and the capacities of the planned dams have a total of 15,500 million m^3 in active storage and large enough to regulate river runoff for irrigation water supply.

(3) Irrigation

Irrigation in Turkey

The cultivated area in Turkey is about 27.7 million ha or 35.5 % of the total land area. It is believed that 8.5 million ha are economically irrigable, but 3.3 million ha are actually irrigated. Of the total irrigation area, 2.3 million ha are developed by Government agencies and 1 million ha by private farmers.

Main implementing agencies for irrigation projects are General Directorate of State Hydraulic Works (DSI) under the Ministry of Public Works and Settlement and General Directorate of Rural Affairs (GDRA) under the Ministry of Agriculture, Forestry and Rural Affairs (formerly Soil Conservation and Farm Irrigation and Drainage - TOPRAKSU - under the Ministry of Rural Affairs).

DSI handles feasibility studies of the major irrigation projects, the construction of their major irrigation and drainage facilities for more than 500 liter/sec of discharge, and their operation and maintenance. DSI has constructed about 80 thousand ha of irrigation schemes throughout Turkey in every year since 1982. GDRA executes minor irrigation projects and carries out construction and operation/maintenance of on-farm facilities for discharge of less than 500 litre/sec as well as land consolidation. In case of groundwater irrigation, farmers usually establish a land and water cooperative, DSI constructs wells and pumping facilities, and GDRA constructs irrigation networks. Operation and maintenance of the facilities are made by the land and water cooperative.

Irrigation in the GAP region

About 114 thousand ha are presently irrigated in the GAP region, realizing only 6 % of the potential (GAP Agricultural Development Symposium 1986). Most present schemes are irrigated by groundwater. The following DSI irrigation projects are under operation in the Region ("Appraisal Report on Irrigation Results, 1986").

Existing Irrigation Projects in GAP Region Operated by DSI
(1986)

Projects	Irrigation Area (ha) Developed	Irrigated	Province
1. Devegeçidi	7,500	6,344	Diyarbakır
2. Batman	3,500	4,289	Diyarbakır
3. Gözegöl	1,000	600	Diyarbakır
4. Hilvan	550	391	Şanlıurfa
5. Nusaybin	6,900	6,022	Mardin
6. Akçakale*	13,800	10,367	Şanlıurfa
7. Ceylanpınar*	9,000	5,246	Şanlıurfa
Total	**42,250**	**33,259**	

* : By groundwater

Of 13 component projects in the GAP, 10 are related to irrigation, including two solely for irrigation (Figure 5.1). All these projects were originally planned to be implemented by the year 2002. The present implementation status is shown in Table 5.1 ("Atatürk Dam and Irrigation System - An Overview, PMU, March, 1988).

5.1.2 Review of existing plans

(1) Assumptions and criteria for review

The original DSI plan has been reviewed by using the river simulation and analysis model. Water uses in the system include irrigation water supply, hydroelectric power generation, and to a small extent municipal water supply. Table 5.2 summarizes the main features of the reservoirs in the system.

Irrigation water requirements

Water requirements for the GAP irrigation schemes are estimated under the following conditions.

1) Simplified cropping patterns are adopted for long-term planning purposes (Appendix A-2). Overall crop intensity is 134 %, higher than originally assumed by DSI, in accordance with the basic strategy (sub-section 2.3.2).

2) DSI's standard procedure to estimate irrigation water requirements is basically followed except residual soil moisture and covering ratio. The residual soil moisture is not explicitly taken into account but this aspect is reflected properly in irrigation water requirement estimate in the study. For perennial crops, effective canopy coverage by the crops is taken at 75 % of irrigation land. Overall irrigation efficiencies are 54 %, 72 % and 85 % respectively for conventional method, sprinkler method and drip method.

3) Ten irrigation projects in the GAP have been subdivided into 17 schemes and an estimate is made for each. Gross areas of respective schemes are based on the data in "Atatürk Dam and Irrigation System - An Overview" (PMU, March 1988). Net areas are estimated by applying net area factors used for DSI projects.

Review criteria

In planning for irrigation projects, DSI may allow some deficits in irrigation water supply in accordance with the following risk criteria :

Maximum annual deficit -- smaller than 35 % of requirement

Average annual deficit for consecutive five years -- smaller than 25 % of requirement

Average annual deficit for simulation period -- smaller than 5 % of requirement

These criteria are referred to in reviewing the existing plans.

The following priority ordering adopted by DSI is taken into account in the review:

1) Domestic water supply,
2) Irrigation, and
3) Hydropower generation.

Development of optional facilities to regulate the water availability is also taken into consideration. In order to alleviate possible water deficits, limited introduction of drip irrigation system is also considered, if such a system seems promising in the future for some schemes and crops.

(2) Irrigation water requirements

Calculated irrigation water requirements are shown in Table 5.3 for each scheme on a monthly basis. The unit water requirement ranges from 701 mm/year to 1,252 mm/year, depending on cropping patterns and irrigation methods. The Master Plan recommends the application of a drip irrigation system to the Adıyaman-Göksu-Araban scheme, covering some 25 % of the area with perennial crops and vegetables. For the Dicle-Kralkızı scheme, a drip system will be introduced for 10 % of the total area.

The total annual water requirements of all the proposed projects will amount to 15,624 million m^3 (Table 5.3):

Basin	Area (10^3 ha)		Requirements
	Gross	Net	($10^6 m^3$)
Fırat	1,083	932	10,429
Dicle	558	486	5,195
Total	**1,641**	**1,418**	**15,624**

(3) Review of Fırat river system

Fırat main stream

Annual yields of the reservoirs on the Fırat main stream are as follows.

	Natural Runoff		Regulated Runoff		
	Mean annual runoff ($10^6 m^3$)	Minimum monthly discharge (m^3/s)	Annual firm yield ($10^6 m^3$)	Incremental firm yield ($10^6 m^3$)	Firm discharge (m^3/s)
Keban	20,600	136	15,000	4,900	465
Karakaya	23,700	145	17,900	1,000	562
Atatürk	26,800	152	21,400	1,900	625
Birecik	30,400	156	22,600	—	635
Karkamış	30,700	158	22,700	—	636

If all the reservoirs on the Fırat main stream are operated exclusively for power generation, the annual energy production would be 24,624 GWh, to which the Atatürk will contribute 8,705 GWh. The annual energy production after full irrigation development would be 20,071 GWh (Table 5.4).

Adıyaman - Kahta

The Gömikan scheme may suffer water shortage in a drought year, but the deficit will be within the DSI risk criteria. Thus the water shortage will be averted with proper reservoir operation. The total power production of the scheme will be 627 GWh, including 302 GWh firm and 325 GWh secondary energy.

Adıyaman - Göksu - Araban

This scheme has the smallest unit water requirements as the Master Plan recommends the drip system applied to a substantial area. If water requirement increases in the future, another source or larger facilities may be considered to cover the planned irrigation area.

Gaziantep

If all of the Hançağız, Kayacık, Kemlin and Seve dams are operated independently for their respective irrigation schemes, irrigable areas will be 6,100 ha, 2,896 ha, 1,347 ha and 804 ha, respectively. If all the dams and main feed canal are integrated, the irrigable area would be constrained by the capacity of main feed canal. With the original design capacity of 49.2 m^3/sec, some 61,000 ha can be covered. The capacity can be increased to 70 m^3/sec to cover the entire irrigation area of 89,000 ha originally planned.

(4) Review of Dicle river system

Dicle - Kralkızı - Devegeçidi

Water deficits to occur in drought years will violate the DSI criteria. As countermeasures, an additional dam at Dipni or heightening of the Dicle dam may be considered. Drip irrigation can be introduced to cover 10 % of the irrigation area.

Batman - Silvan

The Batman dam is located downstream of the Silvan dam. Even if all the water above the Silvan dam is extracted for Silvan-Batman irrigation scheme, no water deficit is expected for Batman irrigation area of 37,700 ha (gross). The Silvan - Batman scheme with 213,300 ha (gross) will face water deficits in drought years. The Kayser dam would be one of possible countermeasures. The dam site is located on a tributary flowing into the Batman dam and the stored water would be exported to the Silvan reservoir through a transfer tunnel.

After the Silvan dam is constructed upstream of the Batman dam, the annual energy production of the Batman power plant would be 382 GWh, consisting of 120 GWh firm and 262 GWh secondary energy. The Silvan power plant would produce a small amount of secondary energy.

Garzan

The Garzan reservoir would have sufficient yield for irrigation covering 60,000 ha in gross area. Annual energy production would be 292 GWh in total, 213 GWh firm and 79 GWh secondary energy.

Dicle main stream

The annual firm yield of the Cizre reservoir is calculated at 7,400 million m^3 after full development of the Dicle river basin, sufficient to cover the entire irrigation area originally planned.

The annual firm energy at the Ilısu and the Cizre would be 2,310 GWh and 612 GWh, respectively after full basin development. The total energy production of these two plants would be 4,021 GWh annually, including secondary energy.

Silopi

The Kırkemir and Hezil reservoirs would have sufficient storage capacities to supply irrigation water to the planned irrigation area of 32,000 ha.

Power plants of the scheme would contribute only to secondary energy of 661 GWh in total. During winters when no irrigation water is required, power generation would be possible only if excess water is available in the reservoirs.

The total power generation in the Dicle river basin would be 4,947 GWh, if all the projects are completed (Table 5.5).

(5) Drainage requirement

The provision of sufficient drainage is an absolute must for successful irrigation development. Lack of sufficient drainage will lead to salinization and water-logging problems. Drained irrigation water usually contains high concentration of salts (TDS). Discharge of such water to main streams may not be desirable.

A few options are available to alleviate potential environmental problems associated with drainage. First and foremost, proper farming practice and irrigation water and fertilizer application should minimize the total salts released to ambient environment. Technical options include the treatment of drained water before discharge, transport of drained water to the mass body of water (e.g. sea), and evaporation pond. Costs involved in these options should be carefully weighed against the future costs of reclaiming the lands after salinization and other problems have occurred due to lack of proper attention.

5.1.3 Summary and recommendation

(1) Summary

For most irrigation schemes,the planned irrigation areas can be covered by the facilities originally planned even with the proposed cropping patterns. Marginal deficits may occur for a few schemes within the DSI risk criteria. They can be alleviated by proper reservoir operation. Introduction of water saving technologies such as drip irrigation would be necessary for the Adıyaman - Kahta - Göksu and the Dicle - Kralkızı schemes to avoid water deficits.

Only for a few schemes,the planned irrigation areas may not be fully covered. Countermeasures are conceivable for these schemes such as an additional dam and/or trans-subbasin water diversion as well as introduction of water saving irrigation technologies. Conjunctive use of groundwater with surface water is another possibility which deserves serious consideration in some areas.

An inherent trading-off exists between hydroelectric energy production and irrigation water supply for the Fırat river system (Figure 5.4). The Dicle river system may face a serious water deficit problem with the planned facilities, if water requirements increase in the future.

The annual energy production at full irrigation development is summarized.

		Annual energy (GWh)
Fırat main stream*	firm energy	17,474
	secondary energy	2,597
	total	20,071
Fırat tributaries**	firm energy	302
	secondary energy	325
	total	627
Dicle river	firm energy	3,255
	secondary energy	1,692
	total	4,947
Total	**firm energy**	**21,031**
	secondary energy	**4,614**
	Grand total	**25,645**

Notes : * Including Keban power plant
** Adıyaman - Kahta, Adıyaman - Göksu - Araban, Urfa tunnel and Suruc - Baziki schemes

(2) Recommendation

The following pragmatic approach is recommended.

1) The first priority should be given to the prompt completion of projects under construction.
2) Those projects at an advanced stage (detailed design completed and/or ready for financing) should be implemented at the earliest time.
3) Other priority projects having lower unit irrigation cost per ha or higher rate of return from power generation should be advanced for implementation in the near future.
4) In the mean time, research should be intensified on
   i) cropping patterns and crop rotations under irrigation,
   ii) water saving irrigation technologies, and
   iii) on-farm water management.
5) For those projects/components, where alternative schemes are conceivable for increasing firm discharges and/or irrigable areas, comprehensive feasibility studies should be conducted, including the examination of those alternative schemes and review of the planned schemes, except those at an advanced stage. Such studies should be based on the updated information on the issues listed under 4) above. Study results should clarify trade-offs between hydropower and irrigation and the best compromise solutions in view of economic efficiency and geographic distribution of benefits, and priority areas for irrigation selected with better cropping patterns and possibly smaller irrigation water requirements.
6) Implementation of those projects/components should follow in accordance with the viability and priority established in step 5).

In re-formulating some projects or project components, the conjunctive use of groundwater with surface water should be considered, if relevant. Especially for those schemes on the lower plains of Şanlıurfa, Mardin, and Diyarbakır, this option may be viable. A preliminary investigation should be made based on available data, and a program for further exploration be prepared, if found promising.

Priority projects identified following the steps 1) through 3) are listed in Table 5.6. Investment

schedule for other projects is necessarily indicative (Section 6.3), and definite schedule should be prepared after respective feasibility studies.

In order to utilize the reservoir systems most effectively, an optimization study is recommended to determine the operation rules of completed reservoirs in conjunction to avoid/minimize the water shortage. The water shortage within the DSI risk criteria will be averted most likely by utilizing the reservoir systems according to such rules.

5.2 Energy

5.2.1 Present energy situation in GAP region

(1) Energy demand and supply

Reliable statistics on regional energy production and consumption are not available except electricity.

The GAP region is becoming a significant producer of electricity with two major hydropower stations completed, viz. Keban (1,360 MW) and Karakaya (1,800 MW) and the Atatürk dam under construction to provide an additional 2,400 MW by early 1990's. There are also coal/lignite thermal power plants. In addition, Çağ Çağ III (run-of-river, 14.4 MW) is in operation, and Kralkızı, (94 MW), Dicle (110 MW) and Batman (185.6 MW) in the Dicle river are under construction. After completion of all these plants by 1992, the installed capacity would be 5,960 MW with total annual generation of 21,900 GWh providing 25 % of electric energy supply in the Country in 1992 or 85 % of energy production by hydroelectric power plants throughout Turkey in that year. If all the power plants now in the planning or design stage in the Region are commissioned, the energy generation would be 25,000 GWh with the installed capacity of 7,561 MW (Tables 5.4 and 5.5).

The electricity consumption within the Region is still low, with the share of 4.6 % in the national consumption in 1986. Per capita electricity consumption is 350 kWh in the Region compared with the national average of some 650 kWh.

Only 16.3 % of all the villages were electrified in the Region in 1980, while the corresponding figures for the Country was 50.7 %. The village electrification ratio increased significantly to reach 94 % for Turkey and 84 % for the Region.

Wood and tezek (dried animal dung) are two main sources of energy for rural households in the Region. Relative importance of these energy sources varies among the six provinces. In some 90 % of villages in Şanlıurfa, tezek was preferred in 1980 as heating fuels,while in a significant majority of villages in the other five provinces, wood was preferred. Estimates have been made for the availability of tezek in the Region and in Turkey. Based on 1986 animal population data, the availability of tezek in the Region is 1.15 million tons or 9.1 % of the total availability in Turkey (12.65 million tons).

(2) Energy resources

The hydropower potentials of the Fırat river and the Dicle river are estimated at 35,000 GWh and 12,000 GWh, or 30 % and 10 % of the Nation's potential. Asphaltite reserves in Turkey concentrate in the GAP region around Silopi and Şırnak in Siirt province. Estimated total reserve is 75 million tons. The southeast of the Diyarbakır-Gaziantep basin on the fringes of the great Middle East oil field is the major oil producing area in Turkey, producing 98 % of the total domestic production. However, yields are generally low for such fractured terrains.

5.2.2 Energy prospects in GAP region

(1) Energy demand structure and growth

Final energy demand in the GAP region has been roughly estimated by supply source for 1986 and compared with the whole of Turkey.

Final energy demand by supply source in 1986, GAP region and Turkey

Source		Region		Turkey	
		10^3 toe	(share %)	10^3 toe	(share %)
Asphaltite	175,000 tons	75	(4)	260	(1)
Wood	1,500,000	450	(27)	5,271	(15)
Tezek	1,288,000	296	(17)	2,963	(8)
Plant waste	930,000	214	(13)	2,380	(7)
Petroleum	518,000	518	(31)	13,786	(39)
Electricity	1,559 GWh	134	(8)	2,884	(8)
Others(*)	—	0	(0)	7,838	(22)
Total		**1,687**	**(100)**	**35,382**	**(100)**

(*) Include hard coal, coke, briquettes, lignite, jet fuel, naphtha, natural gas and city gas.

Prospects for alternative sources of energy in the Region may be as follows. Electricity will grow at 8.0 % per annum, the highest of all the energy sources. Petroleum will grow at 4.5 % per annum, slightly lower than the expected national average. The growth of asphaltite and plant wastes will be respectively higher than the expected national average due to better availability of these resources in the Region, and 4.5 % and 4 % are taken as the average annual growth rate respectively. Use of wood will not much increase, and 2.5 % is assumed for its growth rate. Use of tezek will not increase. Final energy demand for all these resources will become 3,500 thousand tons of oil equivalent (toe) in 2005 from 1,687 thousand toe in 1985, representing the average annual growth rae of 3.7 %.

The growth of final energy demand is highly correlated with the economic growth. The elasticity of energy demand to the economic growth is usually around 1.0. Taking a modest elasticity value of 0.8, the growth of final energy demand will become 4,800 thousand toe in 2005 and the demand for other alternative sources of energy will be 1,300 thousand toe.

(2) Supply prospect

The demand for electricity (625 thousand toe in 2005) will increase its share to 18 % of the total final energy. This corresponds to 7,300 GWh, while the total amount of electric energy to be generated by all the hydropower schemes of the GAP project could be 25,000 GWh. Development needs are in extension of transmission and distribution networks and stable and reliable supply for industries to be newly established.

Supply increase of petroleum will depends simply on import and transport facilities. Supply expansion of asphaltite to meet the demand (181 thousand toe) will not face any serious problem. The total reserve of asphaltite in the Region is estimated at 75 million tons or 32.3 million toe, sufficient to meet the demand in the next few decades, even if only 10 % of the reserve is economically exploitable.

Availability of plant wastes will increase as the agricultural production expands. Availability of animal manure will also increase as the livestock sector develops, but the direct use as fuel will become less popular. At present, about 33 % of the manure is used in the Region as tezek, while in Turkey the ratio is 18 %. The tezek use will remain at the present level in the Region, if the ratio of manure use as tezek decreases to 15 % level by 2005.

At present, about 20 % of the land in the Region is classified as forest and heath areas, but only 47,916 ha are actually forested. The remaining area is classified as "energy forest" that are covered with shrubs and bushes. Woodfuel production from more productive energy forests is estimated at 700,000 tons, while regional demand for woodfuel is some 1.5 million tons. By increasing the area of productive energy forests by converting other poor quality energy forests, and increasing the yield by better management, the regional woodfuel production can increase to 1.1 million tons by 2005. The total woodfuel demand in the Region is projected to be 2.0 million tons in 2005. In order to meet the balance, the productive forest area will have to be increased annually by 2,400 ha over 1990-2005 (Appendix A-1).

In order to fill the gap between the projected demand and the expected supply by source outlined above, alternative sources of energy will have to be developed. Main options available in the Region are:

1. Small hydropower plants,
2. Afforestation with fast growing trees for fuelwood, and
3. New and renewable forms of energy, including solar, wind, biogas, and geothermal.

The Region is relatively favoured with solar radiation and wind energy (EIEI Reports 83-29 and 85-1). Probable geothermal potential in the Eastern and the Southeastern regions is estimated to be 500 MW for electricity generation and 4,000 MW for heating (Proceedings of the New and Renewable Energy Resources Conference, EIEI, Ankara, 23-26 November, 1981). Detailed studies are necessary to confirm the reserves within the Region. More manure will become available for biogas production, as the livestock sector develops and the use of tezek becomes less popular.

5.2.3 Recommendation

(1) Objectives of energy development

Given the present energy situations and prospects described above (details in Appendix-F), and in view of overall regional development needs, the objectives of energy resources development for the GAP region may be spelled out as follows.

1) To support the high rate of industrialization envisioned by the Master Plan;
2) To cope with the structural changes in energy use by rural households; and
3) To make a smooth transition from conventional energy to commercial energy as the urbanization proceeds.

(2) Measures

Measures to attain these objectives consist of those related to industrialization, rural energy, new/renewable energy and others as described below.

Industrialization

Chief energy sources for industrialization are electricity, petroleum products, and to a much

smaller degree coal/lignite/asphaltite. Electricity generation within the Region has been and will be primarily by hydropower.

The hydroelectric energy to be produced by the GAP hydropower schemes will be far more than sufficient to meet any foreseeable demand by prospective industries in the Region. The priority should be given, therefore, to the extension of transmission and distribution networks to ensure stable and reliable supply, as well as to early completion of major hydropower schemes.

