

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

THE STUDY ON THE TRANSPORTATION SYSTEM
AND
THE NATIONAL ROAD TRANSPORTATION MASTER PLAN

MAIN REPORT

(VOLUME II)

OCTOBER 1993

YACHIYO ENGINEERING CO., LTD.
IN ASSOCIATION WITH
PACIFIC CONSULTANTS INTERNATIONAL INC.

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YACHIYO ENGINEERING CO., LTD.
IN ASSOCIATION WITH
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Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

October, 1993

Dear Sir,

Letter of Transmittal

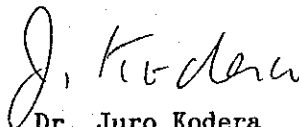
We are pleased to submit to you the report on the Study on the Transportation System and the National Road Transportation Master Plan in the Arab Republic of Egypt. The report contains the advice and suggestions of the authorities concerned of the Government of Japan and your Agency as well as the comments made by the Transport Planning Authority, Ministry of Transport, and the authorities concerned in the Arab Republic of Egypt. The report consists of a main report (two volumes) and an executive summary.

This report deals with the present and future transportation demand on road, rail and inland waterway in entire Egypt, and the master plans for road network and road transportation industries to cope with the demand.

In view of the road transportation efficiency and the transportation cost saving in the Arab Republic of Egypt, we recommend the plans for road network development, inter city bus and taxi services, and road freight transportation shall be implemented in the frame work of this Five Year Plan and the succeeding Five Year Plans as well. However the master plan shall be reviewed in accordance with the socio-economic changes in future, and we believe that this master plan provides the basic policy for the long term.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, the Ministry of Construction and the Ministry of Transport. We also wish to express our deep gratitude to the Ministry of Transport and the Governmental Agencies concerned in the Arab Republic of Egypt for the close cooperation and assistance extended to us during our study. We hope this report will contribute to the effort made in the development of the Arab Republic of Egypt.

Very truly yours,



Dr. Juro Koderu
Team Leader

The Study on the Transportation
System and the National Road
Transportation Master Plan

PREFACE

In response to a request from the Government of the Arab Republic of Egypt, the Government of Japan decided to conduct a master plan study on the Transportation System and the National Road Transportation Master Plan and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Egypt a study team headed by Dr. Juro Kodera, and composed of members of Yachiyo Engineering Co. Ltd., and Pacific Consultants International Inc., four times between April 1992 and August 1993.

The team held discussions with the officials concerned of the Government of Egypt, and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Arab Republic of Egypt for their close cooperation extended to the team.

October, 1993



Kensuke Yanagiya
President
Japan International Cooperation Agency

Study on the Transportation System and
the National Road Transportation Master Plan

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Part II Demand Forecast

CHAPTER 11 FUTURE SOCIO-ECONOMIC FRAMEWORK

11.1 Population

11.1.1 Review of Various Population Forecasts

1) The World Population Report, UNPF 1992

The United Nations Population Fund (UNPF) published a long range population projection as shown in Table 11-1-1. This forecasts that World population in the year 2025 will reach 8.5 billion, and in the same year Egyptian population will be 90.4 million.

Table 11-1-1 Socio Economic Indices in UNPF

Item	Figure
Population in 1990	52.4
2025	90.4
Average Growth Rate(%) 1990-95	2.2
Birth Rate(per 1,000) 1990-95	31
Death Rate(per 1,000) 1990-95	9
Percent Urban 1990	47
Urban Growth Rate(%) 1990-95	3.7

UNPF's figure for 1990 is set smaller than MOP's official figure of 54.4 million, and the average annual growth rate is also set lower than official figure of 2.47%. Thus UNPF predicts that the growth rate will drop to 1-2% level after the year 1995. This is the lowest figure among all estimates.

It is also noteworthy that urban population ratio of 47% is set slightly higher than GOPP's 45.7%, and urban growth rate of 3.7% is set higher than GOPP's 2.7%.

2) Transportation and Traffic Analysis for the Greater Cairo Ring Road Nile Bridges, Transport Planning & Engineering Consultants Office, 1990.

This report used annual growth rates in the Greater Cairo Urban Transport Master Plan Study, JICA 1988 (TS) for the period 1986-2000 and population for the year 2001. Annual growth rates for the periods 2000-2010 and 2010-2020 are set 2.26% and 2.06% respectively as shown in Table 11-1-2.

Table 11-1-2 Population Growth Rate in Greater Cairo Urban Transport Study

Period	Average Annual Growth Rate(%)
1986-2000	2.46
2000-2010	2.26
2010-2020	2.06

Based on the growth rates previously described, Egyptian populations are projected as follows;

Table 11-1-3 Population Growth Rate in Cairo Ring Road Study

Year	Population(Million)	Source
1986	48.2	(1986 Census)
2000	67.7	(JICA TS estimate)
2010	84.7	(Study Team Estimate)
2020	103.8	(Study Team Estimate)

For each governorate population projection, JICA TS's annual growth of population rates for the year 2001 are used, and the rates are assumed to be constant.

3) New Cities, GOPP 1992

GOPP population projection set an assumption that population of 53.5 million in the standard year 1991 will increase to 66.5 million in the year 2000 at an average annual growth rate of 2.28%. The population in 1991 is smaller than MOP's 1991 population of 2.4 million.

GOPP is in charge of New City Planning. In its projection, the share of urban population to the total is assumed to increase from 45.7% in the year 1991 to 47.4% in the year 2000. The urban population growth rate is set to be 2.7%, higher than 1.9% growth of the rural population. The projection assumed that New Cities will absorb 55% of incremental 12 million population by the year 2000.

4) Third Five Year Plan, MOP 1992

Third Five Year Plan is prepared based on the MOP's Egyptian long term population projection. MOP sets that population is 55.9 million at the standard year 1992. Populations will reach 62.9 and 70.1 million in the years 1996 and 2001 respectively. The average growth rate is 2.4% during the Third Five Year Plan period, and slightly lower 2.2% for Fourth Five Year Plan period. The decline in growth rate in both periods reflects the Egyptian population control policy.

The results of the 1976 and 1986 population census are reflected in setting the projection framework; those findings are that the urban population ratio to the total is 44%, and that the same growth rate was observed for both urban and rural areas.

The population estimate in these studies is presented in Fig. 11-1-1.

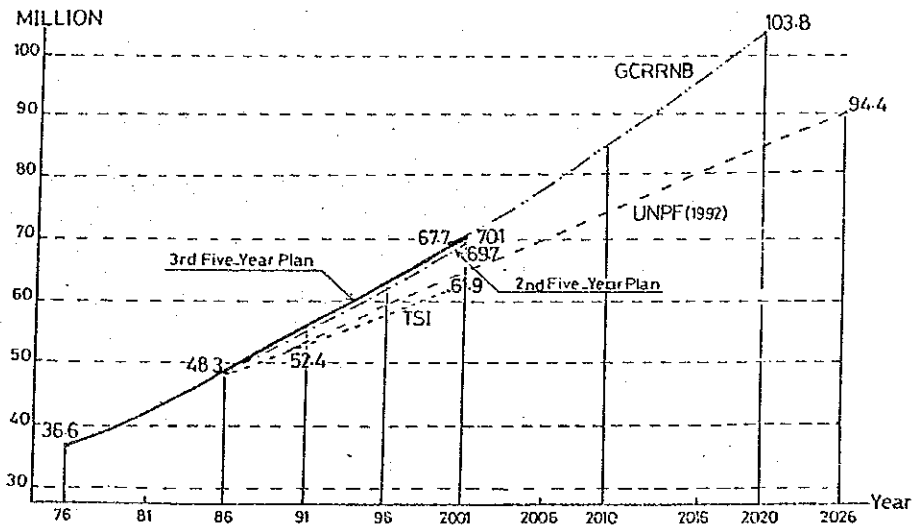


Fig. 11-1-1 Population Estimate in Various Studies

11.1.2 Egyptian National Population Projection

This study adopted official figures of the national population projection in the Third Five Year Plan. It sets 55.9 million in the standard year 1991, 62.9 million in 1996, and 70.1 million in 2001.