Petroleum supply needs to be expanded primarily by increasing imports, but accelerated exploration may lead to substantial increase in domestic supply. A comprehensive study should be carried out to examine alternatives for petroleum transport, including pipeline extension, road improvement and reinforcement of railway systems. This study should be taken up within a consistent framework for the regional transport needs encompassing all the transport modes and all the major commodities to be generated by the GAP implementation.

Exploration of asphaltite should be continued in a systematic way. New reserves for earlier exploitation should be identified from regional development needs.

Proper price systems need to be established to encourage efficient use of all the commercial energy. Electricity tariffs were too low in the past. They should be set in accordance with the long run marginal cost of supply. Prices of petroleum products should reflect the real costs of supply from the viewpoint of the Nation's economy in order to attain optimal levels of both imports and domestic production and efficient use.

Rural energy

Rural electrification has accelerated in recent years, and most villages in the Region have now been served with electricity, except some settlements in the mountanous areas in Siirt. Emphasis therefore should shift to increasing the distribution capacity of powerlines and utilizing new and independent energy sources. In the latter case, small hydropower would be the main option.

Rural energy sources can be diversified by combining electricity, biogas, LPG and plant wastes as well as conventional tezek and fuel wood. In doing so, integrated systems should be established incorporating various rural activities in order to attain overall energy efficiency. As the availability of manure increases, biogas digesters can be promoted to produce both fuel and organic fertilizer. Increasing amount of plant wastes can be used both directly as fuel and as animal feed, which in turn will increase livestock and manure production. On-farm tree planting should be encouraged by increasing the supply of seedlings in order to supply additional fuel as well as to reduce soil erosion.

Participation of local people in developing local energy sources is important to make them more conscious of energy use and thus to encourage efficient energy use and saving. For this purpose rural cooperatives may be organized. Information related to more efficient energy use can be transmitted through such cooperatives to rural population.

New/renewable energy

Use of solar water heaters should be extended from domestic uses to a range of industrial uses. Use as industrial process heat for some agro-processing industries envisioned by the Master Plan will be most appropriate, as such industries require relatively low enthalpy process heat. Use for hygienic purposes is another possibility such as for cleaning at slaughterhouses.

Use of photovoltaics can also be readily expanded, although economy of use needs to be carefully assessed for each case. Demonstration schemes for controlled grazing should incorporate photovoltaics to keep cattle within different areas in rotation and to make them stay off

the irrigation canals. Photovoltaics may also be used for demonstration purposes at some public facilities, including the proposed headquarters of the Regional Development Center.

Biogas digesters mentioned above should be introduced first as a demonstration scheme in selected areas within the Region having different natural conditions and prevailing herd composition. Wind and geothermal energy would deserve exploration. A few demonstration installation of windmills should be made in the near future to monitor their performance in different areas and to find out the conditions for their local manufacturing. Use of geothermal energy in the Region will be a longer term option. A systematic exploration should be initiated, aiming at integrated use for power generation, industrial process heat, green houses, recreational and domestic purposes.

5.3 Environment

5.3.1 Context of environmental management

It has been widely recognized that high economic growth in any region, especially under severe natural conditions, cannot be sustained without having concomitantly proper management of the environment. With this respect, the real issue is not a trade-off between economic development and environmental conservation but rather the environmental management for sustained economic growth.

The GAP, being a large-scale, multi-sectoral project, will have significant effects on the environment. Especially, irrigation development on extensive land area, with large water impoundments and trans-subbasin water diversion, will change the land and water regimes in the Region substantially. This, in turn, will affect fauna and flora as well as human beings.

These changes will be quite fundamental and long-lasting just as the socio-economic impact of the GAP implementation. Therefore, the environmental aspect should be taken as an integral part of the GAP regional development, and an integrated approach be adopted consistently with other measures for socio-economic development.

5.3.2. Possible problems and general measures

(1) Possible problems

If the GAP is implemented without paying proper attention to the environment, a range of problems may arise. These problems may be categorized into two classes: those that can be approached on a project-wise basis and others calling for a more integrated approach. Typical problems foreseen are listed below under each category.

(a) Environmental problems to be approached on a project-wise basis

- Industrial effluents
- Municipal wastewater discharges
- Solid waste dumping
- Air and water pollution related to mining, industrial production and thermal power generation
- Sedimentation in reservoir
- Land slide around reservoirs
- Changes in habitat and effects on migrating habits of fish species due to damming and impoundment
- Degradation of river beds and erosion of banks due to changes in river flow pattern
- Land use conflict between agriculture and urbanization

(b) Environmental problems calling for a more integrated approach

- Soil erosion
- Water-logging and salinization due to insufficient drainage
- Wind erosion
- Deterioration of forest resources due to illicit cutting for fuelwood and conversion to cultivation/grazing areas
- Deterioration of pastures due to over-grazing
- Non-point water pollution due to increased fertilizer and pesticide use
- Ecological changes in fauna and flora
- Climatic changes
- Water-borne diseases

(2) General measures

For those problems under category (a), counter-measures can be formulated on a project-wise basis, if necessary. They may take a form either of other projects or of institutional measures. The former include waste-water treatment plants, solid waste management projects and projects of structural measures to prevent land slide or to relocate facilities. The latter include enforcement of effluent discharge and emission standards and land use regulations.

The problems under category (b) are all land- and water- related. In fact, what is fundamentally needed is the integrated land and water management, which is sometimes called watershed management. Objectives are (1) to minimize the erosion of productive top soil, (2) to minimize the discharge of organic and non-organic wastes into the ambient environment, and (3) to enhance the water-retaining and productive capacities of the land.

Many factors affect the land- and water- related environmental problems. More important ones are:

- rainfall patterns --- both spatial and temporal,
- land use --- cultivated areas with different crops and farming practices, grazing areas, buildup areas of different density and extent etc.,
- vegetation cover,
- soil characteristics, and
- topography --- slope gradient and slope length.

General measures to alleviate those problems include the following.

1) Improvement of farming practices such as deep ploughing, terracing on slopes, buffer strip cropping and mulching as well as controlled application of irrigation water, fertilizer and pesticides;
2) Allocation of sufficient cultivation area to perennial crops and other crops of better land surface coverage and soil enriching characteristics;
3) On-farm tree planting;
4) Pasture management;
5) Promotion of controlled grazing; and
6) Afforestation.

5.3.3 Recommendation

Two sets of measures are recommended to cope with the possible environmental problems outlined above. First, the Environmental Impact Assessment practices should be initiated for the GAP. This will help to identify project-specific environmental problems, mostly under category (a), and formulate counter-measures. The General Directorate of Environmental Affairs is finalizing the Regulations on Environmental Impact Assessment in accordance with the Law on the Environment (Article 10). Most of the major GAP related investments and the GAP as a whole fall in the category where the filing of an Environmental Impact Assessment Report is mandatory (Table 5.7).

Such an initiative will not only pave the way for the full compliance with the requirements by the European Economic Community's Council Directive issued in 1985 for compulsory Environmental Impact Assessment, but is quite relevant for the GAP. The magnitude of development, extra-territorial effects and model case of regional development, all foreseen for the GAP, justify such an initiative.

Second, continuous efforts should be made by relevant agencies to cope with the problems under category (b). Agricultural extension, demonstration, and monitoring are essential components.

Application of irrigation water, fertilizer and pesticides, adoption of better cropping patterns and farming practices, and on-farm tree planting are subjects for agricultural extension. For the promotion of managed pasture and controlled grazing, and accelerated afforestation, public sector interventions will be necessary. Demonstration projects should be initiated for the former. Those measures are described in relevant sections of this report. Monitoring is essential for controlling water-borne diseases and assessing climatic and ecological changes. As a first step, a survey should be conducted to assess the data available from existing organizations, to determine indices to be used for monitoring and to identify needs for further data collection.

5.4 Human Resources and Social Needs

5.4.1 Present conditons

(1) Demographic structure

The population density in the Region has been lower than the national average,although it varies within the Region from 43 per km^2 in Şanlıurfa to 126 per km^2 in Gaziantep in 1985. Overall growth rates are higher in the Region than the national average. The ratio of urban population in the Region was 49.9 % in 1985, slightly lower than the national average of 53.0. Detailed data are given in Appendix G-1.

The Region is a net out-migrating region. Only Gaziantep showed net in-migration for the periods 1965-70 and 1970-75 but turned to net out-migration in the 1975-80 period to join the five other provinces.

The high population growth rates and the net out-migration imply that the natural increase of population in the Region is quite large. According to the population surveys conducted in 1966, 1973 and 1978, the Region had the highest fertility rates. The total fertility rates were 6.9 in the Region and 5.0 in Turkey in 1975, and 7.0 in the Region and 4.5 in Turkey in 1980. The child mortality rates are also generally on the high side for the provinces in the Region, although they have decreased since 1970 owing much to the extended mother and child care and family planning efforts.

High fertility rates are usually associated with high mortality rates, which reflect poor sanitary and nutritonal conditions, insufficient health facilities and lack of knowledge of proper treatment. In the Region, severe climatic conditions in the north, the social structure of rural population, and negative attitude toward family planning due to cultural norms are also factors for high fertility and mortality rates.

According to the socio-demographic findings of the Ministry of Health and Social Assistance survey, factors affecting fertility are:

- level of education of men and women,
- level of infant mortality,
- availability of health services,
- availability of family planning services, and adequate information, motivation and satisfactory consultation for couples.

Fertility rates are usually lower in urban areas, where the education level is generally higher, mortality is lower due to better health services and sanitary conditions, information is more readily available, social and cultural norms are relatively loose, and women participate in non-farm activities. The total fertility in the areas with over 10,000 population in 1980 was 6.3 in the Region and 4.1 in Turkey, respectively lower than the overall fertility figures cited above.

Due to the high fertility rates and net out-migration, the ratio of working age population is lower in the Region than the national average. The ratio of population in the 15-69 age group was 47.9 % in 1975 and 47.0 % in 1980 in the Region, compared with 54.7 % and 55.9 % in Turkey.

(2) Health services

Primary health services in Turkey aim at providing medical care and protecting health for people in all the settlements. There are three types of dispensaries and medical units as follows.

A_1 type dispensary for a province center serving 50,000 people with four doctors and six health personnel.

D_1 type dispensary for a district center serving 30,000 people with two doctors and four health personnel.

Village type dispensary to serve 7,000 to 8,000 people with one doctor and three health personnel.

Medical unit to serve 2,000 to 2,500 people and having one midwife.

As of the end of 1987, there exist 250 dispensaries, 1,502 medical units, and 340 medical doctors in the Region. The number of facilities seems adequate in the light of the above criteria, but doctors and health personnel as well as equipment are not sufficient. Infection rates in the Region were substantially higher than the national average for dysentery, paratyphoid fever, malaria and typhoid fever. Intra-regional difference was striking. Siirt had the highest infection for most major diseases in 1981, but the situation improved appreciably by 1987.

An extensive vaccination campaign has been conducted recently by the Ministry of Health and Social Assistance. This has resulted in decreases in the cases of whooping cough, diphtheria, measles, polio, and typhoid fever. In the Region, the number of children vaccinated increased from 343,754 in 1981 to 1,136,752 in 1987 at the average annual rate of 22 %.

Consultation is an important component of mother and child care activities, especially in less developed regions where the education level is generally lower. Implementation of mother and child care includes the provision of contraceptives and baby food as well as education and home visits during and after pregnancy. In Turkey the number of hospital beds per 10,000 population was 23.7 in 1986, and 24.1 in 1987. The corresponding figures in the Region in 1986 are 7.4 in

Adıyaman, 22.0 in Diyarbakır, 14.1 in Gaziantep, 4.5 in Mardin, 6.6. in Siirt and 7.8 in Şanlıurfa. Despite these low levels in the Region, bed occupancy ratios are low. This was due to (1) insufficient personnel, (2) inadequate medical equipment, and (3) lack of knowledge or mental barrier on the part of people. People also use facilities outside the Region for better services.

Most hospitals belong to the State. In 1987, there were 47 hospitals in the Region, of which 36 were State hospitals (Appendix G-3).

(3) Education

The education system in Turkey consists of formal education and adult education. The formal education has five levels:

- Pre-school education for 3-4 years
- Primary school 5 years
- Junior high school 3 years
- High school 3 years
- Higher education (universities) 4-6 years

Pre-school education is conducted by kindergartens for 3 to 5 years age group and nursery classes for 6 years age group. The target enrollment ratios for the Country are 6.0 % for 1986/1987, 8.0 % for 1987/88, and 10.0 % for 1988/89. Pre-school education is particularly important for teaching Turkish.

According to the 1985 Population Census, 77 % of the Turkish population over six years old was literate (86 % for men and 68 % for women). Literacy ratios are generally much lower in the Region ranging from 48 % in Mardin to 71 % in Gaziantep in 1985. The literacy ratios improved significantly during 1980-85, especially in the GAP provinces and for women.

Primary school education is compulsory in Turkey. Enrollment ratios in primary schools, including public primary schools, regional basic schools, regional boarding schools, primary schools for the disabled and private primary schools, are lower in the Region than the national average but steadily increasing. Especially girls enrollment increased at over 10 % per annum between 1980/81 and 1986/87, increasing the share in the total girls enrollment in Turkey from 5.8 % to 8.4 %. The number of pupils per teacher is consistently higher in the Region and increased from 30 in 1980/81 to 41 in 1986/87, as compared with 20 and 31 in Turkey in respective years.

The number of students in different levels of schools is increasing more rapidly in the Region than in Turkey. Consequently, the shares of students in the Region to the national total are increasing more rapidly than the Region's population.

	Region's share of students (%)	
	1980/81	1986/87
Primary school	7.8	9.6
Junior high school	5.4	6.0
High school	5.8	6.0

The school enrollment ratios during the 1987-88 academic year are compared with the respective targets.

(Unit : %)

	Target	Adıyaman	Diyarbakır	Gaziantep	Mardin	Siirt	Şanlıurfa
Pre-school education	10.0	8.2	8.2	13.5	8.3	11.5	8.9
Primary school	100.0	92.0	80.6	98.9	70.7	71.0	80.4
Junior high school	68.0	35.8	32.1	45.8	18.8	24.5	26.0
High school	37.3	14.4	17.4	25.9	8.9	12.3	11.2

There are vocational schools at junior high and high school levels. There exist only two classes of industrial vocational junior high schools in the Region with 100 students, while there are 46 classes with 2,400 students in Turkey in 1986/87. At high school level, there are 17 schools, 193 classes and 5,944 students at vocational schools in the Region, as compared with 342 schools, 5,132 classes and 189,349 students in Turkey in 1986/87. The Region's share of students is significantly lower for this category of education. Facilities are particularly lacking in rural areas.

There are 22 faculties and higher education institutes in the Region belonging to two universities: Dicle University and Gaziantep University. Seven of them started accepting students in 1988/89.

The adult education institutes in the Region consists of practical vocational schools for girls, adult education centers, apprentice training centers, domestic science schools, private teaching centers and courses, literacy campaign activities and mobile village courses.

5.4.2 Labour demand and supply

(1) Labour demand and supply balance

Labour requirement

In order to attain the development targets specified by the recommended socio-economic framework, the labour requirement will have to be satisfied. Employment in 1985 was 1,528,000. Labour requirements in 2005 have been calculated to be 2,796,000 from the projected value added and assumed employment coefficient by sector incorporating increase in labour productivity (Section 4.1). The data and the results are summarized below.

Sector	Value-added per employee 10^3 TL		Value-added 10^9 TL		Employment 10^3	
	1985	2005	1985	2005	1985	2005
Agriculture	1,350	2,210	1,467	3,186	1,086	1,440
New agro-industries	7,200	13,000	0	724	0	56
Other industries	7,500	13,550	582	2,583	78	191
Construction	5,600	8,320	276	864	50	104
Services	4,400	6,540	1,384	6,572	314	1,005
Total			**3,709**	**13,929**	**1,528**	**2,796**

As seen from the table, 1,267,000 workers will be additionally required in this 20 year time.

Labour supply

The total population in the Region may increase at 2.9 % per annum following the trend. The natural increase of population in the Region at present is estimated at 3.0 % per annum. If this rate is maintained, the population of 4,304 thousand within the Region will multiply to 7,774 thousand by 2005, while the trend population projection to 2005 is 7,575 thousand. If the birth and death rates for the Region decline following the national trend in the past decades, the present population in the Region will multiply to 7,521 thousand by 2005. Thus the trend population projection represents decreasing net out-migration combined with decreasing birth and death rates.

According to the recommended socio-economic framework, the Region's population will increase to 7,809 thousand in 2005. This implies that additional population corresponding to 3 % of the total will have to come from other regions. The average in-migration ratio for the Region was 3.6 % during 1975-80, while the average over all the provinces in the Nation was 6.4 % (Appendix G-1). Thus the in-migration into the Region will have to become comparable to the national average, resulting in the reversal from net out-migration to net in-migration.

The ratio of working age population to the total population was 47 % in the Region in 1985. This will increase as in-migration takes place. The labour participation ratio was 70 % in 1985. There are two factors affecting this ratio in the future. First, increasing number of women will participate in the labour force. Second, more people will receive higher education, staying away from the labour force for a longer period of time. Assuming 50 % working age population and 70 % labour participation ratio, the scenario population projection implies the labour supply of 2,733 thousand.

(2) Qualifications

Need for higher education

As the Region's economy develops more workers of higher educational background would be required. Shares of workers having education higher than the junior high, the high and advanced levels are about 12 %, 7.5 % and 2 % of the total number of workers, respectively (Appendix G-1). These shares will have to increase significantly in the future together with the improvement of quality of education at different levels.

Total graduates from different levels of education have been calculated for two cases: (1) present enrollment ratios and (2) recommended enrollment ratios. The results are summarized below:

(Unit: 10^3)

Type of Education	Enrollment 1986		Enrollment in 2005			Total Graduates 1986-2005	
			According to			According to	
		(%)	Present ratio	Recommended ratio	(%)	Present ratio	Recommended ratio
Jr. Highschool (General)	93.7	(29.0)	181	375	(60)	897	1,320
Jr. Highschool (Technical)	11.5	(3.6)	23	125	(20)	111	298
Highschool (General)	38.7	(13.0)	71	115	(21)	352	452
Highschool (Technical)	15.4	(5.2)	28	104	(19)	141	289
Advanced education	9.1	(2.6)	16	75	(12)	60	143

If the present enrollment ratios are maintained through 2005, the additional labour to be generated with higher educational background will be 706 thousand for junior highschool or higher, 345 thousand for highschool or higher and 42 thousand for advanced education, assuming the same labour participation ratio of 70 %. These correspond respectively to 25 %, 12 % and 1.5 % of the total labour requirement in 2005. Compared to the present ratios, these represent sufficient improvement probably except for the advanced education. With the recommended enrollment ratios, the ratios of labour force having higher educational background will be 41 % for junior highschool or higher education, 18 % for highschool or higher, and 3.6 % for advanced education.

In - migration

The GAP region as a whole is a net out-migrating area, but out-migration rates of the GAP provinces are not so high, except Şanlıurfa and Mardin, as compared with the average of all the provinces in Turkey (Appendix G-1). However, in-migration rates for the Region are much lower than the average in Turkey. In order to reverse the net out-migrating trend, in-migration ratios will have to increase.

Distribution of in-migrants to the GAP provinces by origin and distribution of out-migrants from them by destination for 1975-80 are summarized :

Origin/destination	In-migration	Out-migration
Other GAP provinces	30.2 %	16.5 %
Adjacent provinces	17.9	8.4
Çukurova region	12.7	23.9
Metropolitan regions	16.7	27.7
Other provinces	22.5	23.4
Total number of in-/out migrants	122,703	226,219

In-migration from and out-migration to the adjacent provinces are well balanced. As the GAP region enhances its relative economic position, in-migration from these provinces will outweigh the out-migration. Also in-migration from other provinces will become more balanced. In-migration from more developed Çukurova and Metropolitan regions will not increase much in the short run, but male-dominant return migration will be a significant factor especially for the provinces of Şanlıurfa and Mardin.

5.4.3 Recommendation

(1) Objectives of human resources development

Development of human resources is not only an essential condition for successful regional development but more importantly a goal by itself. In the GAP region, levels of social services are generally much lower than the national average, although they are rapidly improving in recent years. All the six GAP provinces are net out-migrating areas. In order to improve the situations, two objectives may be set:

1) To reverse the net out-migrating trend, and
2) To develop manpower within the Region.

In fact, these objectives are complementary to one another. To reverse the net out-migrating trend, social services within the Region will have to be much improved, and this is an important condition also for manpower development. Improvement of social services in all aspects, in parallel with economic development, therefore, would be a prime means for human resources development.

(2) Recommendation

To attain these objectives, three broad measures should be taken. First, education and health services should be much improved. Second, technical education and training should be emphasized. Third, facilities of higher order service functions should be established in the long run. More specific points related to each of these measures are described below.