Average annual growth rate after the year 2001 is set 2%. It is low; because the Egyptian government is taking population control measures, and the population control policy assumes the decrease in average annual growth rate from 2.4% for the years 1991-96 to 2.2% for the years 1996-2001.

Table 11-1-4 Adopted Population Growth Rate

Period	Average Annual Growth Rate(%)
1986-1991	2.9
1991-1996	2.4
1996-2001	2.2
2001-2021	2.0

These settings result in 86.9 million in the long term target year of 2012 as shown in Table 11-1-5.

Table 11-1-5 Adopted Population Projection

Year	Population (million)
1986	48,264(Census Year)
1991	55,680
1996	62,690
1997	64,069(Short Term Target)
2001	69,896
2002	71,294(Medium Term Target)
2012	86,907(Long Term Target)

11.1.3 Future Population by Semi-Governorate Zones

The future population by semi-governorate zones was estimated based on the population growth rates by governorate and by urban/rural population in the ten years period of 1976 - 1986, adjusting the calculated total to the total population estimated above. The estimate process is shown in Fog. 11-1-2.

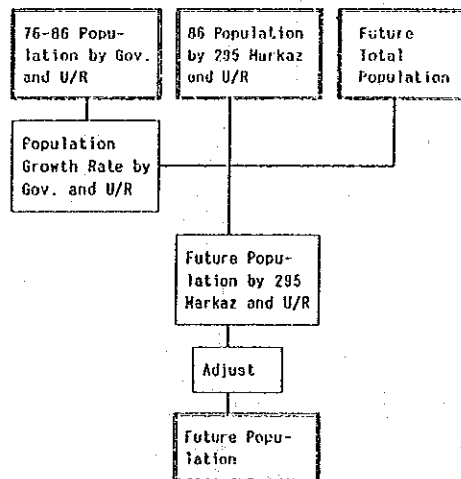


Fig. 11-1-2 Estimate Process of Population by Semi-Governorate Zone

The estimated population distribution is that followed the past ten years trend. New cities which are planned by GOPP and are included in the 3rd Five year Plan aim to accommodate the excess urban population in each governorate estimated following also the past trend to the near by area and do not intend to construct completely new cities.

Table 11-1-6 Estimated Population by Semi-Governorate Zone

Zone	Population(1,000)					Share(%)	
	1986	1991	1997	2002	2012	1986	2012
1 CAI	8,666	9,934	11,376	12,644	15,434	18.0	17.8
2 GTZ	1,842	2,289	2,873	3,429	4,477	3.8	5.2
3 QAL	1,802	2,193	2,688	3,148	4,034	3.7	4.6
4 SKS	2,282	2,620	2,992	3,302	3,985	4.7	4.6
5 SKN	1,133	1,297	1,475	1,624	1,953	2.3	2.2
6 DKE	2,593	2,950	3,333	3,649	4,372	5.4	5.0
7 DKW	891	1,008	1,131	1,229	1,463	1.8	1.7
8 DAM	741	858	990	1,102	1,342	1.5	1.5
9 PTS	401	498	624	744	970	0.8	1.1
10 ISM	545	682	863	1,037	1,363	1.1	1.6
11 SUZ	328	428	570	716	982	0.7	1.1
12 MIF	2,222	2,544	2,895	3,184	3,831	4.6	4.4
13 GHS	1,931	2,178	2,433	2,637	3,125	4.0	3.6
14 GHN	953	1,073	1,196	1,294	1,530	2.0	1.8
15 KAF	1,809	2,067	2,347	2,579	3,102	3.7	3.6
16 BHS	1,098	1,267	1,456	1,615	1,959	2.3	2.3
17 BHN	2,150	2,447	2,765	3,030	3,632	4.5	4.2
18 ALX	2,926	3,304	3,697	4,011	4,759	6.1	5.5
19 WDS	161	194	236	276	353	0.3	0.4
20 SIN	200	231	265	293	355	0.4	0.4
21 FAY	1,551	1,820	2,131	2,401	2,960	3.2	3.4
22 BES	1,450	1,664	1,901	2,098	2,532	3.0	2.9
23 MYA	2,645	3,016	3,413	3,738	4,477	5.5	5.2
24 ASY	2,216	2,547	2,909	3,212	3,877	4.6	4.5
25 NEW	113	139	172	205	270	0.2	0.3
26 SOH	2,447	2,774	3,117	3,394	4,043	5.1	4.7
27 QEN	2,259	2,613	3,010	3,344	4,064	4.7	4.7
28 ASW	809	930	1,064	1,177	1,424	1.7	1.6
29 RED	90	115	148	181	241	0.2	0.3
Total	48,254	55,680	64,070	71,293	86,909	100.0	100.0