Education and health services

Improvement of education and health services in the Region should aim at least at the attainment of the present national average by 2005. Specifically, the enrollment ratios at schools of different levels and the levels of health facilities and personnel should exceed the current national average by 2005. This will call for the allocation of public investment to the Region in these sectors higher than its population shares (Appendix C). Roles of private sector in education and health services will become increasingly more important.

Still, the target of 100 % enrollment for primary school education may face difficulty due to the dispersed settlement pattern and the social structure of rural population in the Region. To overcome this difficulty, a new system should be examined, combining boarding schools and bussing system (Appendix G-2).

Parallel to the improvement of physical conditions, teaching staff and all other staff requirements should be met through all stages of education. To this end, extra stipends for teachers posted to the Region should be substantially increased, and their housing, health and recreational needs should be met on priority basis.

Audio-visual media should be effectively utilized for educating a broad range of people and for health, sanitation and other campaigns. They are also useful for transmitting extension information related to crop varieties, farming practices and marketing opportunities.

Improvement of rural sanitation is important not only as a basic human need but also as another condition for enhancing productivity in rural areas. In addition to improving the provision of health services in accordance with the criteria described above, a particular attention needs to be paid to some diseases that may proliferate as a result of extensive irrigation and water impoundment. Monitoring is an essential measure to control such adverse phenomena.

Technical education/training

Levels of technical education and training are particularly low in the Region as compared with the national average. In view particularly of a range of activities to be newly established as a result of GAP implementation, technical education/training in a wide range of fields will be required. These fields include various agro-processing, intensive cattle raising, poultry and associated service activities. The current initiative taken by the General Directorate of Work and Employment for vocational training should be further strengthened. To increase overall productivity and employment opportunities in rural areas, courses should be offered at existing and new institutes gearing with specific needs of the Region's rural areas such as metal works, weaving, handicraft and home economics.

High order services

Higher order service functions often attract potential in-migrants, and the presence of such facilities is quite effective in enhancing the overall image of the GAP region. A major institute for higher education should be established in the Region in the long run. Other facilities of higher order functions to be considered include international conference facilities and centers for advanced technology.

5.5 Financial Capacity

5.5.1 Past trends

(1) Capital investment - a macro view

The State budgets with deficit policy represent a major weakness of public finance in Turkey, causing high inflation rates and bias in savings (subsection 2.1.1). To reduce public investment to decrease deficits and suppress inflation, however, will slow down the economic growth considerably. The Economic Stabilization Programs introduced in 1980 by the Government is an attempt to resolve this dilemma. For instance, the value added tax (VAT) should be seen as a means to increase State revenues, and various funds have been established to meet investment requirements through non-budget funds. Examples of the latter are the Mass Housing Fund and Public Participation and Development Support Funds put into application in 1984.

Another major change in the policy direction is the increasing importance attached to the private sector to realize more efficient allocation of financial resources by utilizing market mechanism. This includes the transition of State Economic Enterprises (SEE's) to the market economy to make them profit-making institutions and the privatization of some of them. The factor income of SEE's after taxes is estimated to reach the level comparable to the State revenue from the VAT.

Changes which have occurred along these lines may be traced by a few macro-economic indices. The following points may be noted from the fixed capital investment in recent years.

1) The share of consolidated State budgets in the total fixed capital investment has been decreasing since 1983.
2) The share of SEE investments in the total fixed capital investment has also decreased since 1983.
3) The private sector investment, which decreased its share in the total investment from the 50 % level in early 1970's to 38.9 % in 1982, has now increased to 43 % by 1986.

There are other indications of changes in recent years. The ratio of the fixed capital investment to GNP had been around 20 % since 1975 and decreased to 18-19 % level in 1980's. However, in 1986 it increased to 22.3 %. This is due to the utilization of the mass housing fund and increased utilization of foreign resources. Investment efficiency has been improved as appeared from the incremental capital to output ratio (ICOR) calculated based on the total investment and GNP at factor costs measured respectively in constant prices. That is, the ICOR value improved from 11.8 in the 1976-81 period to 4.4 in 1981-86.

(2) Regional allocation of investment

Public investment

Allocation of public fixed capital investment to the GAP region was 5 % in the 1970-75 period and 6 % in 1976-81, respectively lower than the population share. Considering that the Region has been more sparsely populated, requiring generally higher per capita investment to provide the same service levels, the allocation may reflect the past low priority accorded to the Region by the Central Government.

The public investment share to the Region increased rapidly after 1983 and reached the 9 % level in 1986. This level appears to be reasonable in relation to the population share and the density, but flow of public investments to the Region is considerably different from that for the Nation as a whole. Public investments by source are compared in Table 5.7 for the Region and Turkey for the year 1986. In the Region, the State budgets dominate the public investments accounting for 75.5 %, while the corresponding figure for Turkey is 33.9 %. A significant portion of the State budget allocation to the Region, TL 201.2 billion out of TL 357.1 billion or about 56.3 % of the total, was allocated to the DSI projects which are essentially national projects.

SEE investments in the Region accounted for 7.9 % of the total public investment in 1986. This may be compared with 40.1 % in the Country in the same year. SEE funds in the Region are used mainly for energy, mining (particularly petroleum and phosphate) and manufacturing of cement.

Investments into urban infrastructure facilities such as water supply, sewerage and other municipal facilities, and industrial sites have been partially supported by the İller Bank sources. The Region's share of public investments allocated through İller Bank was 7.6 % of the total İller Bank allocation. If the allocation to local governments, which covers provincial special administrations and municipalities, is included, the Region's share was mere 3.9 % in 1986 for these categories of public investments.

Allocation of public fixed capital investment by sector is also revealing (Table 5.7). First of all, 46 % of all investment in the Region is in the energy sector due to major national projects implemented

by DSI. Of the remaining public sector investment, 68 % is in transport sector. Thus shares of other sectors appear to be excessively small. With this precaution, the following may be observed. Allocations to the mining and manufacturing sectors are generally in proportion to the shares in GDP of value-added in the respective sectors in the Region. Allocation to the agricultural sector is small in view of the Region's contribution within the Nation's economy. Allocations to the tourism, housing, education, health and other services are much smaller than the Region's population share.

Private investment

The private sector investment has been analyzed by examining main components for investment by sector such as wells and pumps in the agricultural sector, vehicles in the transportation sector, and housing. The Region's share in private fixed capital investment has been around 5 % (Table 5.8). Housing and agriculture claim larger shares of the total investment in Turkey, having 7.5 % and 6.7 % respectively. The shares of social sectors are particularly low: 2.5 % for health services and 0.6 % for education.

Provincial breakdown

Provincial breakdown of public and private fixed investments are summarized:

(Unit: %)

	Public investment	Private investment
Adıyaman	2.8	8.9
Diyarbakır	45.2	16.8
Gaziantep	2.6	30.9
Mardin	2.5	9.0
Siirt	5.2	7.9
Şanlıurfa	41.7	26.5
Total	100.0	100.0

The share of Gaziantep in private investment is due to its dominant position in housing, manufacturing and apparently heavy recent expenditure on private irrigation schemes. Şanlıurfa seems also to have attracted relatively high proportion of investment.

(3) Present financial capacity

Government revenues and expenditures

Although a full breakdown of government revenues and expenditures is not possible, some analysis of the current fiscal situation is desirable as a background for projecting potential funding of the GAP. The current position may be summarized as follows:

1) Expenditures are much higher than revenues in all the GAP provinces except Gaziantep;
2) Government tax collections constitute a very small portion of the revenues, being slightly over 2 %; one reason is that many tax exemptions are available for agriculture, the mainstay of the Region's economy;
3) The base for municipal incomes is weak. GAP municipalities depend on their per capita contribution from the Central Government to finance about half of their expenditure, compared with the national average of 38 % (Table 5.9).

4) The Region is highly dependant on the Central Government for financing public sector investments; in 1986, the Region depended on the general budget for financing 76 % of the public sector expenditure, while the municipal authorities financed only 2.2 % (Table 5.7).

Credit facilities

The requirements of working capital and fixed investment can be met from a number of sources. In the Region, commercial banks play a relatively minor role in supplying credit even for working capital (with the possible exception of Gaziantep). According to the Banks Association of Turkey, the provinces of Diyarbakır, Mardin, Siirt and Şanlıurfa received in 1986 only 1 % of the total banking credits supplied. General bank deposits of these provinces is estimated twice the bank credits, reflecting the lack of perceived banking opportunities.

Such credits extended to the Region are mainly in the form of specialized funds, 50 % to agriculture, 10 % each in real property and professional credits and 20 % in development and investment bank credits.These credits are largely provided from the government associated banks - Ziraat Bank in agriculture, the Emlak Bank for real estates, the Halk Bank for commerce and artisan activities.The Region receives 9.6 % of the Ziraat Bank's credits.

Major portions of private sector investment have been financed from sources other than official credit institutions. Mass Housing Fund has financed 10-15 % of private formal housing in the Region.

5.5.2 Financial capacity

(1) Public investment requirements

Public investment requirements have been estimated by sector (Appendix C). Investment costs of the priority irrigation and hydropower schemes of GAP have been estimated individually, and investment requirements for other sectors have been estimated as a whole. For social sectors the estimate assumed that the existing disparity between the GAP region and the rest of the Country in service levels will be narrowed.

The total public investment requirements are estimated to be TL 20,600 billion (in June 1988 price) during 1989-2005. Requirements by five year plan period are TL 5,032 billion during the sixth (1990-94), TL 7,371 billion during the seventh (1995-1999) and TL 6,878 billion during the eighth plan period (2000-2004).

As the major irrigation schemes are put to implementation in stages, the sector division of expenditure will change drastically. The expenditure in agriculture will account for 29 % of the total expenditure in the Region during 1990-94, 34 % during 1995-1990, and 20 % during 2000-2004. It will cover the main irrigation works accounting for 60 % of the total agricultural expenditure, on farm development including land levelling, drainage and small irrigation channels, and soil protection and land improvement measures.

(2) Financial capacity

Assuming a 4.0 % annual increase in public sector investments in Turkey, the GAP investments would account for 8.6 % of the national investment expenditure in 1990-94, 10.3 % in 1995-99, and 8.0 % in 2000-2004. In view of the GAP region's population share, which will increase from 8.5 % in 1985 to 9.6 % in 2005, the required GAP investments as estimated would be justifiable. These allocations are relatively small, considering the contribution of the GAP to national economy especially in the form of foreign exchange earnings/savings.

The incremental capital to output ratio (ICOR) for the GAP investments has been calculated at 3.24 (Section 4.1). At the national level, the ratio of the total investments to the value-added (GNP) will be around 20 %. The average growth of the national economy will be at around 5.4 % per annum in the long run (subsection 4.1.3). This implies the overall ICOR value of 3.7. Thus, the GAP investment would be justified from investment efficiency point of view.

Table 5.1: Main Features of the Southeastern Anatolia Project (GAP)

NO. Project	Irrigation Area (ha)	Power Generation Capacity (MW)	Power Generation Production* (GWh/year)	Province	Present Stage**	Pumping Station Capacity (MW)	Pumping Station Consumption (GWh/year)	Irrigation Water Requirement Max. Unit (lit/sec/ha)	Irrigation Water Requirement Per ha (m^3/ha/year)	Irrigation Water Requirement Annual (Mm^3/year)
1. Lower Fırat Project										
1.1 Atatürk Dam and HPP	—	2,400	8,100	Adıyaman / Ş.Urfa	U/C	—	—	—	—	—
1.2 Urfa Tunnel and HPP	—	48	124	Şanlıurfa	U/C	—	—	—	—	—
1.3 Urfa-Harran Irrigation	141,535	—	—	Şanlıurfa	U/C	—	—	1.11	10,410	1,481
1.4 Mardin - Ceylanpınar Irrigation										
1.4.1 First Stage Irrigation	230,130	—	—	Mardin / Ş.Urfa	F/S	101	272	1.08	10,005	2,302
1.4.2 Second Stage Irrigation	104,809	—	—	Mardin / Ş.Urfa	F/S	—	—	1.08	10,005	1,049
1.5 Siverek-Hilvan Pumped Irrigation	160,105	—	—	Şanlıurfa	Rec	616	1,250	0.99	8,920	1,428
1.6 Bozova Pumped Irrigation	69,702	6	16	Şanlıurfa	Rec	216	437	0.99	8,920	622
2. Karakaya Dam and HPP Project	—	1,800	7,354	D.Bakır / Ş.Urfa	in operation	—	—	—	—	—
3. Border Fırat Project										
3.1 Birecik Dam and HPP	—	672	1,797	G.Antep / Ş.Urfa	D/D	—	—	—	—	—
3.2 Karkamış Dam and HPP	—	180	470	G.Antep / Ş.Urfa	D/D	—	—	—	—	—
4. Suruç - Baziki Project	146,500	44	107	Şanlıurfa	Rec	216	430	1.11	10,410	1,525
5. Adıyaman - Kahta Project										
5.1 Hydroelectric Power Plants (5 Projects)	—	196	509	Adıyaman	M/P	—	—	—	—	—
5.2 Irrigation Projects (5 Projects)	77,409	—	—	Adıyaman	M/P	308	494	0.88	7,626	590
6. Adıyaman - Göksu - Araban Project	71,598	—	—	A.Man/G.Antep	F/S	57	111	0.87	7,227	517
7. Gaziantep Project	81,670	—	—	G.Antep	F/S	146	408	0.87	7,227	590
SUB-TOTAL (1 to 7) FOR FIRAT RIVER BASIN	1,083,458	5,346	18,477			1,660	3,402	—	—	10,104
8. Dicle-Kralkızı Project										
8.1 Kralkızı Dam and HPP	—	90	142	Diyarbakır	U/C	—	—	—	—	—
8.2 Dicle Dam and HPP	—	110	118	Diyarbakır	U/C	—	—	—	—	—
8.3 Dicle Right Bank Irrigation	52,033	—	—	Diyarbakır	D/D	—	—	1.23	11,693	137
8.4 Dicle Right Bank Pumped Irrigation	74,047	—	—	Diyarbakır	D/D	86	214	1.23	11,693	866
9. Batman Project										
9.1 Batman Dam and HPP	—	185	483	D.Bakır/Siirt	U/C	—	—	—	—	—
9.2 Batman Right Bank Irrigation	18,758	—	—	Diyarbakır	U/C	—	—	1.17	8,678	163
9.3 Batman Left Bank Irrigation	18,986	—	—	Siirt	U/C	12	25	1.17	8,678	165
10.Batman-Silvan Project	213,000	300	1,500	Diyarbakır	M/P	104	256	1.17	8,678	1,848
11.Garzan Project	60,000	90	315	Bitlis/Siirt	M/P	29	53	1.03	8,441	506
12. Ilısu Dam and HPP	—	1,200	3,028	Mardin/Siirt	D/D	—	—	—	—	—
13. Cizre Project										
13.1 Cizre Dam and HPP	—	240	940	Mardin	D/D	—	—	—	—	—
13.2 Silopi Irrigation	32,000	—	—	Mardin	F/S	65	121	1.17	9,019	289
13.3 Nusaybin-Cizre-İdil Pumped Irrigation	89,000	—	—	Mardin	F/S	349	643	1.03	9,805	873
SUB-TOTAL (8 to 13) FOR DICLE RIVER BASIN	557,824	2,215	6,526			645	1,312	—	—	4,847
TOTAL (1 to 13) FOR WHOLE GAP	**1,641,282**	**7,561**	**25,003**			**2,305**	**4,714**			**14,951**

Sources: Atatürk dam and irrigation system - an overview -, Southeast Anatolia Project Management Unit, March, 1988
Supplemented by Güneydoğu Anadolu Projesi, DSI, 1980

* : At full development

** : U/C- under construction, D/D- detailed design completed, F/S- feasibility study completed, M/P- master plan, Rec- Reconnaissance

Table 5.2: Main Features of Water Resource Facilities

Project	Reservoir			Power Plant		
	FSL (*) (El. m)	Active storage (10^6 m^3)	Surface area at FSL (km^2)	Installed capacity (MW)	Max (**) discharge (m^3/s)	Catchment area (km^2)
Fırat River System						
Keban	845.0	16,800.0	675.0	1,360.0	1,080	64,092
Karakaya	693.0	5,589.0	298.0	1,800.0	1,470	80,358
Atatürk	542.0	19,300.0	817.0	2,400.0	1,760	92,338
Birecik	385.0	704.0	56.0	672.0	1,900	100,702
Karkamış	340.0	150.0	28.0	180.0	1,900	102,612
Gömikan	831.5	39.5	1.8			53
Çamgazi	648.5	44.2	6.2			137
Koçali	1,067.0	264.8	7.2	39.8		294
Büyükçay	1,210.0	130.2	3.2	30.4		172
Kahta	653.0	170.0	20.7	75.4		1,687
Sırımtaş	860.0	3.0	1.2	28.4		291
Fatopaşa		run-of-river		22.2		166
Çataltepe	918.5	627.0				1,667
Harmancık	842.0	200.0				40
Çatobağazı	699.0	223.0				37
Hancağız	432.5	83.0	7.5			1,017
Kaycık	600.0	117.0	4.6			465
Kemlim	566.0	31.7	3.6			222
Seve	587.5	19.4				142
Dicle River System						
Kralkızı	815.8	1,712.0	58.0	90.0	145	1,300
Dicle	715.0	255.0	24.0	110.0	156	3,216
Devegeçidi	757.0	195.0	30.0			1,578
Batman	665.0	737.0	45.0	185.0	262	4,105
Silvan	820.0	4,138.0	181.0	150.0	105	2,305
Kayser	830.0	527.0	21.9	90.0		789
Garzan	830.0	435.0	19.0	90.0	62	
Ilısu	525.0	7,460.0	295.0	1,200.0	1,100	35,509
Cizre	404.4	232.0	19.0	240.0	743	38,295
Kirkemir	837.0	182.0	5.0	48.0		1,658
Hezil	719.0	24.0	0.8	40.0		1,698
Hezil regulator		run-of river		14.7	73.5	
Zorova I		run-of river		5.7	11.8	
Zorova II		run-of river		94.0	72.8	
Dicle P/S		run-of river		58.5	72.3	

Note: (*) FSL=Full Supply Water Level

(**) Maximum discharge is the Consultant's estimate

Source: Feasibility study reports of respective projects, DSI

Table 5.3: Summary of Irrigation Water Requirements

Irrigation scheme	Irrigation area Gross (ha)	Irrigation area Net (ha)	Water Requirements* (10^6 m^3)	Monthly Peak Demand* (m^3/s)
1) Fırat river basin				
Urfa-Harran	141,535	123,560	1,527	144
Mardin-Ceylanpınar I	230,130	195,518	2,370	228
Mardin-Ceylanpınar II	104,809	89,800	994	102
Siverek-Hilvan	160,105	140,060	1,523	158
Bozova pumped	69,702	60,975	718	68
Suruç-Baziki	146,500	124,994	1,472	137
Adıyaman-Kahta	77,409	66,324	677	73
Adıyaman-Göksu-Araban	71,598	61,087	428	43
Gaziantep	81,670	69,093	720	67
Total Fırat river	1,083,458	931,411	10,429	1,020
2) Dicle river basin				
Dicle-Kralkızı I	52,033	44,395	506	55
Dicle-Kralkızı II	74,047	63,977	750	82
Batman right bank	18,758	15,937	169	19
Batman left bank	18,986	16,062	163	19
Batman-Silvan	213,000	187,099	1,752	200
Garzan	60,000	52,704	537	62
Nusaybin-Cizre-Idil	70,000	61,488	770	76
Nusaybin	19,000	16,690	209	21
Silopi	32,000	27,648	339	35
Total Dicle River	557,824	486,000	5,195	569
Grand Total (Fırat + Dicle)	**1,641,282**	**1,417,411**	**15,624**	**1,589**

* Estimated by the Consultant

Table 5.4: Mean Annual Energy Production in Fırat Main Stream*

Reservoir	Item		Mean Annual Values (1) without irrigation	(2) with Urfa-Harran	(3) (2) plus Mardin-Ceylanpınar I	(4) full irrigation development
	Irrigation area (gross)	(ha)	0	141,500	371,700	1,083,500
Keban						
	plant factor	(%)	48	48	48	48
	firm discharge	(m^3/s)	465	465	465	465
	firm energy	(GWh)	5,200	5,200	5,200	5,200
	secondary energy	(GWh)	558	558	558	558
	total	(GWh)	5,758	5,758	5,758	5,758
Karakaya						
	plant factor	(%)	41	41	41	41
	firm discharge	(m^3/s)	562	562	562	562
	firm energy	(GWh)	6,220	6,220	6,220	6,220
	secondary energy	(GWh)	639	639	639	639
	total	(GWh)	6,859	6,859	6,859	6,859
Atatürk						
	plant factor	(%)	40	37	32	22
	firm discharge	(m^3/s)	677	627	546	375
	firm energy	(GWh)	8,190	7,580	6,610	4,550
	secondary energy	(GWh)	515	536	622	750
	total	(GWh)	8,705	8,116	7,232	5,300
Birecik						
	plant factor	(%)	43	40	34	21
	firm discharge	(m^3/s)	687	637	554	347
	firm energy	(GWh)	2,330	2,180	1,940	1,220
	secondary energy	(GWh)	250	259	358	483
	total	(GWh)	2,580	2,439	2,298	1,703
Karkamış						
	plant factor	(%)	37	34	30	18
	firm discharge	(m^3/s)	688	638	557	348
	firm energy	(GWh)	583	536	473	284
	secondary energy	(GWh)	139	144	140	167
	total	(GWh)	722	680	613	451
Total	firm energy	(GWh)	22,523	21,716	20,443	17,474
	secondary energy	(GWh)	2,101	2,136	2,317	2,597
	total energy	(GWh)	24,624	23,852	22,760	20,071

Note: Full development includes Urfa-Harran, Mardin-Ceylanpınar, Siverek-Hilvan, Bozova pump, Suruç-Baziki, Adıyaman-Kahta, Adıyaman-Göksu-Araban, Gaziantep projects.