Fig. 11-1-3 shows the estimated result by semi-governorate zone and by year. The population in Greater Cairo zone is estimated at 15.4 Million followed such 9 zones as Giza, East Dakhalia, Alexandria and Minya with over 4 Million by the year 2012.

Fig. 11-1-4 shows the change of population share by semi-governorate zone in 1986 and 2012. The population share of Greater Cairo zone in 1986 was 18% and is estimated to reduce by 0.2%, while the share of such zones surrounding Greater Cairo and along Suez Canal as Giza, Qaliubia, Port Said, Ismailia and Suez are estimated to increase by 0.5% - 1.5%. The population share among zones will not change so much.

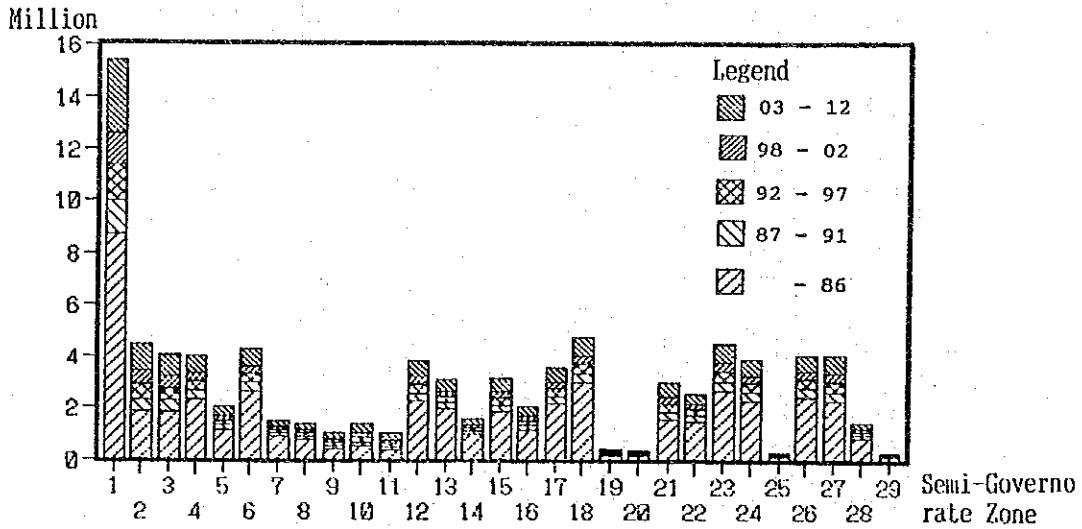


Fig. 11-1-3 Future Population Distribution by Zone

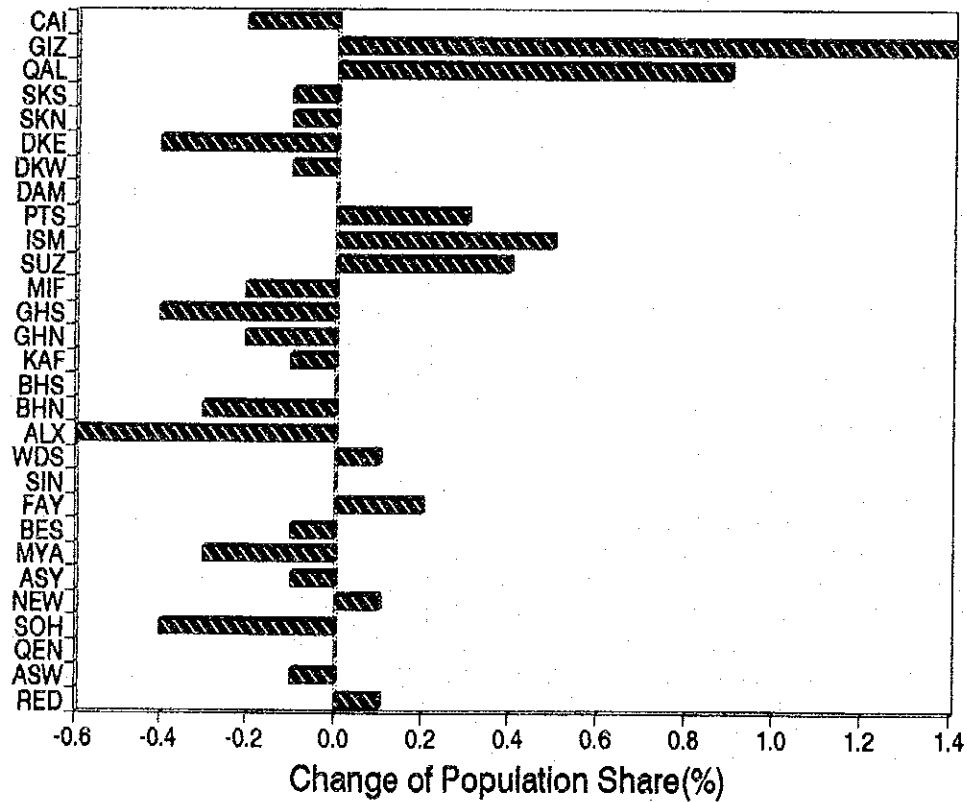


Fig. 11-1-4 Change of Population Share (%)

11.2 Gross Domestic Product (GDP)

11.2.1 Average Annual Growth Rate of GDP

1) Third Five Year Plan

The ten year target for GDP was set in the latest Five Year Plan. It targets at 5.1% of average annual growth rate for the period 1991/92 - 1996/97, and 6.5% for the period 1996/97 - 2001/02. These are numbers that show enthusiasms of policy makers (see Table 2-8-5).

For the production sector to keep 50% of GDP, high growth in industry must be achieved. The annual growth rates targeted for the industry sector are 7.0% for the period 1991/92-1996/97, and amazing 10.3% for the period 1996/97-2001/02. Egyptian economy in the future depends heavily on growth of industrial sector.

2) EIU Estimate

One year has passed since Egypt and IMF agreed on the economic reform program. In reviewing a year of reform on progresses in accordance to the economic reform program, general economy are described by Economist Intelligent Unit (EIU) as follows;

- (1) Egypt had made a progress in reforming the macro-economy by means of restructure of its monetary and financial system, liberalization of the foreign exchange rate and interest rates. The next step is to accelerate the structural adjustment of commodity production sectors.
- (2) Economic reform measures do not envisage any socio-economic foundations for mid- and long-term economic perspective. Social and administrative reform should be emphasized as well as economic reform. Those fields are, for example, technical education and improvement of the literacy rate.
- (3) Current fiscal policy aims at calming inflation down. However, it should be adjusted to induce more investment.
- (4) Privatization process shall be accelerated, and the custom regulations should be reformed.

According to EIU, during three years of economic reform program, GDP average annual growth rate is lower than average population growth rate. GDP will supposedly recover in 1993 to 4-5% average annual growth rate level (Table 11-2-1).