* Estimated by the Consultant.

Table 5.5: **Annual Energy Production in Dicle River**

			Mean Annual Value		
	Irrigation schemes		(1) * no new irrigation	(2) ** under const. +priority project	(3) *** full development
	Irrigation area	(ha)	12,800	376,800	525,800
Kralkızı					
	plant factor	(%)		0	0
	firm discharge	(m^3/s)		0	0
	firm energy	(GWh)		0	0
	secondary energy	(GWh)		101	101
	total energy	(GWh)		101	101
Dicle					
	plant factor	(%)		0	0
	firm discharge	(m^3s)		0	0
	firm energy	(GWh)		0	0
	secondary energy	(GWh)		124	124
	total energy	(GWh)		124	124
Batman					
	plant factor	(%)		8	8
	firm discharge	(m^3/s)		19	19
	firm energy	(GWh)		120	120
	secondary energy	(GWh)		262	262
	total energy	(GWh)		382	382
Silvan					
	plant factor	(%)		0	0
	firm discharge	(m^3/s)		0	0
	firm energy	(GWh)		0	0
	secondary energy	(GWh)		27	27
	total energy.	(GWh)		27	27
Garzan					
	plant factor	(%)			33
	firm discharge	(m^3/s)			15
	firm energy	(GWh)			213
	secondary energy	(GWh)			79
	total energy	(GWh)			292
Ilısu					
	plant factor	(%)	31	25	24
	firm discharge	(m^3/s)	289	232	220
	firm energy	(GWh)	2,960	2,410	2,310
	secondary energy	(GWh)	979	857	796
	total energy	(GWh)	3,939	3,267	3,106
Cizre					
	plant factor	(%)	45	43	30
	firm discharge	(m^3/s)	314	250	177
	firm energy	(GWh)	942	760	612
	secondary energy	(GWh)	258	178	303
	total energy	(GWh)	1,200	938	915
Total	**firm energy**	**(GWh)**	**3,902**	**3,290**	**3,255**
	secondary energy	**(GWh)**	**1,237**	**1,549**	**1,692**
	total energy	**(GWh)**	**5,139**	**4,839**	**4,947**

Note: * (1) Existing irrigation, Devegeçidi and Batman
** (2) Kralkızı-Dicle-Devegeçidi and Batman-Silvan
*** (3) (2) plus Garzan, Nusaybin-İdil-Cizre and Silopi

•• Estimated by the Consultant

Table 5.6: Summary of Project Ranking

Province	Under Construction Project	Type*	To be newly implemented Project	Type*	Evaluation** Irrigation (10^6TL per ha)	Power IRR (%)	Gross irrigated area (ha)	Installed capacity (MW)
Adıyaman			Kocali & Fatopasa	IR, HP	0.78		21,605	62
			Büyükçay	IR, HP	1.06		12,322	30
Diyarbakır	Dicle-Kıralkızı 1 st	IR, HP	Dicle-Kıralkızı 2nd	IR	1.14		74,047	
			Batman-Silvan	IR, HP	1.26		213,000	150
Gaziantep			Kaycık dam and irrigation	IR	1.21		2,896	
	Hancağız	IR	Birecik pumping system	IR	1.09		55,960	
			Çataltepe dam and Gaziantep water supply***	WS, IR			11,937	
Mardin			Mardin-Ceylanpınar I	IR	1.23		230,130	
			Ilısu	HP		13.70		1,200
Siirt	Batman irrigation	IR, HP	Hezil-Silopi irrigation	IR, HP	1.28		32,000	173
	Garzan-Kozluk	IR						
Şanlıurfa	Atatürk dam	IR, Hp						
	Urfa tunnel	IR,HP,WS	Birecik	HP		19.20		672
	Urfa irrigation	IR	Karkamış	HP		16.40		180
	Harran Irrigation	IR						
	Total						653,897	2,467
	Grand Total including those under construction						894,459	5,306

* IR-irrigation, HP-hydropower, WS-water supply

** Criteria for project selection: Irrigation project: cost/ha smaller than 1.3 million TL/ha
Hydropower project: internal rate of return (IRR) greater than 12 %

*** Selected with water supply priority

Table 5.7: **Activities Subject to Environmental Impact Assessment**

1. Refineries and establishments for liquefaction and gasification
   a) Crude oil refineries (excluding the establishments producing grease out of crude oil)
   b) Establishments for liquefaction and gasification, out of coal and bituminous schist
2. Thermal power plants and nuclear power plants,
   a) Thermal power plants and other combustive establishments, having 300 MW or more heating power
   b) Nuclear power plants and other nuclear reactors (excluding research centers related to the fissionable products having not more than 1 kW of maximum thermal power)
3. Establishments for radioactive wastes
   a) Establishments for storage or disposal of radioactive wastes
   b) Long term storage of radioactive wastes
4. Integrated iron and steel establishments
5. Integrated chemical establishments
6. Cement factories
7. All types of paper factories
8. Establishments for producing asbestos and asbestos products
   a) Establishments producing asbestos-cement products, with an annual production of more than 20,000 tons
   b) Establishments producing friction products with an annual production of more than 50,000 tons
   c) Other type of establishments using asbestos more than 200 tons annually
9. Large infrastructure constructions
   a) Inter city highways, express ways and bridges and tunnels connected to these highways
   b) Inter city railways and bridges and tunnels connected to these railways
   c) Airports having longer than 2,100 m of runway
   d) Commercial ports
   e) Petroleum and gas pipe lines and establishments
   f) Dams (having more than 100 million m^3 of maximum storage capacity or having more than 15 km^2 of surface area)
10. Integrated development projects (regional development, rural development, tourism development and other similar projects)
11. Establishments for burning toxic and hazardous wastes, chemical purification and land disposal

Source: G.D. of Environmental Affairs, Draft Regulations on Environmental Impact Assessment, 1989.

Table 5.8: Public Investment Expenditures by Sector in1986, GAP Region and Turkey

(Unit: 10^9 TL in current price)

Sector	General Budget		SEE		Funds		İller Bank		Revolving capital		Local governments		Total public investment		%	
	Turkey	GAP	Turkey	GAP	Turkey	GAP	Turkey	GAP	Turkey	GAP	Turkey	GAP	Turkey	GAP	Turkey	GAP
Agriculture	315.0	12.5	26.1	0	0	0	0	0	45.4	0.8	15.6	0.4	**402.2**	**13.7**	8.1	3.1
Mining	32.0	0	273.9	13.7	0	0	0	0	0	0	5.2	0.3	**311.1**	**14.0**	6.2	3.2
Manufacturing	3.5	0	372.4	10.2	0	0	0.9	0.1	4.8	0	31.3	1.0	**412.8**	**11.3**	8.3	2.6
Energy	357.0	149.6	509.4	10.8	225	51.6	0	0	0	0	18	1.5	**1109.4**	**213.5**	22.2	48.7
Transport	430.0	161.4	789.6	0	148.8	2.5	0	0	44.1	0.3	242.2	0.6	**1654.7**	**164.8***	33.2	37.7
Tourism	11.5	0.3	5.3	0	3.5	0	0.9	0	4.2	0	30.7	0.2	**56.2**	**0.5**	1.1	0.1
Housing	61.2	2.2	7.2	0	0	0	0	0	0.4	0	21.4	0.4	**90.3**	**2.6**	1.8	0.6
Education	155.7	1.2	1.4	0	14.6	0	0	0	4.8	0	20.9	0.5	**197.4**	**1.7**	4.0	0.4
Health	46.6	1.0	1.5	0	0	0	0	0	5.9	0	26.7	0.4	**80.6**	**1.4**	1.6	0.4
Other Services	279.5	1.9	15.2	0	48	0	124.7	7.5	4.1	0	204.4	4.3	**675.8**	**13.7**	13.5	3.2
Total	**1692.0**	**330.1**	**2002.0**	**34.7**	**439.9**	**54.1**	**126.5**	**7.6**	**113.7**	**1.1**	**616.4**	**9.6**	**4990.5**	**437.2**	100.0	100.0
(%)	33.9	75.5	40.1	7.9	8.8	12.4	2.5	1.7	2.3	0.3	12.4	2.2	100.0	100.0		

* Includes investment costs of the second Iraq - Turkey pipeline (TL 141.9 billion) and some portion of TETEK project.

Table 5.9: **Fixed Investment in GAP Compared with the Nation (Average over 1981-1985)**

(a) Fixed Investments

(Units: 10^9 TL, 1988 prices)

	GAP			NATION		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
AGRICULTURE	28.0	51.0	79.0	833.3	755.6	1588.9
MINING	23.0	3.7	26.7	954.0	74.3	1028.3
MANUFACTURING	67.0	87.8	154.8	1983.5	2440.9	4424.4
ENERGY	334.0	0.0	334.0	2624.9	8.2	2633.1
TRANSPORT	160.0	22.6	182.6	2303.4	453.7	2757.1
HOUSING	11.0	149.7	160.7	204.2	1983.3	2187.5
EDUCATION	4.0	0.1	4.1	370.6	16.3	386.9
HEALTH	1.0	0.5	1.6	151.3	19.7	171.0
TOURISM	1.0	2.0	3.0	69.2	80.3	149.5
OTHER SERVICES	15.0	15.1	30.1	788.9	302.8	1091.7
TOTAL	644.0	332.6	976.6	10283.3	6135.1	16418.4

(b) Investment Structure

	GAP			NATION		
	PUBLIC	PRIVATE	TOTAL	PUBLIC	PRIVATE	TOTAL
AGRICULTURE	4.3	15.3	8.1	8.1	12.3	9.7
MINING	3.6	1.1	2.7	9.3	1.2	6.3
MANUFACTURING	10.4	26.4	15.9	19.3	39.8	26.9
ENERGY	51.9	0.0	34.2	25.5	0.1	16.0
TRANSPORT	24.8	6.8	18.7	22.4	7.4	16.8
HOUSING	1.7	45.0	16.5	2.0	32.3	13.3
EDUCATION	0.6	0.0	0.4	3.6	0.3	2.4
HEALTH	0.2	0.2	0.2	1.5	0.3	1.0
TOURISM	0.1	0.6	0.3	0.7	1.3	0.9
OTHER SERVICES	2.4	4.6	3.1	7.7	4.9	6.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

(c) Region's Share in Turkey

	GAP		
	PUBLIC	PRIVATE	TOTAL
AGRICULTURE	3.4	6.7	5.0
MINING	2.4	5.0	2.6
MANUFACTURING	3.4	3.6	3.5
ENERGY	12.7	0.0	12.7
TRANSPORT	6.9	5.0	6.6
HOUSING	5.4	7.5	7.3
EDUCATION	1.1	0.6	1.1
HEALTH	0.9	2.5	0.9
TOURISM	1.4	2.5	2.0
OTHER SERVICES	1.9	5.0	2.8
OVERALL	6.3	5.4	6.0

Sources: SPO, Annual Investment Programs and SIS Statistics

Table 5.10: Municipal Revenues, 1984

(a) Municipality Revenues (Units: 10^9 TL, Current prices)

TOTAL REVENUES	ADIYAMAN	DİYARBAKIR	GAZİANTEP	MARDİN	SİİRT	Ş. URFA	GAP	TURKEY
Municipal share from General Budget Tax Revenue	1.50	5.11	5.36	2.65	2.22	3.71	20.54	471.41
Municipality:								
Taxes	0.18	0.83	0.76	0.37	0.19	0.36	2.69	79.80
Fees and charges	0.15	0.41	0.46	0.48	0.12	0.43	2.05	78.42
Cost recovery from Water Supply and Urban Roads	0.09	0.20	0.12	0.17	0.13	0.10	0.81	35.84
Revenue and Profit from Institutions/Enterprises	0.26	0.51	4.33	0.30	0.14	0.26	5.80	70.48
Various Revenues, Wages, Aids and Funds	0.53	2.24	3.01	1.83	0.93	1.50	10.04	497.66
TOTAL	2.71	9.28	14.04	5.80	3.74	6.37	41.94	1233.61

(b) Municipality Revenues (%)

TOTAL REVENUES	ADIYAMAN	DİYARBAKIR	GAZİANTEP	MARDİN	SİİRT	Ş. URFA	GAP	TURKEY
Municipal share from General Budget Tax Revenue	55.33	55.01	38.15	45.62	59.44	58.30	48.98	38.21
Municipality:								
Taxes	6.55	8.90	5.42	6.45	5.10	5.68	6.42	6.47
Fees and charges	5.57	4.42	3.27	8.29	3.19	6.80	4.89	6.36
Cost recovery from Water Supply and Urban Roads	3.31	2.11	0.88	2.89	3.53	1.60	1.93	2.91
Revenue and Profit from Institutions/Enterprises	9.51	5.45	30.88	5.16	3.81	4.04	13.82	5.71
Various Revenues, Wages, Aids and Funds	19.72	24.12	21.41	31.59	24.93	23.58	23.95	40.34
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: SIS, Final Accounts for Local Governments, 1984

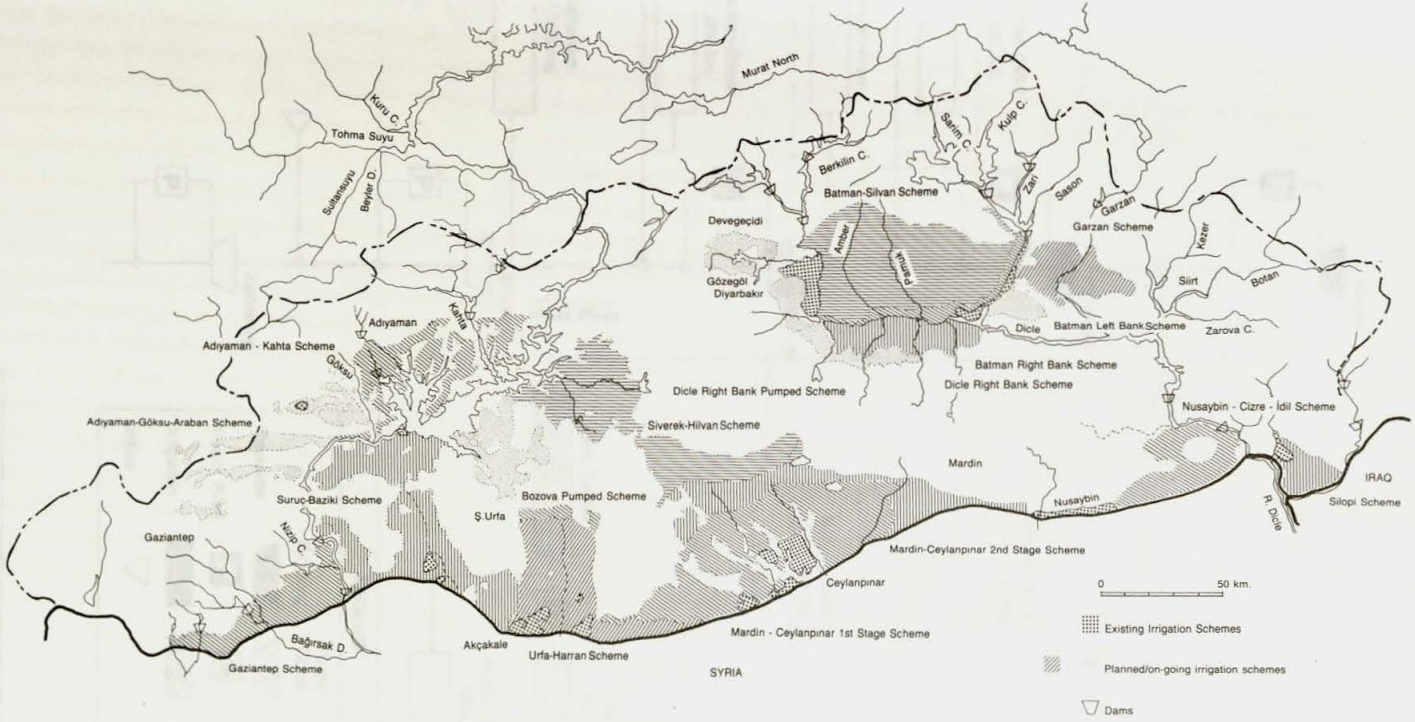

Figure 5.1: Location Map of Water Resources Development Schemes in the Region

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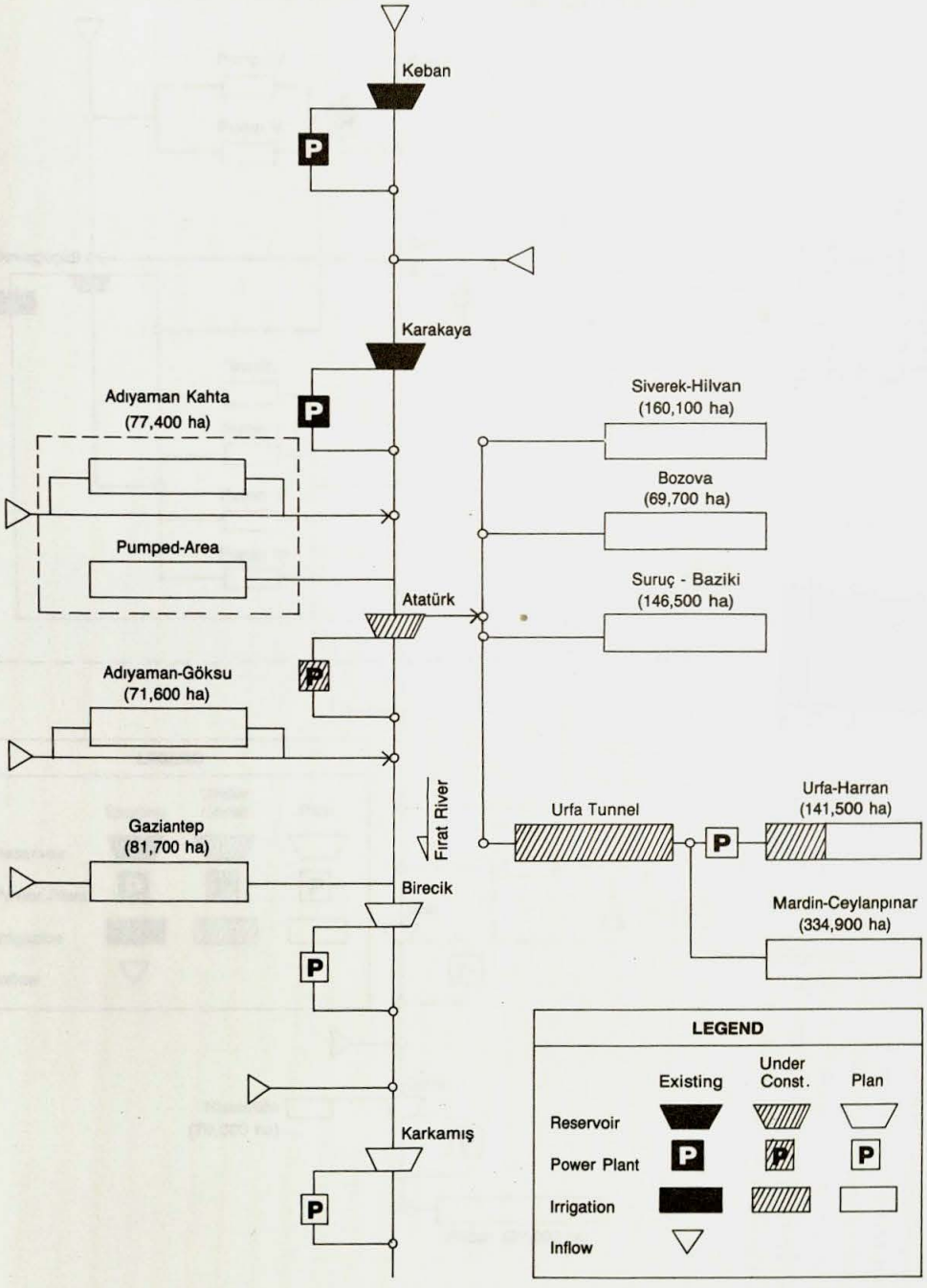

Figure 5.2: Fırat Main Stream Model

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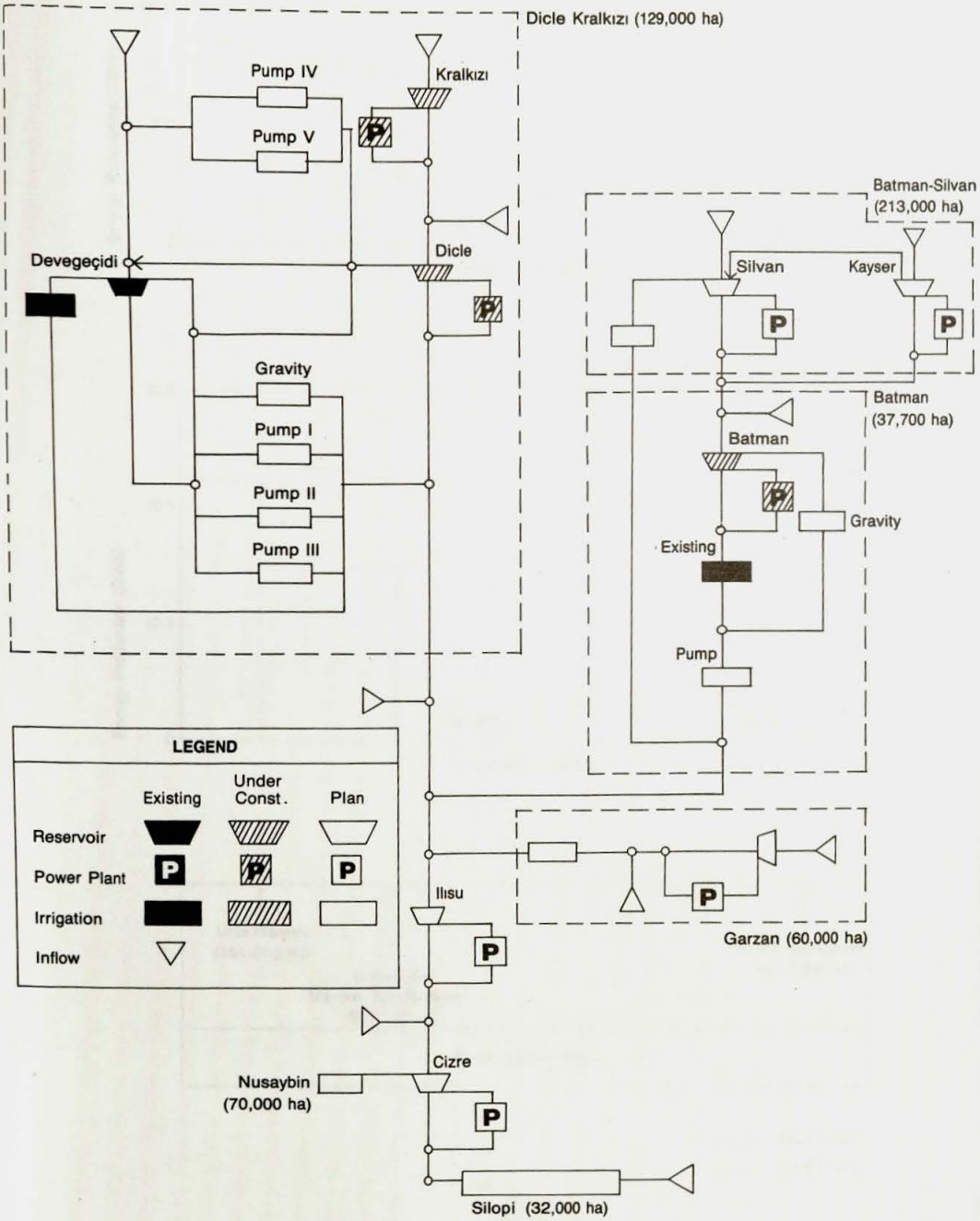

Figure 5.3: Dicle Main Stream Model

REPUBLIC OF TURKEY
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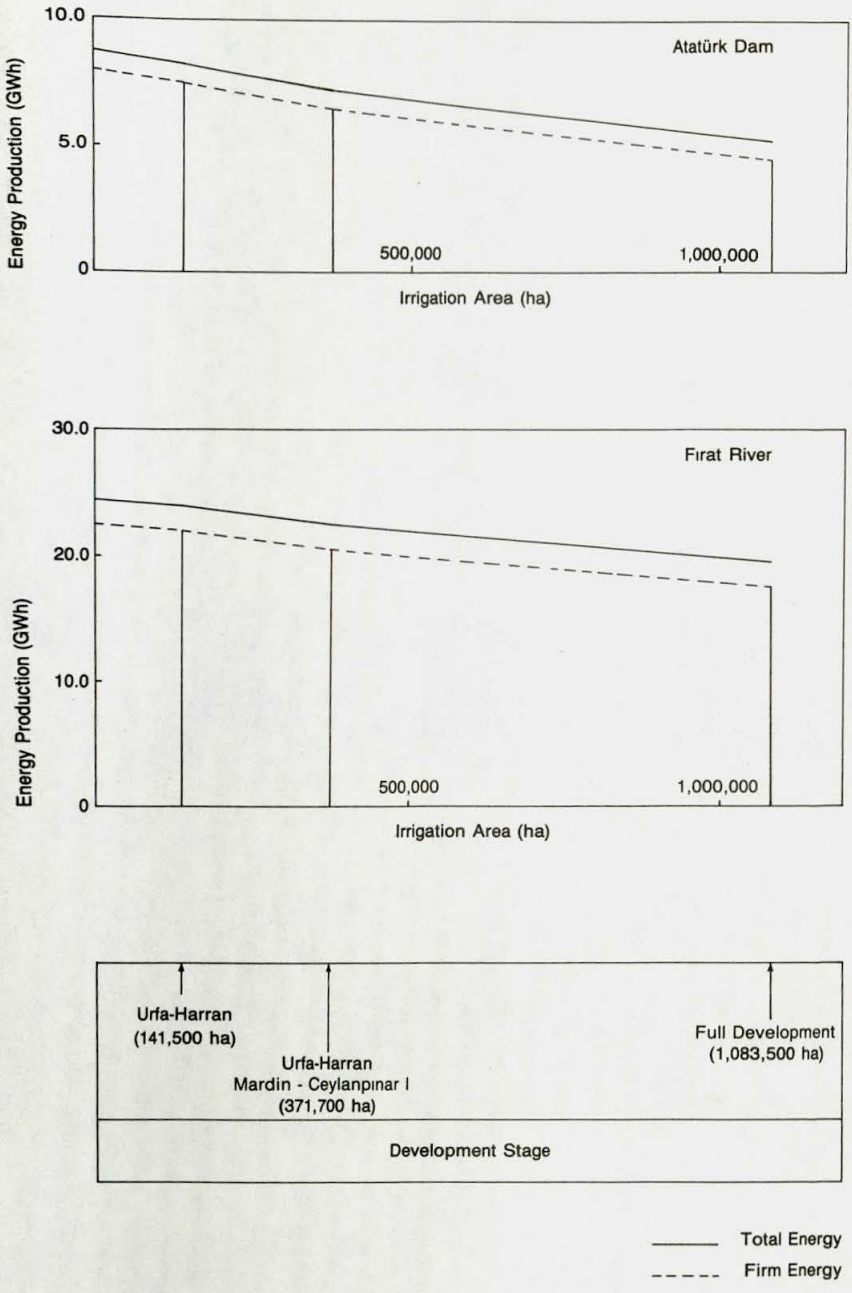

Figure 5.4: Trade-off Between Irrigation Area and Energy Production in Fırat River

REPUBLIC OF TURKEY
SOUTHEASTERN ANATOLIA PROJECT
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6

Chapter VI

DEVELOPMENT PLAN

6.1 Development Areas and Projects

Six broad areas have been defined as development areas (subsection 4.2.5). A different set of programs is proposed for each of these areas on the basis of their resource base, constraints faced and expected functions. These functions are: a) high order export oriented manufacturing (Gaziantep); b) agro-processing and trading (Mardin and Şanlıurfa); c) production and administrative services (Diyarbakır, Şanlıurfa, Siirt); and d) special resource base production and services (Adıyaman).

For each of these development areas, present conditions will be outlined, constraints and prospects clarified, basic strategy formulated, and development measures to be implemented in Phase I described. Major constraints to be addressed are low productivity rain-fed agriculture, urban physical infrastructure, social services and communication/transportation. Broad scheduling of the development measures is presented in Tables 6.1 through 6.6.

6.1.1 Diyarbakır - Batman Development Area

(1) Present conditions

This development area is most diversified both in existing conditions and in future prospects. Some accumulation of industries is observed, representative ones being tobacco, liquor, textile, and animal feed industries as well as flour mills in Diyarbakır and a refinery in Batman. The Ergani copper smelter with 18,000 tons/year capacity is now operating at 8,000 tons/year production. The Turkish Development Foundation (TKV) has a variety of activities, including poultry, animal feed, slaughtering and carpet weaving.

Livestock activities are also popular in this area. Diyarbakır province has the largest number of cattle of all the GAP provinces. Silkworm growing and bee-keeping add to the variety of this area's economy. The city of Diyarbakır is not only the center of commerce and industry for this and contiguous areas, but also a distribution center for goods from the inland. Dicle University has its campus with medical science, education, law and architecture schools.

(2) Constraints

Extended dry season with very high temperature in summer and occasional frost damage in winter constrain the agricultural development in this area. Sloping and undulating lands are dominant in the planned irrigation areas. Economic feasibility of some of the planned schemes may need to be carefully re-established. Livestock activities seem to be constrained by the diminishing productivity of the grazing land.

The tribal (aşiret) structure constitutes the social base, and large landlords dominating each tribe/sub-tribe are said to be conservative to innovation.

(3) Prospects

Large irrigation schemes are planned and partly implemented. On the basis of expanded agricultural produce, many prospective agro-processing industries are conceived such as edible oils, animal feed, and ginnery. Petroleum resources will continue to be of major importance in the coming two decades, provided that the exploration for additional reserves is continued.

Diyarbakır city will play a key role for the area's development, having an airport, railway connection and good road services and being a part of the main development axis. Most agro-processing industries will be located in and around the city. With the urban functions of the city and the productive hinterland, this development area will form a consolidated urban-rural complex.

(4) Basic strategy

Short - to medium - term

- To concentrate development efforts on more promising irrigation schemes identified by the Master Plan in order to attain maximum benefits with smaller investment costs and on the establishment of processing industries based on the increased agricultural produce; and
- To enhance the urban functions of Diyarbakır municipality by improving infrastructure and social services and establishing the processing industries.

Medium - to long - term

- To expand the development corridor along Diyarbakır - Batman by capitalizing on the productive agricultural land and improving the physical linkages.

(5) Projects and other measures

In addition to the completion of on-going projects, the Batman right bank irrigation project should be implemented, and the implementation of the Dicle right bank irrigation and the Batman left bank irrigation projects should be initiated in Phase I. Grain storage facilities should be expanded, and a major distribution depot for fertilizer and agro-chemicals established. Demonstration schemes for oil crops should be implemented, the EBK meat combine upgraded and animal feed mills also expanded in Phase I. The first stage of the Diyarbakır urban development project will be implemented, focusing on the rehabilitation of existing facilities.

The feasibility study (F/S) of the Dicle right bank irrigation with an additional dam at Dipni and the Dicle right bank pumped irrigation projects urgently need to be updated. The F/S of the Batman-Silvan project should be reviewed comprehensively, including the Kayser dam and water transfer option. A study of pipeline extension for local needs will be conducted in this phase.

Commercial poultry by Turkish Development Foundation (TKV) will be promoted with contract farmers. An integrated poultry center should be established including parent stock breeding, production and distribution of chicks and feed, slaughter facilities, cold stores and marketing facilities. Both investment and production credit need to be provided. The Agricultural Bank (TCZB) programmes providing credit for broiler and egg production should be extended to the GAP region.

Extension services related to the expansion of various oilseed will be intensified within the TYUAP system. Also intensified in the initial phase should be research on irrigation technology, crop rotation and on-farm water management particularly on slope lands.

6.1.2 Greater Şanlıurfa Development Area

(1) Present conditions

This development area consists of the area around Şanlıurfa municipality, Siverek, Viranşehir, Birecik and Bozova. This is an area where the potential has been least exploited. Subsistence-oriented activities with mixed farming are still dominant, or otherwise large scale farms are operated in an extensive manner with a small number of beneficiaries. Land ownership is most distorted. In the province of Şanlıurfa, about 40% of farm families are landless. Livestock is dominated by sheep and extensive grazing. The existing manufacturing base is very weak, consisting of a few major feed plants and food and beverage industries. The most important private enterprise is UPISAS cotton yarn factory. An agricultural machinery and implement manufacturing plant exists in Şanlıurfa, owned by the Agricultural Supply Organization (TZDK).

(2) Constraints

The land tenure system constitutes a major constraint. Main characteristics of land ownership in the Region are typically observed in Şanlıurfa such as high share of land owned by large landlords, high proportion of the landless and smallholders, existence of ağa, and high ratio of land owned by absentee landlords. The Land Authority expropriated 161,600 ha in Şanlıurfa designated as a land reform area by Law 1757. This law was cancelled by the High Constitution Court in 1978. The new law (Law 3083) enacted in 1984 concerns mainly land distribution and consolidation in the Urfa - Harran irrigation areas in Şanlıurfa.

Levels of urban and social services are low compared with the national average, which discourages return migrants, despite the expected irrigation development. Lack of a major airport is another constraint, although a new airport has just been completed.

(3) Prospects

Development prospects of the area in the medium - to long - term are quite high. Key factors are the existence of large irrigation schemes including the top priority Urfa-Harran, the central location on the major artery and the main development axis, and the city of Şanlıurfa. Şanlıurfa city has the potential to become the regional center due to its central location, productive hinterland, existing facilities and economic activities and potential tourism resources. This development area as a whole may be characterized as a communication center in the future.

(4) Basic strategy

Short - to medium - term

- To implement the Urfa - Harran irrigation scheme as a driving force of the area development with the concomitant provision of extension services and new land management/ownership;
- To improve the provision of urban services in the city of Şanlıurfa and infrastructure associated with the irrigation development such as rural roads and storage facilities for grains and pulses.

Long-term

- To develop the city of Şanlıurfa into a regional center by providing much improved urban infrastructure and social services; and
- To expand the economic corridor by improving linkages with neighbouring areas.

(5) Projects and other measures

The Urfa-Harran irrigation and the Şanlıurfa-Diyarbakır road improvement projects will be completed in Phase I. The Mardin-Ceylanpınar irrigation first stage and the Border Fırat projects will be initiated. Cotton area will much expand under the Urfa-Harran scheme, and so will ginneries and textile industry capacities. Edible oils and animal feed industries will be established. Increase in on-farm grain storage capacity and upgrading of the EBK meat combine should also take place in this initial phase. The agricultural machinery and implement plant should be upgraded to produce a wider range of products meeting the regional needs. An integrated poultry center and an animal feed lot will be established in the Ceylanpınar State farm.

A set of urban projects should be implemented in Phase I, centering on the city of Şanlıurfa. The Şanlıurfa city water supply and sewerage project will be implemented in stages, with the first stage aiming primarily at rehabilitation of existing facilities. The Şanlıurfa urban development project, first stage, will upgrade roads and communication facilities primarily for tourism and industrial activities. A tourism information center will be much improved.

The communication complex project will aim at converting a part of the State farm to a complex of communication-related facilities. Its first stage will include the improvement of facilites for domestic tourism such as a deer park, picnic area with out-door cooking facilities, small forest for trekking and sport fishing. The farm can also be utilized as a place for out-door education for children, where they can learn some production techniques and experience farming and other rural activities. An easy day trip can be made by a bus from Şanlıurfa, Mardin or Diyarbakır, if the access is improved. The area can be converted in a long run into an international conference/recreation center in a peaceful environment. Advanced agricultural research center may also be established to serve not only the Region and the Country but also neighbouring countries.

The F/S's of the Siverek-Hilvan pumped irrigation and the Bozova pumped irrigation projects should be reviewed and updated in order to identify more promising areas. F/S's of the Suruç-Baziki and the Şanlıurfa regional airport projects will be carried out. Comprehensive studies for the communication complex and the Şanlıurfa urban development projects should precede the respective implementation described above.

Organization/re-organization of smallholders and landless farmers will be necessary for successful implementation and operation of the Urfa-Harran and other irrgation schemes. Such organizations will help to improve on-farm water management and to enhance land productivity (Section 6.3). Extension staff should be trained on the basis of on-the-job training in order to serve other irrigation schemes as well.

6.1.3 Gaziantep Gateway Development Area

(1) Present conditions

This development area covers the area around Gaziantep municipality and the contiguous area along the border with Syria. This area is a gateway from the Mediterranean coast and also to the Middle East markets. It contains the most industrialized area with a variety of manufacturing and commercial activities. The province of Gaziantep contributes to 40% of the total manufacturing value-added in the GAP region with textile, apparel, food and beverages, metal products and other industries. Most agro-related products are presently exported through Gaziantep such as live animals, meat, cereals, lentils, chick peas and pistachios.

(2) Constraints

The city of Gaziantep faces water supply problems. Conflicts in land use between urbanization/industrialization and agriculture are acute. In the hinterland, diminishing grazing land and slope land constrain agricultural and livestock activities.

Although the area is highly industrialized, further growth at higher level of industrialization may be constrained by the present industrial structure dominated by agro-processing and consumer goods industries. The recent change of the Gaziantep province to a net out-migrating area may be an early indication of this fundamental constraint.

(3) Prospects

The advantages of the area include its location along E-24 close to the Mediterranean coast, good access to the neighbouring Middle East countries, the existence of Small Industry Development Organization (KÜSGET), land generally suitable for agriculture and the well developed road network connecting to neighbouring provinces. The present industrialization level is high enough to introduce a new leading industry. The tourism attractions and chromium deposits in the west are other factors for consideration.

The area already has a well developed private business sector. Incentive measures will constitute the main form of public sector intervention.

(4) Basic strategy

Short - to medium - term

- To improve infrastructure and utilities within Gaziantep municipality in order to maintain its status as the Region's commercial and trade center; and
- To take incentive measures to attract the private sector investment into new industries to diversify the industrial base.

Long - term

- To develop Gaziantep into a high order export oriented industrial center.

(5) Project and other measures

The projects to be completed in Phase I include the Hancağız irrigation scheme of the Gaziantep project, Gaziantep-Araban road improvement, and Gaziantep city water supply and sewerage, first stage, primarily for rehabilitation of existing facilities. The F/S of Adıyaman-Göksu-Araban project should be reviewed and updated with the primary focus on the Çataltepe dam and municipal water supply for Gaziantep. The F/S of Gaziantep project should be updated for subsequent implementation.

Groundwater irrigation development by private sector should also be promoted. Technical training by KÜSGET should be strengthened as well as industrial extension and consultancy/guidance for prospective entrepreneurs (Section 6.3). As various economic activities further accumulate in the city of Gaziantep, regulations related to urban development and industrial location will have to be introduced, followed by wastewater discharge regulations for industries. A comprehensive study of railway reinforcement should be carried out, covering the improvement of Fevzipaşa passage and the expansion to Şanlıurfa.

6.1.4 Siirt Development Area

(1) Present conditions

This development area is the least developed of all the development areas. Levels of social services are lowest in the Siirt province of all the GAP provinces. The number of agricultural machinery and equipment, fertilizer use and agricultural productivity are low. Livestock activities are dominated by goat raising. A few new industries are developing such as pistachio processing/packing, licorice processing, ginneries and brick making in addition to tobacco and coal mining.

(2) Constraints

Spatial development of this area is constrained by mountainous areas in the east and the north. Access from contiguous areas is less favourable. Sheep fattening within the city poses problems. Nomadic ways of life are still prevailing, leaving land productivity at low level.

(3) Prospects

Despite the present conditions, this development area has a range of potentials. Livestock activities have much room for improvement/expansion. A new intensive livestock system has already started to be implemented. The forestry industry will be established with 700,000 ha along the northeastern border of the province to be utilized for fuelwood production. Other prospects include Siirt pistachio, sericulture, bee-keeping, weaving, simple vegetable processing and chromium exploitation in the north. In the long-run, tourism activities can be developed, capitalizing on natural conditions such as mountains and hot springs and handicraft production.

(4) Basic strategy

Short - to medium - term

- To promote the livestock industry by taking a comprehensive set of measures; and
- To satisfy basic human needs by improving social services and rural infrastructure such as water supply, sanitation and rural roads.

Long - term

- To diversify the economy by exploring other resources such as tourism, geothermal and other resources.

(5) Projects and other measures

The on-going Siirt city water supply project will be completed and a sewerage project initiated. The Garzan-Kozluk irrigation should be completed in Phase I. The rural road programme will be continued, extending the efforts initiated by YSE. The small dam project will be implemented to create reservoirs on many small rivers for small irrigation, livestock, forestry and other rural activities.

The livestock improvement programme should be initiated, consisting of comprehensive measures to promote this sector. Components will include the following:

- demonstration of zero-grazing, stall grazing and managed pasture,
- improvement of cattle by artificial and natural insemination and disease control,

- establishment of an organized sheep fattening facilities outside the city,
- establishment of sanitary slaughtering, quality standards and inspection,
- establishment of marketing facilities for the new livestock products, and
- encouragement of processing and related industries.

Meat processing and animal feed industries will be expanded.

During the initial phase, a comprehensive study for hydropower development should be conducted along the Botan river. Afforestation and erosion control on slope lands will be another important measure. A F/S of the Garzan project will also be carried out in Phase I.

6.1.5 Adıyaman Development Area

(1) Present conditions

This development area is less developed, and in particular livestock herd size is very small. Almost all the manufacturing establishments are small. The manufacturing sector value-added contributes to less than 10% of the provincial GRP, sharing 6% of the manufacturing value-added in the Region. This sector, however, is rapidly growing due to backward linkages of industries in Gaziantep. The industrial establishments belonging to the State are Sümerbank cotton weaving, Turkish milk industry corporation, Turkish feed industry, TEKEL tobacco and a few others. Tourism activities centering around Mt. Nemrut are popular.

(2) Constraints

Limited agricultural land of good quality and lack of irrigation facilities and modern farming practices are constraining the area's agricultural activities. Area of productive land will be further reduced by the Atatürk reservoir. Other major constraints are lack of airport, relatively undeveloped roads in the interior and insufficient social services.

(3) Prospects

Tourism resources abound in the province of Adıyaman and its vicinity. Creation of a reservoir by the Atatürk dam will provide additional opportunities for tourism and fishery. Irrigation by water from the Atatürk reservoir will provide another prospect, although economic viability will have to be carefully assessed for different schemes. Grapes and pistachios have been successfully promoted in the slope lands of this province since 1970's. This area may be characterized as the water-based development area.

(4) Basic strategy

Short - to medium - term

- To strengthen physical and economic inter-connections with the neighbouring provinces: e.g. the development of backward linkage industries to those in Gaziantep, and the development of tourism for visitors from Diyarbakır, Gaziantep and Şanlıurfa.

Medium - to long - term

- To promote water-based economic activities, capitalizing on the Atatürk reservoir, such as irrigation, tourism and fishery.

(5) Projects and other measures

The Çamgazi irrigation scheme of the Adıyaman-Kahta project will be implemented in Phase I. Realignment and paving of the Kahta-Gerger road and the Atatürk link to Şanlıurfa with bridge and road will be completed.

A comprehensive F/S of the Adıyaman-Kahta project should be conducted,covering the options of diverting water from the Kocali reservoir to the Gömükan and Çamgazi schemes and sending supplementary water from the Kahta reservoir to the Büyükçay scheme in order to increase irrigation areas. A comparative F/S of the Atatürk passage across the reservoir in the north will be conducted in an early part of Phase I, taking account of tourism aspect. A comprehensive study for tourism development should also be carried out.

A fishery complex should be established within the area consisting of a hatchery, a research and training center, fingerlings production facilities and a processing unit. A F/S of this fishery complex project should be carried out in Phase I.

The Mt. Nemrut area has been designated as a national park. Afforestation should be vigorously carried out along the Atatürk reservoir (10,000 ha planned at present) to minimize soil erosion and extend the life of the reservoir. The area around the reservoir may be designated as a recreational area, and a tourism training/information center established.

6.1.6 Mardin Frontier Development Area

(1) Present conditions

This development area consists of areas along the Syrian and Iraqi borders, from Mardin-Kızıltepe in the west via Nusaybin all the way to Cizre-Silopi in the east. The area is generally less developed and no major economic activities exist except those associated with the transit traffic on E-24. However, the population density in this area is quite high, with many villages along E-24.

The manufacturing value-added in the province of Mardin contributes only 5% to the Region's total, consisting of flour mills, textile industry (Nusaybin) and livestock industries such as feed plant, milk plant and a slaughterhouse. A meat combine in Kızıltepe is not working at present. A small industry site exists just outside the city of Mardin, but its occupancy ratio is low. Concentrate phosphate production commenced in 1977 in Mazıdağı, northwest of the area.

Livestock activities are popular with large number of goats and relatively large cattle population . The Silopi-Nerdüş irrigation is near completion in the eastern part of the area.

(2) Constraints

The terrains are undulating and partly covered by stones. The border areas sometimes suffer from drought, which does not preclude the floods in some parts, especially along the Dicle river. Despite its location along the main trading route, many products produced in and around the area face marketing problems without effective distribution centers. Nomadic population still exists, engaging in low productivity stock raising.

(3) Prospects

Favourable conditions that this area has include its strategic location, many religious objects for tourism, and large phosphate deposits in the northwest. Water availability is generally high, and several irrigation schemes are planned and partly implemented. However, economic viability of

some irrigation schemes needs re-evaluation. The area will become more important as an outlet for livestock products as these activities develop in Siirt as well as in Mardin. International trade-related activities are also conceivable. This area may be characterized in the future as an export trade center.

(4) Basic strategy

Short - to medium - term

- To improve and maintain good access provided by E-24 by regular maintenance and repair, while improving facilities and services on the border for international transit traffic, and
- To select and implement most promising components of planned irrigation schemes.

Medium - to long - term

- To strengthen inter-connections with neighbouring areas to stimulate trade and livestock activities.

(5) Projects and other measures

In addition to the completion of Silopi-Nerdüş and Nusaybin irrigation, the Cizre dam and hydropower project, E-24 improvement and Savur road rehabilitation will be implemented. A distribution depot should be established for fertilizer and agro-chemicals. The livestock improvement programme should be initiated with the same comprehensive set of components as described in subsection 6.1.4.

The F/S of the Mardin - Ceylanpınar irrigation project, second stage, should be updated, and more promising areas selected for subsequent implementation. A comprehensive F/S of the Cizre project should be carried out, including an update F/S of Nusaybin-Cizre-Idil pumped irrigation. A study to identify promising horticultural crops should be conducted with a view to establishing processing industries, covering marketing aspect as well as soil suitability and agro-ecological conditions. Asphaltite reserves in Şırnak should be investigated to identify deposits for earlier exploitation.

Promotion measures for selected horticultural crops should be taken, including the provision of market information, seed and seedlings and extension services. Marketing channels need to be established for new agro-industries. Customs and related services on the border will be improved.

6.2 Investment Schedule

According to the broad phasing of projects associated with the development areas (Section 6.1, Tables 6.1-6.6), an investment schedule has been prepared for Phase I (1990-94) in an indicative way. For the most projects for Phase I included in Tables 6.1 through 6.6, investment costs have been estimated individually based on the available data. For some projects, annual allocations of investment costs are also shown. For some other projects or sub-sectors, order-of-magnitude allocations are given just to indicate relative importance of investments into different activities.

Allocation of public investment to different sectors will change substantially from the past allocation shown in Table 5.9. The agricultural sector will increase its share significantly to receive the largest allocation of all the sectors, as major GAP irrigation schemes are implemented. In addition to the seven major GAP irrigation schemes, its allocation covers oil seed and feed grains demonstration under TYUAP, grain storage facilities, livestock improvement programme, agricultural inputs distribution depots and extensive afforestation.

The energy sector will closely follow the agriculture, although its share in total public investment will decrease from the level in recent years as the Atatürk dam will be completed during Phase I. The energy sector public investments include, in addition to the original GAP hydropower schemes, small dam project in Siirt, Adıyaman-Gölbaşı thermal power plant, power transmission and distribution, and rural electrification.

The third largest allocation will be to the transportation sector. It will cover the road projects identified as high priority by the Master Plan including highway maintenance/repair/upgrading, a study and initial implementation of railway reinforcement, upgrading of the outer ports, improvement of regional aviation services, oil pipelines for domestic uses, and communication. Realignment of roads to be inundated by the priority dam schemes should be given priority.

Allocation to the mining and the manufacturing sectors will not increase much, as these sectors should develop primarily on the private sector initiative. Tourism will also be led by the private sector, but its share in public investment will increase from unproportionally small allocation in the past to provide the basic support facilities.

Allocation to housing will increase in proportion to population increase. Social sectors will receive larger shares of public investment than in the past. The share of education will increase from 0.6% of the total public investment in the Region in recent years to 1.7%, including the allocation to schools to be relocated from planned reservoir areas. The share of health will double from 0.2% in recent years to 0.4%.

Allocation to other sectors is primarily for urban infrastructure. Water supply and sewerage will be improved for the major cities of Diyarbakır, Gaziantep and Şanlıurfa, and also for other towns. On the other hand, most rural infrastructure including rural electricity, water supply, health and sanitation facilities as well as on-farm development and drainage is covered under different sectors.

6.3 Institutional Measures

Implementation of development projects will have to be complemented by proper institutional measures. Some institutional measures and studies associated with different development areas have already been suggested (Tables 6.1 through 6.6). This section summarizes sector-related measures and other more general measures.

6.3.1 Agriculture

(1) Land tenure systems

The number of rural families in the Region is estimated to be 326,000 in 1985. Of these 125,000 (38.4 %) owned no land or livestock. On the other extreme, 8 % of farm families own 51 % of the agricultural land. Average land holding in that group is 57 ha per family. There is also a State farm with 170,000 ha. The highest percentage of land holdings (40.7 % of farm families) is in the 1 to 5 ha group. This small family farm pattern is most prevalent in Gaziantep and Adıyaman.

An alternative model is proposed for each of these three groups. The common features of these models are (1) organizations for on-farm development/maintenance; (2) monitoring and evaluation of irrigated farming; and (3) effective procurement of inputs/marketing of output.

There is an urgent need to classify the status of land ownership following the cancellation of the Land Reform Act by the Constitutional Court. The cropping pattern in the large holdings will diverge from the optimum pattern proposed as the large farmers, given the uncertainty regarding ownership, may try to minimize the use of labor rather than maximize their output.

With secure land title and crop sharing arrangements, as exist at present, the extension and organization efforts should be directed at landless farmers operating part of large farms on crop sharing basis. Provision of credit and other inputs to the landless share croppers/tenants will help improve their position vis a vis the land owners. Consideration should also be given to similar arrangements for land owned by the State (Ceylanpınar).

Both from a social as well as economic perspective top priority should be placed on increasing the area owned by family farms of 1 to 5 ha. Labor utilization and cropping intensities are likely to be much higher in such farms. The government should clarify the future of land reform legislation as soon as possible, as land redistribution will increase the share of small farmers.

For medium sized family farms, establishment of cooperatives should be given priority. Such cooperatives will supply modern inputs, undertake marketing and will organize farmers for other activities including on-farm water management and extension. These cooperatives will be a forum for discussions on cropping patterns, and equitable utilization of irrigation water.

Another key issue involving both the small farms and land distribution is the question of land consolidation. The present irregular shape and fragmentatiton of holdings has adverse effects for building a rational canal lay-out. It also delays land leveling and increases its costs.

(2) Extension, research and information services

Extension

The TYUAP extension projects should be continued and extended to all the GAP provinces. All the standard inputs for the TYUAP system should be provided in a few years, including personnel, vehicles, machinery and equipment, and audio-visual aids. Central villages and their service hinterlands should be selected by taking account of settlement hierarchy and social structure.

Application of the TYUAP system is particularly important for the expansion of new crops. Most oil crops and irrigated feed grains are relatively unfamiliar to the farmers in the Region, and solid research results are lacking. The TYUAP system will allow research results to be effectively transmitted to farmers. In extending the project to different provinces, more important crops and activities should be identified for each province and emphasis placed on them.

Research

Research works should place emphasis on adoption of crop varieties, crop cycles and cultivation techniques under irrigation. The Institute of Irrigation Techniques, recently set up by MAFRA, needs to be further supported with research personnel and facilities. In view of the importance of cotton growing in the Region, this institute may be specialized in cotton research, as another research institute for irrigation techniques exists.

The Gaziantep Pistachio Research Institute should be enlarged and supported to carry out research works on all promising horticultural crops in the Region. Special attention should be directed to grapes. More substations should be established, representing different micro-climates and specializing in different crops.

The soil analysis for farmers' lands should be conducted regularly to clarify more efficient fertilizer utilization.For this purpose, the capacity of existing soil analysis laboratories should be improved. Leaf and fruit analyses are important in determining crop response to fertilizer.

A research coordination committee should be established to coordinate the research works for the GAP region. All the related institutes should participate in the committee, including the Çukurova University Faculty of Agriculture and the Çukurova Agricultural Research Institue. Extension services will also be represented on the committee. The maintenance of well organized links with other institutes in other regions is important. Education and training should

be provided for research personnel both in the Country and abroad in order to keep abreast with advanced agricultural technologies.

Information services

In order to enhance the overall productivity in rural areas, production and market related information will have to be conveyed to the majority of farmers. Information on better farming practices, improved varieties and availability of support facilities such as research/extension centers, processing and storage facilities and machinery hire services will be of direct use. Also vital are meteorological information to allow timely land preparation and seeding, and information on opportunities for new crops and markets. The latter may be provided by the proposed Regional Development Center.

(3) Financial system

The main constraint for the farmers in getting credit from the Turkish Agricultural Bank (TCZB) is the need for collaterals. Because of the uncompleted land registration activities and lack of land title deeds, farmers can not provide collaterals required by TCZB. In the case of short term production credit, mutual guarantee should serve as a collateral. For medium and long term credit for machinery and equipment and other facilities required for project implementation,the project itself should be approved as a collateral. This in effect is a risk sharing scheme. TCZB can carefully assess the project by examining future revenues from the project, instead of relying on a collateral.

Continuing coordination between TCZB and the MAFRA extension services is very important. It will help the screening of farmers' credit applications, evaluating their needs and input requirements.The same farmers will also be the key recipients of extension and training.In this way, attainment of expected production increase is more likely. The similar format has been applied successfully to the Çorum-Çankırı Rural Development Project. Details should be worked out for specific projects.

The roles of agricultural credit cooperatives (TKK) are very important particularly in providing short term production credit to small farmers. These cooperatives should be staffed with more qualified personnel, and new cooperatives should be established in locations of new irrigation schemes.

In order to meet the financial needs of the GAP agriculture sector, TCZB has set up a Directorate for the GAP for the purpose of developing a special preferential system of agricultural credits specific to the Region.

A fundamental measure to increase substantially the amount of credit available to farmers in the Region is to establish an "Agricultural Development Fund". Initially the fund will be provided from the Government budget and transferred to TCZB every year. However, strict criteria should be established for the implementation of the Fund, and credit terms should be clarified. This will help to enforce financial discipline to farmers and make the Fund eventually self-revolving.

(4) Agricultural inputs

Seed and seedlings

The Ceylanpınar State farm, responsible for seed and seedlings production and distribution throughout the Country, has an important role to play for the Region. The farm has a potential to supply all kinds of quality seed suitable for dry farming and irrigated farming in the Region.

The Gaziantep Pistachio Research Institute will be responsible for providing good quality pistachio and vine plants, plant shoots and grafting materials. Vineyards and pistachio orchards

are expected to be created in irrigation areas. Varieties suitable for irrigated conditions will have to be selected. For this purpose, a nursery should be established within the institute.

The importance of private enterprises will increase in seed industry. They should be encouraged to establish seed production units and nurseries. Some public lands may be allocated for this purpose and rented to private companies as initiated by the Ceylanpınar State Farm.

Fertilizer

The requirements for fertilizer will increase by four times as farming practices are converted to more intensive irrigated agriculture by the full development of the GAP. Two organizations have fertilizer storage and distribution capacity in the Region: the Agricultural Supply Organization (TZDK) and the agricultural credit cooperatives (TKK). The TKK storage capacity is particularly small and insufficient. They are more important for the distribution of fertilizer to individual farmers in their vicinity. Their capacity should be increased, especially in those localities of priority irrigation schemes. Private dealers and manufacturers have already started to establish distribution depots in the Region,and they should be supported to provide additional storage capacity.

A fertilizer utilization calender should be distributed to those involved in fertilizer supply including credit and extension organizations. This will make it possible to control the stocks, collect farmers demand for fertilizer and credit, and allow timely delivery of fertilizer.

Mixed farming with crop cultivation and livestock activities provides opportunities to save the use of chemical fertilizer. The manure can be used as organic fertilizer either directly or as the residual of biogas digester. The manure also improves the physical characteristics of the Region's soil, which is generally poor in organic contents.

Agricultural chemicals

Under irrigated conditions, certain pests and disease may proliferate. Well formulated crop rotations, preventing concentration in a few crops, can minimize these problems and the use of chemicals. The Plant Protection Institute in Diyarbakır should be supported to provide farmers plant protection and other related services.

(5) Farm mechanization

Demand for farm machinery will increase as crop diversification progresses and crop intensity increases. Mechanization level on dryland will also improve. At the full development of the GAP, the total tractor requirement in the Region will reach 90,000 units of 45 hp, a three fold increase from the present tractor park.

The combine harvester and tractor hiring services should be extended to other machinery and equipment particularly for small and medium size farms. For this, some medium size farm owners/operators should be encouraged to expand their machinery park. This will include machinery needed for new crops grown under irrigation. This will be supported by extension services and TCZB credit. The farm machinery and equipment manufacturing plant of TZDK in Şanlıurfa will continue to meet the Region's specific requirements.

(6) Marketing

Soil Products Office (TMO) will continue its activities to support farmers backed by the Government price support policy. Thus for those crops handled by TMO, viz. cereals and legumes, no serious marketing problem is foreseen from farmers' point of view. The TMO storage capacity needs to be increased from 421,000 tons at present and 500,000 tons by 1990 as planned.

Cotton, soybean, groundnut, sesame and sunflower may face problems with marketing and processing, as their production increases.The Çukurova Cotton Agricultural Sales Cooperative (Çukobirlik) and the Southeastern Agricultural Sales Cooperative (Güneydoğubirlik) should be re-organized to cope with these problems by proper pricing, development of domestic and international markets and provision of incentives and financial supports to farmers. Financial and personnel capacities of these cooperatives will have to be much increased.

The private sector should be encouraged for better functioning of marketing channels in the Region. In particular, investment in agro-processing industries, storage and conservation facilities, packaging and transportation should be supported by the provision of credit and other means.

Establishment of quality standards and product classification is another important area of future concern in Turkey. This is particularly relevant in the GAP region, as most agricultural products and agro-processed commodities are oriented to export. Quality control should be an important area in extension services provision related to those crops to be much expanded such as oil crops, cotton and horticultural crops.

6.3.2 Livestock, forestry and fishery

(1) Livestock

Institutional arrangements for livestock development should aim at improving the productivity of the existing herd in the short run. In the medium to long run, efforts should aim at improving the cattle breeds and development of commercial poultry.

Improvement of the productivity of the existing livestock herd requires strict veterinary control, and better husbandry practices including supplemental feeding. The farmers will be reluctant to adopt these practices without a simultaneous improvement in incomes from livestock.

At present, the major feed source in the Region is communal village pastures. Both the quality and the hay yield of these pastures have deteriorated due to overgrazing. Demonstration projects for controlled grazing should be started immediately. Additional feed will become available by introducing feed grains and forages into the summer rotations under irrigated conditions.

The Region is part of the border band for control of epidemic diseases. Periodic vaccinations should be strictly undertaken. Combined with the control of internal and external parasites, these measures could increase livestock productivity by up to 15 % at little marginal cost.

The farmers' adoption of these practices as well as the long run structural change of livestock production in the Region require increases in incomes from livestock raising. This would depend on improvements in marketing. Although excess capacity for both meat and milk processing exists in the Region, little meat and milk is processed. The amount of processed milk could be increased by additional investments in milk collection facilities.

Both for milk and meat, composition of processed products should be changed. Shift from production of cheese to fresh milk and yoghurt will increase the value added and farmers' income. In the case of meat, shifts from export of whole carcasses to choice cuts of packaged meat will have a similar impact. Additional income could accrue to the farmers by improving the efficiency of State owned processing facilities (EBK and SEK) and privatizing these facilities.

In the long run, the livestock base will be increasingly dominated by cattle since the scope for increasing sheep and goat production without a larger herd size is limited. The Government policy calls for keeping the herd size constant. Increases in production, therefore, will come mainly from cattle. Depending on the accessibility of the villages, cross breeding for cattle will utilize both artificial and natural insemination, with the first becoming increasingly dominant.

Parallel to the improvements in breeds, and the possible establishment of some nucleus farms keeping pure-bred cattle, the feed base in the Region will expand with irrigation. Demonstration forage production projects should be undertaken in areas where high yield breeds are available.

Agricultural credit for cattle should be directed to the medium sized farms to encourage mixed farming. About 10 % of farm families in the Region own no land and rely exclusively on livestock. These primarily sheep and goat raising families should be the exclusive beneficiaries for sheep and goat credits from the Agricultural Bank.

(2) Forestry

Forestry activities consist mainly of afforestation around the new reservoir areas to reduce sedimentation and create additional recreational opportunities, expansion/improvement of energy forests for woodfuel production, and on-farm tree planting to protect agricultural land from erosion and various external effects and also to provide extra revenue to farmers. To encourage them, the following measures should be taken:

1) to provide farmers with seedlings of selected species, and
2) to provide technical extension on nursery practices and woodlot management and clarify marketing and economic aspects of wood production.

Seedlings/saplings supply by private enterprises should be encouraged with incentives provided by Forestry Law 6831 as amended and new Afforestation Legislation introduced in 1987.

(3) Fishery

As the inland fishery activities are currently almost non-existent and the demand for fish is not developed in the Region, public sector initiative will be required to promote this sector. A fishery center should be established and managed by a designated public agency. The center will conduct research/training for fishing gears and methods, equipped with hatchery and fingerlings production facilities, and establish distribution and marketing channels. Storage and processing facilities will also be provided at a later stage.

6.3.3 Industry

(1) Manufacturing

The Government policy on development calls for reliance on the private sector. The kind of industries proposed for the Region (agro-industries, construction materials and consumer goods production) are of small scale and undertaken by the private sector. The role of the Government in the industrialization of the Region is thus establishment of the appropriate policy framework, including incentives, taxation and financing.

Technical consultancy/guidance

Consultancy or guidance for prospective investors will be essential. The information to be provided includes new investment opportunities, marketing prospects, and available support services such as concessional credit, tax incentives and financing. Export incentives under the "Law Concerning the Encouragement of Foreign Capital" and the "Law for the Encouragement of Investments" are particularly relevant for the GAP region. Five of the GAP provinces are classified as development priority areas and export-oriented industrial growth is envisaged by the Master Plan.

Technical guidance to prospective investors will be required to introduce new production processes and technologies and indicate other factors affecting the establishment of new industries. Technical training by Small Industry Development Organization (KÜSGET) should be extended to cover all the GAP provinces. The proposed Regional Development Center should cooperate with this and other institutions to provide the information and the industrial extension, also covering management skills including financial management. The organization of seminars is an effective way to disseminate technical information.

One area where such vital information is produced by SPO, for instance, is estimate of subsectoral growth based on domestic and export demand. Another is the projects for which incentive certificates are issued. This information should be produced for GAP and disseminated to potential investors.

Cooperation between research institutes and industries should be promoted. The research institutes should respond to specific needs for industrial technology, and new technology should find immediate application in existing or new industries.

A rapid increase is expected in the private manufacturing investment as the irrigated agriculture expands. The existing financial institutions in the Region do not have the capacity or resources to meet this demand. Both the number of branches of development banks in the Region and the Region's share in total lending should be increased.

Foreign investment should be promoted in the forms of joint-venture formation, direct investment and BOT schemes. Essential for this will be dissemination of information on investment opportunities, incentive measures and other conditions of investment to prospective foreign investors, and identification of local partners and areas of cooperation. For these services, the proposed Regional Development Center is expected to cooperate with existing organizations.

Organizational measures

For all these measures, local government support will be essential. A private sector firm should be contracted for the promotion of industrial development, in cooperation with the Regional Development Center and other related organizations. It will provide technical guidance, assistance in the preparation for obtaining loans and promotion for foreign participation, and advise the local government on promotional measures, including industrial estates.

Procedure

Active participation of able indigenous entrepreneurs is an essential condition for industrial development in the Region. As the first step to recruit such candidates for new investment opportunities, potential indigenous entrepreneurs should be identified by this firm in cooperation with RDC. Local Chambers of Commerce and Industry will be the main sources.

Representative pre-feasibility studies should be carried out by RDC, the firm or any other entities subcontracted. On the basis of these reports, all relevant candidate entrepreneurs will be invited for application with relevant information. If required by the prospective entrepreneur, RDC will continue to provide technical information, contacts for joint venture and local governments, and general planning advice.

RDC will coordinate training provided by public agencies, if found necessary for any particular industry to be established. The training courses will cover general industrial project management and specialized subjects related to the particular industry. The latter may include a tour of similar establishments within and/or outside the Country.

(2) Mining

More private sector initiative should be encouraged for exploration and exploitation of mineral resources. For this purpose, existing data on mineral deposits and assay results should be compiled for easy access by the private sector, and the existing system of licencing and crediting for prospective investors should be improved.

The compilation of existing data may be done as a part of more comprehensive survey to prepare mineral resources base maps. Additional data will be obtained by Landsat imagery interpretation, airborne magnetic survey, geological survey, gravity survey or geochemical survey. Such base maps will be very useful for future exploration/exploitation activities.

(3) Tourism

As a first step to promote tourism, a tourism resource inventory should be prepared with the cooperation of the Ministry of Culture and Tourism and local and foreign travel agencies. A comprehensive study of these resources should be conducted, and broad guidelines established, including an action restoration programme for historical ruins. Tourism personnel should be trained by the Ministry and TURSAB for hotel management, catering, tour operators and travel agencies. Tourism centers should be established, where the information on tourism attractions, accommodations and other facilities, and tour routes will be made available.

6.3.4 Trade and commerce

Trade and commerce activities are an integral part of urban and regional economic structure. They provide services that are essential for the viability of local business and the subsistence of households such as banking, wholesale and retail trade, hotel/restaurant and real estate/ insurance.

In the GAP region, trade activities concentrate in Gaziantep. Some major banks do not have branches in most administrative centers in the Region such as the Turkish Halk Bank (THB), the primary lending bank for small and medium size business and manufacturing establishments (Appendix B-4).

The following measures need to be taken:

1) to establish bank branches and financial advisory services in those regional/sub-regional centers lacking THB,
2) to encourage and support on-the-job training programs for employees of banks/finance and hotel/restaurant services, and
3) to re-evaluate the curricula of the Region' vocational high schools to gear it with specific needs of the Region.

In the long-run, more trading centers need to be established, including a few specialized in international trade preferably in Mardin and Gaziantep. National policies need to be clearly stated in the Five Year Plans including training programs and associations to monitor the services for quality improvement.

6.3.5 Infrastructure

(1) Water resources

The management of water resources is a key to the successful GAP implementation. In addition to

the technical issues related to water resources development (Section 5.1), management and institutional issues are involved in GAP implementation. Important ones include water charge and on-farm management of irrigation water as well as a broader issue of watershed management (Section 5.3). These are closely related also to on-farm development and drainage, land tenure, electricity charge for pumping, and agricultural extension.

In order to address these issues in a coherent way, irrigation districts should be established, first on a pilot project base. Model farms should be established in areas where small farmers are dominant and / or land consolidation/redistribution has been completed. Farmers should be organized to become a substantial implementing agency for irrigation development and management. New water charge system and irrigation technologies can be tested through such an entity.

(2) Transportation

Overall needs

The Master Plan has clarified in general terms main directions of transport development in the Region. However, the lack of reliable and consistent data related to regional traffics by mode and the capacity of existing transport facilities hinders the formulation of specific measures to be taken. Especially the lack of O-D tables is critical. While the existing transport system dominated by the good road network continues to serve the immediate needs in the Region, it would be sensible to conduct a comprehensive study of this important sector. Such a study should focus on the critical issues identified by the Master Plan and should be conducted in an output-oriented way to formulate specific measures to be implemented subsequently in order to support the GAP implementation on a full scale.

Main points to be covered by this regional transportation study are included in the following paragraphs. In addition, modal split in general, aviation needs including improvement of local airports and establishment of local air services and direct connection to neighbouring countries, and pipelines for domestic needs should be covered.

Road transportation

For the road network to serve as the prime mode of transportation in the Region, consistent measures will have to be taken continuously to further improve the system. In addition to the physical measures suggested in Section 6.1, road maintenance capacity of TCK will have to be enhanced.

The following measures should be taken in the nearest future, particularly related to GAP implementation.

1) Completion of the O-D survey and study of traffic demand on E-24 and other priority roads.
2) Comparative feasibility study of Atatürk reservoir passage, covering alternative routes, modes and types of bridge, if relevant; and
3) Corridor study to examine socio-economic conditions for locations of strategic industries and to identify infrastructure and utilities needed along the Diyarbakır-Şanlıurfa highway.

Other points to be highlighted in the regional transport study include the following. The use of dam reservoirs more generally as a part of the Region's transport system may deserve consideration. The portion of the proposed motorway within the Region should be reviewed for possible realignment in the light of the Master Plan. Those sections of the roads to be submerged by the planned reservoirs should be given priority considerations.

Railway

The main issue within the railway operation is management. The railway at present is not operated in an effective manner, and potential freight and passenger traffic is diverted to road services.

The regional transport study should cover both the needs for improving physical facilities and management issues such as the following:

- loading and unloading facilities in Nusaybin
- economic and traffic potential for realignment of Nizip-Nusaybin railway via city of Şanlıurfa
- potential for goods movement between Batman and Kurtalan and points to the north and west of Malatya
- improvement of Fevzipaşa passage with the focus of traffic demand to the north and the east
- optimum pricing policy
- physical measures including track replacement, bridge upgrading, alignment relocation, new rolling stock and updated signalling.

Ports

The envisioned increase in agricultural products and manufactured goods for international trade would make it necessary to re-evaluate the ports just outside the Region. Along this line, consideration of the impact from the international and domestic adoption of cargo containerization would be required. Adoption of containerization may permit greater potential for penetration into foreign markets. A study of this possibility should be a part of the regional transport study.

(3) Social infrastructure

Top priority should be given to the improvement of health and education services by establishing a fair share allocation of State budgets to these sectors in order to narrow gaps in service levels between the Region and the national average. At the minimum, the present national average levels should be attained in the Region by 2005. Guidelines for allocation to the GAP region should be established and used to evaluate any proposed allocation.

Extended education should be encouraged. Curricula and courses offered need to be reviewed to make them fit to the Region's needs. For this, a study should be carried out in the near future to examine possible subjects to be covered, target population, location and composition of facilities.

In the long run, a major institute for higher education/studies should be established. This may be new or built upon an existing university. The institute will provide post-graduate training for both Turks and foreigners. Contacts with international research institutes such as CIMMYT and IRRI and doner agencies should be established. The subjects of specialization could include irrigation technologies, Middle Eastern trade and policy studies. The institute should aim at an international reputation as a study center.

6.3.6 Urban sector

Many of the powers and responsibilities previously held by the Central Government have now been delegated to the local authorities. The staff capacities for planning and financial management, however, are extremely limited. A major program should be undertaken to develop the manpower resources in these entities. Despite the substantial financial resources made available after decentralization to the local administrations, their financial capability has not sufficiently improved.

Financial management

A review of municipal finances in GAP indicates that an increasing percentage of future reserves are committed to debt repayment and to cover the current account deficit. This limits the fund available for fixed capital formation.

Suggestions for improvements in municipal finances include:

- Funding from the general budget should be increased, earmarked to specific urban projects in the GAP region;
- Municipalities should be given access to loans at concessional rates;
- Accumulated short term loans should be consolidated and rescheduled;
- The accumulation of funds due to municipalities should be placed in separate accounts to ensure their availability for GAP projects. These funds would be supplemented by extra-budgetary funds.
- Municipal administrations should be oriented to be as efficient as possible with efforts made to revalue assets, make adequate provision for liabilities, and identify new sources of income.

The change in the law in 1984 allows municipilaties to undertake commercial activities on their own or through partnerships.The funding for these, however,has to be municipalities' own funds or otherwise may be borrowed.

Together with the provincial administrations, which may undertake similar activities outside the municipal boundaries, this combination of public and private activities may provide an appropriate institutional framework and additional opportunities to promote investment in GAP.

Municipalities are encouraged to prepare and propose projects of their own. They can use external professional services or apply to the İller Bank. The latter will in turn put up tenders on behalf of the municipalities for project preparation. The proposed Regional Development Center may perform the same function. Municipalities are encouraged also to undertake cost recovery measures. The most viable sets of principles for cost recovery are set out in the Reconstruction Act and the Municipal Revenues Act.

Urban planning

The Reconstruction Act defines the urban planning process in two stages: 1) master planning stage, and 2) implementation planning stage. In the Act, these two separate but complementary activities are indicated as the necessary steps to be taken before any physical development occurs. All settlements with populations over 10,000 are required to prepare such plans.

The following guiding principles are recommended to improve the planning of major urban centers.

1) The plan should clarify the socio-economic framework of urban development within the regional development frameworks provided by the GAP Master Plan, rather than just being a physical plan of facilities and land use. Objectives and basic strategy of urban development should be specified.
2) The plan should be a realistic and implementable one. Cost estimates and implementation phasing should be included in the plan, and needs for human, financial and other resources should be carefully weighted against respective availability during program formulation.
3) The plan should formulate measures for mobilizing private sector resources and guiding private sector activities. The measures will include land use control, user charges, environmental regulations, building codes and others. They need to be institutionalized with formal adoption of the plan.
4) Procedures must be established for collecting and structuring basic data for urban planning and updating the plan.

Table 6.1: Development Phasing... (1) Diyarbakır - Batman Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Update F/S of Dicle right bank irrigation and Dicle right bank pumped irrigation	- Kralkızı dam and hpp (completion) - Dicle dam and hpp (completion) - Dicle right bank irrigation	- Promotion of commercial poultry
	- Comprehensive F/S of Batman-Silvan Project	- Batman dam and hpp (completion) - Batman right and bank irrigation - Batman left bank irrigation	- Extension services for oil seed and feed grains expansion (under TYUAP)
	- Study of pipeline extension for domestic needs	- Diyarbakır - Urfa road upgrading - Bismil - Batman road (completion) - Grain storage facilities - Major distribution depot for fertilizer and agro-chemicals - Demonstration schemes for oil crops and feed grains - Upgrading of EBK meat combine - Expansion of animal feed mills - Diyarbakır urban development-1 st stage	- Research on irrigation technology, crop cycles and on-farm water management on slope land
II 1995 ~ 2004	- F/S of Kayser dam and Silvan-Batman irrigation - Study of Ergani-Batman rerailing	- Dicle right bank pumped irrigation (initiation) - Silvan dam and hpp - Silvan-Batman irrigation (initiation) - Ergani - Hilar caves - Cayonu tourism road - Upgrading of Diyarbakır airport - Establishment of edible oil industry - Further expansion of animal feed mills - Diyarbakır urban development - 2nd stage	- Encouragement of on-farm tree planting on slope land and other soil conservation measures - Improvement of social services - Extension services for on-farm water management and horticulture
III 2005 ~		- Dicle right bank pumped irrigation (completion) - Silvan - Batman irrigation (completion) - Expansion of edible oil industry	

Table 6.2: Development Phasing... (2) Greater Şanlıurfa Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Update F/S of Siverek-Hilvan pumped irrigation and Bozova pumped irrigation - F/S of Suruç-Baziki Project - F/S of Şanlıurfa regional airport - Comprehensive study for the State Farm conversion - Comprehensive planning study for Şanlıurfa urban development	- Urfa - Harran irrigation (completion) - Mardin - Ceylanpınar irrigation -1st stage (initiation) - Border Fırat project (initiation) - Şanlıurfa-Diyarbakır road upgrading - Viranşehir - Ceylanpınar road improvement - Cotton expansion - Cotton ginneries - Distribution depot for fertilizer and agro - chemicals - Grain storage facilities - Upgrading of EBK meat combine - Şanlıurfa city water supply and sewerage - 1st stage: rehabilitation - Şanlıurfa urban development - 1st stage - Tourism information center - Communication complex- 1st stage	- Promotion of commercial poultry by TKV - Organization of small holders/landless for on-farm water management - Intensification of research on crop varieties, cropping patterns/cycles under irrigation - On - the - job training of extension staff and extension services for irrigated agriculture - Establishment of an institute for advanced education/studies
II 1995 ~ 2004	- F/S of container inland depot	- Mardin - Ceylanpınar irrigation - 1st stage (completion) - Siverek - Hilvan pumped irrigation (initiation) - Bozova pumped irrigation - Border Fırat Project (completion) - Expansion of textile industry - Şanlıurfa regional airport - 1 st and 2nd stage - Şanlıurfa city water supply and sewerage - 2nd stage: major expansion - Şanlıurfa urban development - 2nd stage - Communication complex - 2nd stage	- Regulations related to urban development and industrial location - Environmental measures to control industrial wastewater discharge and application of fertilizer and agro - chemicals
III 2005 ~		- Siverek - Hilvan pumped irrigation (completion) - Suruç - Baziki Project - Container inland depot - Further upgrading of functions of Şanlıurfa city for communication/ education/technology development	

Table 6.3: Development Phasing... (3) Gaziantep Gateway Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Update F/S of Adıyaman - Göksu - Araban Project - Update F/S of Gaziantep Project - Study of traffic demand on E-24 - Comprehensive study of railway reinforcement including the improvement of Fevzipaşa passage and the extension to Şanlıurfa	- Gaziantep Project - completion of Hancağız irrigation - Passing lanes on E-24 - Gaziantep - Araban road improvement (completion) - Gaziantep city water supply and sewerage - 1st stage - Railway reinforcement, stage 1- rehabilitation of existing facilities	- Promotion of irrigation development by private sector - Regulations related to urban development and industrial location - Technical training by Small Industry Development Organization (KÜSGET)
II 1995 ~ 2004		- Adıyaman - Göksu - Araban Project - Gaziantep city water supply and sewerage - 2nd stage - Gaziantep Project (initiation of other schemes) - Yavuzeli - Kasaba village road for tourism - Yeserek village - Islahiye road for tourism - Railway reinforcement, stage 2- improvement of Fevzipaşa passage and extension to Şanlıurfa	- Wastewater discharge regulations for industries
III 2005 ~		- Adıyaman - Göksu - Araban Project - Irrigation - Gaziantep Project (completion)	

Table 6.4: Development Phasing... (4) Siirt Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Comprehensive study for hydro-power development along the Botan River - F/S of Garzan Project	- Garzan - Kozluk irrigation - Small dam project - Rural road programme - Livestock improvement programme - Sanitary slaughter houses - Meat processing industry - Siirt city water supply (completion)	- Afforestation and erosion control on slope land - Establishment of quality standards for livestock products and inspection - Establishment of marketing channels for livestock products
II 1995 ~ 2004	- Comprehensive study for developing geothermal resources for power generation, industrial process heat, green houses, recreational and domestic uses	- Small hydropower development along the Botan River - Small dam project (continuation) - Hides and skins industry - Animal feed industry	- Environmental regulation to control organic wastes from livestock industry
III 2005 ~		- Garzan dam and hpp - Garzan irrigation - Leather product industry - Geothermal development - Tourism development	

Table 6.5: Development Phasing... (5) Adıyaman Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Comprehensive F/S of Adıyaman - Kahta Project - Comparative F/S of Atatürk passage - F/S of fishery complex - Comprehensive study for tourism development	- Adıyaman -Kahta project- Çamgazi irrigaiton - Realignment and paving of Kahta - Gerger road - Atatürk link to Şanlıurfa (bridge and road) - Pistachio processing - Tourism training/information center	- Designation of Nemrut as a national park - Afforestation along the Atatürk reservoir
II 1995 ~ 2004		- Adıyaman - Kahta project (initiation) - Adıyaman - Cermik road - Atatürk passage - Fishery complex - 1st stage: fishery center with a hatchery, research and training facilities - Tourism facilities for Nemrut park and Atatürk recreation area	- Establishment of management body for fishery complex - Establishment of reservoir water quality monitoring station - Designation of Atatürk recreation area - Extension campus of a university in Atatürk recreation area
III 2005 ~		- Adıyaman - Kahta Project (completion) - Fishery complex - 2nd stage: expansion of facilities, processing unit - Further improvement of tourism facilities for Nemrut park and Atatürk recreation area	

Table 6.6: Development Phasing... (6) Mardin Frontier Development Area

Phase	Study	Implementation	Other Measures
I ~ 1994	- Update F/S of Mardin Ceylanpınar irrigation - 2nd stage - Comprehensive F/S of Cizre Project, including update F/S of Nusaybin - Cizre - İdil pumped irrigation - Identification of promising horticultural crops for processing - Identification of asphaltite reserves for earlier exploitation	- Silopi - Nurdus irrigation (completion) - Nusaybin irrigation (completion) - Repair and maintenance of E-24 - Rehabilitation of Savur road - Distribution depot for fertilizer and agro - chemicals - Livestock improvement programme	- Market information and other promotion measures for horticultural crops expansion - Establishment of export marketing channels for primary agriculture and processed products - Improvement of customs and related services on the border
II 1995 ~ 2004	- F/S of a border trade center - Study of economic and traffic potentials for realignment of Nizip - Nusaybin railway - Study of railway extension from Nusaybin	- Mardin - Ceylanpınar irrigation 2nd stage (initiation) - Ilısu Dam Project - Silopi irrigation - Kırkemir - Hezil dams and hpp - Nusaybin - Cizre - İdil pumped irrigation (initiation) - Upgrading of Mardin - Diyarbakır highway - Improvement of Cizre - Şırnak road - Vegetables/fruits processing industry - Exploitation of asphaltite reserves	- Institutional arrangement for establishment of a border free trade zone
III 2005 ~		- Mardin - Ceylanpınar irrigation - 2nd stage (completion) - Nusaybin - Cizre - İdil pumped irrigation (completion) - Cizre dam and hpp - Border trade center with container depot, free trade/processing/ assembly zone, warehouses, banking and other commercial services - Expansion of asphaltite exploitation	

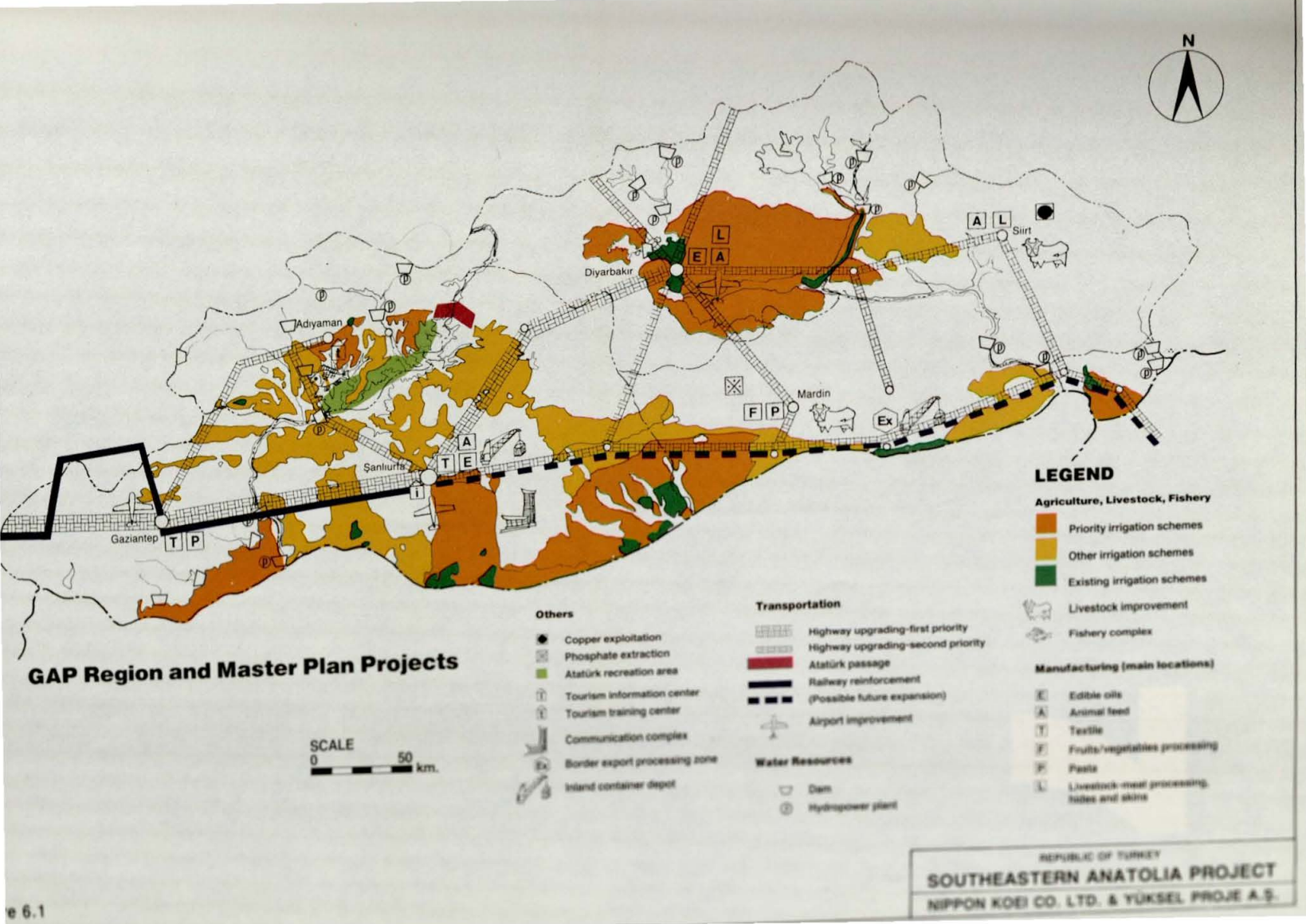
Table 6.7: Indicative Investment Schedule for Phase 1 (1990-1994)*

(Unit: TL 10^9 in June 1988 Prices)

	1990	1991	1992	1993	1994	TOTAL	NOTES
1. AGRICULTURE							
Dicle-Kıralkızı Irrig.	73.8	72.0	65.2	62.7		273.7	
Batman Right Bank Irrig.	36.8	22.7				59.5	
Batman Left Bank Irrig.	9.8	36.6	28.2	10.1		84.7	
Urfa-Harran Irrig.	72.2	80.1	75.5	73.3	60.5	361.6	
Mardin-Ceylanpınar Irrig.		65.6	98.9	98.5	118.4	381.4	1st stage
Hancağız Irrig.	7.9					7.9	Gaziantep Project
Batman-Silvan Irrig.				82.1	120.2	202.3	
Sub-total	200.5	277.0	267.8	326.7	299.1	1371.1	
Other Projects							
Oil Seed & Feed Grains Demonstration, Grain Storage Facilities, Livestock Improvement Programme, Distribution Depots for Agricultural Inputs	4.2	4.4	4.6	4.9	5.1	23.2	
Afforestation	10.3	10.8	11.4	11.9	12.5	56.9	
TOTAL ALLOCATION	215.0	292.2	283.8	343.5	316.7	1451.2	
2. MINING							
Madenköy Copper Extraction	6.3	6.5	6.7	6.9	7.1	33.4	
Mazıdağ Phosphate	3.9	4.1	4.2	4.3	4.4	20.9	
Petroleum	23.6	24.1	25.0	25.7	26.5	124.9	
Asphaltite	2.3	2.4	2.4	2.5	2.6	12.2	
TOTAL ALLOCATION	36.1	37.1	38.3	39.4	40.6	191.4	
3. MANUFACTURING							
Allocation to Strategic Industries	11.3	11.6	12.0	12.3	12.7	60.0	
Other Industries:							
EBK Meat Combines	2.8	2.9	3.0	3.1	3.2	15.0	
Ergani Copper Smelter	2.8	2.9	3.0	3.1	3.2	15.0	
Mazıdağ Fertilizer	28.3	29.1	30.0	30.9	31.7	150.0	
Other SEE's	32.4	33.4	34.3	35.4	36.5	172.0	
TOTAL ALLOCATION	77.8	79.9	82.3	84.8	87.3	412.1	
4. TOURISM							
Tourism Information Centre	0.6	0.6	0.7	0.8	0.8	3.5	
Tourism Training Centre	1.1	1.2	1.3	1.4	1.5	6.5	
TOTAL ALLOCATION	1.7	1.8	2.0	2.2	2.3	10.0	
5. ENERGY							
Atatürk Dam + hpp	211.0	124.5	53.5			389.0	
Batman Dam + hpp	61.2	58.0				119.2	
Birecik Dam + hpp		10.3	20.5	56.8	93.1	180.7	Border Fırat Project
Dicle Dam + hpp	33.1	31.0				64.1	
Dipni Dam			4.4	22.0	22.0	48.4	
Karkamış Dam + hpp		5.1	15.7	15.7	33.7	70.2	
Kıralkızı Dam + hpp	33.4	31.1				64.5	
Urfa Tunnel + hpp	70.0	70.0	67.9			207.9	
Sub-total	408.7	330.9	162.0	94.5	148.8	1144.0	
Other Projects							
Small Dam Project, Adıyaman - Gölbaşı Thermal Power	5.4	6.0	6.7	7.6	8.5	34.2	
Power Transmission and Distribution	15.6	17.5	19.9	22.2	25.0	100.2	
Rural Electrification	3.9	4.4	4.9	5.6	6.2	25.0	
TOTAL ALLOCATION	433.6	357.9	193.5	129.9	188.5	1303.4	

(Unit: TL 10^9 in June 1988 Prices)

	1990	1991	1992	1993	1994	TOTAL	NOTES
6. TRANSPORTATION							
Bismil - Batman Road						8.8	
Şanlıurfa - Diyarbakır Highway						27.0	
K. Maraş - Gaziantep Road						8.0	
E-24 Passing Lanes (G.Antep-Ş.Urfa)						9.0	
E-24 Improvements (Ş.Urfa-Iraqi Boarder)						23.0	
Kahta - Gerger Road						9.9	
Diyarbakır - Adıyaman Reconnection						46.0	
Relocation of Roads related to Atatürk Reservoir						24.6	
Ergani-Dicle-Hani Road Programme						13.3	Realignment and bridges
Gaziantep - Şanlıurfa Motorway						5.0	due to Dicle dam
Gataköprü - Kulp - Lice Road						16.0	
Midyat - Cizre Road						16.0	
Rural Road Programme						92.5	G.D of Rural Affairs allocation
Sub-total	52.0	55.7	59.5	63.7	68.2	299.1	
Railway Reinforcement Stage1						84.0	20 % of total investment
Iskenderun Port Improvement						30.0	costs
Isdemir Port Transformation						40.0	
Rehabilitation of Military Pipelines						40.0	For civilian use
Sub-total	30.2	32.4	34.6	37.1	39.7	174.0	
Other Projects							
Highway Maintenace/Repair/ Upgrading						100.0	
Aviation Services						150.0	
Railway Maintenance/Repair/ Upgrading						80.0	
Communication						387.3	
Sub-total	124.7	133.4	142.9	152.8	163.5	717.3	
TOTAL ALLOCATION	206.9	221.5	237.0	253.6	271.4	1190.4	
7. HOUSING							
Total Allocation	13.2	13.7	14.1	14.6	15.1	70.7	
8. EDUCATION							
Total Allocation	14.1	15.5	17.1	18.9	21.0	76.6	Including schools to be re-located from reservoir areas
9. HEALTH							
Hospitals	2.9	3.3	4.0	4.6	5.5	20.3	
Dispensaries	0.3	0.3	0.4	0.5	0.5	2.0	
TOTAL ALLOCATION	3.2	3.6	4.4	5.1	6.0	22.3	
10. OTHERS							
Şanlıurfa City Water Supply and Sewerage						49.1	
Gaziantep City Water Supply and Sewerage						52.7	
Diyarbakır City Water Supply and Sewerage						38.3	
Siirt Water Supply						17.4	
Diyarbakır Urban Development						20.0	Stage I
Şanlıurfa Urban Development						20.0	Stage I
Communication Complex						5.0	Stage I
Sub-total	33.2	36.5	40.1	44.1	48.6	202.5	
Other Projects							
Water Supply and Sewerage						41.3	
Urban Development						50.0	
TOTAL ALLOCATION	48.1	52.9	58.2	65.0	70.6	293.8	


N
Diyarbakır
Adıyaman
Şanlıurfa
Gaziantep
Mardin
Siirt
SCALE
0
50
km.
GAP Region and Master Plan Projects
Others
Copper exploitation
Phosphate extraction
Atatürk recreation area
Tourism information center
Tourism training center
Communication complex
Border export processing zone
Inland container depot
Transportation
Highway upgrading-first priority
Highway upgrading-second priority
Atatürk passage
Railway reinforcement
(Possible future expansion)
Airport improvement
Water Resources
Dam
Hydropower plant
LEGEND
Agriculture, Livestock, Fishery
Priority irrigation schemes
Other irrigation schemes
Existing irrigation schemes
Livestock improvement
Fishery complex
Manufacturing (main locations)
E Edible oils
A Animal feed
T Textile
F Fruits/vegetables processing
P Pasta
L Livestock-meat processing, hides and skins
REPUBLIC OF TURKEY
SOUTHEASTERN ANATOLIA PROJECT
NIPPON KOEI CO. LTD. & YÜKSEL PROJE A.Ş.

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Chapter VII

ACTION PLAN

The bulk of development projects and related measures proposed by the GAP Master Plan can be implemented within the competence and policies of sector agencies. However, the coordination by SPO of various development efforts by many agencies will have to be facilitated. For this, the Master Plan proposals will have to be discussed among related agencies, sectoral concerns and conflicts resolved, and the Master Plan needs to be formally adopted with addenda, if necessary. Also, related organizational/institutional measures will have to be taken as presented in the proposed Project Management System (Phase II Completion Report, Volume 2). The initial steps to be taken, immediately following the Master Plan submission are shown in Table 7.1.

Apart from the organizatonal / institutional measures to be taken in accordance with the proposed Project Management System, more specific project-oriented actions need to be taken. They consist of (1) the preparation of a definite GAP investment schedule and (2) the prompt actions on the priority projects selected.

The preparation of the GAP investment schedule will follow the procedure outlined below. First, a draft investment schedule will be prepared by SPO on the basis of the Master Plan and initial comments on it by related agencies.It will show implementation timing and budget allocation of all the major projects including the GAP hydropower and irrigation schemes and sectoral / subsectoral allocation for other projects. Second, this draft will be discussed at the working level with the participation of related agencies as well as SPO. SPO should maintain proper sectoral/sub-sectoral allocation. Finally, the definite investment schedule will be adopted by the Ministerial Steering Committee for submission to the High Planning Council (Phase II Completion Report, Volume 2). This schedule should be reviewed periodically to accommodate any policy changes or results of latest studies.

Actions to be taken in parallel with the investment scheduling will consist of (1) implementation of the priority projects, (2) project/ program formulation, and (3) follow-up studies. Construction works for any priority project should be continued or initiated under the responsibility of relevant agency with proper budget allocation. SPO will be in a position to monitor the actions taken by the implementing agencies.

Project / program formulation will in principle be conducted by relevant implementing agencies. Feasibility studies (F/S's) are part of the project/program formulation. Upgrading/updating of F/S's will be required for some original GAP schemes including the Dicle right bank irrigation, Dicle right bank pumped irrigation, Batman-Silvan project, Garzan project, Siverek-Hilvan pumped irrigation, Bozova pumped irrigation, Suruç-Baziki project, Adıyaman-Göksu-Araban project, Gaziantep project, Mardin-Ceylanpınar 2nd stage irrigation and Cizre project (Section 6.1). They should be carried out along the directions indicated by the Master Plan, covering additional elements and new options identified by the Plan.

Some further studies may also be carried out by implementing agencies. The projects that will require this step to be taken immediately are listed in Table 7.2. Other priority projects requiring further studies during Phase I (1990-94) include the Şanlıurfa regional airport, railway reinforcement, pipeline expansion for domestic needs, establishment of local aviation network, State farm conversion and fishery complex.

In addition, SPO will carry out more detailed studies on specific sectors/sub-sectors or aspects identified by the Master Plan as important for the development of the GAP region. Objectives of such studies may be:

- to set a policy framework for the project/program formulation,
- to further clarify in more specific terms directions of development by sector/sub-sector, and
- to identify/formulate new projects and other institutional measures.

The following should be carried out, subsequent to the master planning (Table 7.3).

(1) Corridor development plan study

(2) Manufacturing industry development and location analysis

(3) Regional transport study

(4) Urban planning study for selected cities

(5) Rural socio-economic survey and the establishment of data base associated with the proposed GAP Regional Development Center

(6) Health and education sector planning study, and

(7) Marketing and cropping pattern study.

The first three studies should be carried out in a well coordinated manner so that the study results will be mutually consistent. The manufacturing industry analysis (2) will set a framework for the other two by clarifying spatial distribution of various economic activities in line with the Master Plan. The corridor study (1) will deal with locational issues in more detail and identify specific infrastructure and utilities projects along the most important economic corridor. The regional transport study (3) will formulate more specific measures for transportation development to support the GAP implementation on a full scale.

The other four studies can be carried out fairly independently from the first three.The Master Plan provides sufficient base and direction for these studies.

Table 7.1: Initial Steps in the Action Program for GAP Implementation

Step	Action	By whom
1	Prepare a policy document recommending adoption of the Master Plan objectives and strategy in principal and requesting approval and support	SPO
2	Adopt the Master Plan objectives and strategy in principle as a national policy	Prime Minister High Planning Council
3	Convene the Ministerial Steering Committee and resolve sectoral concerns and conflicts related to Master Plan proposals and the PMS	Chairman
4	Take legislative measures necessary for the streamlining of SPO functions related to GAP and the establishment of RDC	State Minister in charge of GAP
5	Appoint the Director of RDC	—ditto—
6	Establish RDC and organize it with the key staff	Director of RDC
7	Organize the Regional Steering Committee and resolve fundamental issues related to GAP implementation along the Master Plan, including involvement of each implementing agency into information exchange and administration	—ditto—
8	Establish local support and advisory base	RDC
9	Implement the GAP promotion package, including the following: — implementation of orientation seminars to convey the Master Plan proposals to a wide range of people both in Ankara and in the GAP region — preparation of publicity materials — drafting of promotion materials for selected priority projects/programs — organization of international donors meeting	RDC

Table 7.2: Priority Projects Requiring Immediate Studies or Formulation

Project	Immediate Actions	Implementing Agencies
1. Atatürk passage project	Comparative feasibility study of the Atatürk reservoir passage, covering alternative routes, modes and types of bridge, if relevant	G.D. of Highways
2. Şanlıurfa city water supply and sewerage project	Study to formulate an action program for improving municipal services of Şanlıurfa, covering financial as well as physical aspects	DSI/Municipality of Şanlıurfa
3. Grain silo construction project	Study to determine locations and size of grain silos, followed by detailed design	TMO
4. Kahta river basin development project	Comprehensive feasibility study, including new project components identified by the Master Plan	DSI
5. Şanlıurfa-Diyarbakır highway project	Socio-economic study to determine industrial locations for some strategic industries and to identify needs for infrastructure and utilities	G.D. of Highways
6. Oil crops demonstration project	Project formulation to determine elements to be included such as a demonstration farm, extension, research and provision of seed	MAFRA
7. Livestock improvement program	Program formulation to determine components to be included such as a demonstration scheme for controlled grazing, artificial and natural insemination and disease control	MAFRA
8. EBK meat combine upgrading project	Study to determine meat combines to be upgraded, followed by detailed design	EBK
9. Tourism training/information center	Inventory of tourism resources and master planning for tourism development	MC&T/TURSAB
10. Botan river hydropower development project	Comprehensive study to identify hydropower potential and power demand including rural electrification needs	EIE
11. Gaziantep city water supply and sewerage project	Comprehensive feasibility study including rehabilitation in a short run and the Çataltepe dam in a long run.	DSI/Municipality of Gaziantep
12. Gaziantep-Şanlıurfa motorway project	Feasibility study on the basis of the east-west traffic demand analysis along E-24 as well as technical considerations	G.D. of Highways

Table 7.3: Further Studies to be Undertaken by SPO, Following the Master Planning

Study	Description
1. Corridor development plan study	Socio-economic study to examine the locational conditions for some strategic industries along the Gaziantep-Şanlıurfa-Diyarbakır corridor, and to identify specific needs for infrastructure and utilities; to be carried out in view of the project no. 5 in Table 7.2
2. Manufacturing industry development and location analysis	Study to determine potential production volumes, possible locations and other parameters for manufacturing activities to be newly established or much enhanced and to determine support service needs and incentive policies.
3. Regional transport study	(1) Analysis and projection of inter-modal passenger and freight traffic along main sections of the GAP transportation network; (2) Formulation of specific projects and policy measures for transport development to support the GAP implementation
4. Urban planning study for selected cities	Planning study for selected GAP cities from the clarification of socio-economic framework of urban development in each city within the regional development frameworks provided by the Master Plan, to financial management as well as physical plan and detailed land use plan for priority schemes; a seperate study may preceed to identify priority cities, but the city of Şanlıurfa may be used as the first case study incorporating the requirements of the project no. 2 in Table 7.2
5. Rural socio-economic survey and the establishment of RDC data base	(1) Socio-economic baseline survey to collect data to supplement the readily available data for updating the Master Plan and monitoring socio-economic changes due to GAP implementation; (2) design of a computer-based system for regional socio-economic data and project data to be used for monitoring
6. Health and education sector planning study	Study to identify arising needs of the Region's health and education services due to the GAP implementation, covering treatment and prophylactic measures for water-borne diseases and other illnesses, maternal and infant care, birth control, day-care, vocational training, formal and extended education, and to formulate a program package, respectively.
7. Marketing and cropping pattern study	Detailed study of cropping patterns to be adopted for the GAP irrigation schemes from the points of view of domestic and international marketing, and processing as well as soil, climate and other natural conditions