Table 11-2-1 Forecast of Economic Indices

Indices	Annual Growth Rate in Real(%)					
	1991	1992	1993	1994	1995	1996
1. GDP	1.2	2.3	4.0	4.0	4.2	4.2
2. Private Consumption	0.9	1.2	2.8	3.6	3.7	3.7
3. Government Consumption	0.6	0.8	2.0	1.9	2.8	2.1
4. Gross Fixed Investment	1.2	4.0	7.0	5.4	6.0	6.2
5. Exports	3.5	5.5	7.0	6.2	6.5	6.3
6. Imports	1.5	2.0	4.0	4.5	5.0	5.0

Source: Economist Intelligence Unit, 1992

11.2.2 Future GDP Figures

In this study, the government's targets are employed for future GDP figures. The same rate as in 96/97 - 2001/02, is used after the year 2001. Average annual growth rate of GDP are given in Table 11-2-2.

Table 11-2-2 Adopted GDP Growth Rate

Year	Ave. Annual Growth Rate(%)
91/92 - 96/97	5.1
96/97 - 2001/02	6.5
2001/02 -	6.5

The GDP figures based on the growth rates above are calculated as shown in Table 11-2-3.

Table 11-2-3 Estimated Future GDP

Year	GDP (LE in billion) 1991/92 Fixed Price
1991/92	125
1996/97	161
2001/02	220
2011/12	413

11.2.3 GDP by Sector

The annual growth rates of GDP by sector in the 3rd Five Year Plan period of 1992 - 1997 were applied as the base figures to calculate future GDP by sector and beyond 1997, the growth rates by sector were adjusted by the change of the total GDP growth rate. GDP in each sector was calculated applying these growth rates to the 1997 base year GDP by sector and the calculated total was adjusted to the esti-

sector and the calculated total was adjusted to the estimated total above.

Table 11-2-4 shows the resulted GDP by sector for the years 1997, 2002 and 2012 in 1991/92 fixed price base.

Table 11-2-4 Estimated Future GDP by Sector

Sector	GDP(MLE 86/87)		GDP(MLE 91/92)			Structure(%)		
	86/87	91/92	91/92	96/97	01/02	2012	91/92	2012
Total	48,765	59,107	125,399	160,807	220,225	413,573	100.0	100.0
Total Goods	23,471	28,169	63,511	80,042	111,550	223,279	50.6	54.0
Agriculture	10,111	11,622	20,675	24,555	30,287	44,184	16.5	10.7
Industry/Mining	8,137	10,325	21,409	30,090	48,947	124,196	17.1	30.0
Petroleum Product	1,873	1,908	13,342	14,022	15,038	16,585	10.6	4.0
Electricity	528	705	2,009	2,755	3,978	7,953	1.6	1.9
Build./Construction	2,822	3,609	6,076	8,620	13,300	30,361	4.8	7.3
Total Prod.Services	15,808	19,198	42,784	55,420	74,925	132,897	34.1	32.1
Transport/Comm.	3,203	3,856	8,018	10,358	14,443	26,927	6.4	6.5
Suez Canal	840	925	6,154	7,467	9,085	12,896	4.9	3.1
Trade/Fina/Insu	11,306	13,399	26,658	34,245	45,977	79,470	21.3	19.2
Trade	9,097	10,727						
Finance	2,172	2,630						
Insurance	37	42						
Tourism/Rest./Hotels	459	1,018	1,954	3,350	5,420	13,604	1.6	3.3
Total Soc. Services	9,486	11,740	19,104	25,345	33,750	57,397	15.2	13.9
Housing/Public Util	851	1,383	1,677	2,755	3,750	6,662	1.3	1.6
Housing	697	1,159						
Public Utilities	154	224						
Other Services	8,635	10,357	17,427	22,590	30,000	50,735	13.9	12.3
Governmental Services	4,475	5,702						
Private Services	4,160	4,655						

11.3 Employment

1) Total Employment

The employment in the years 1992 and 1997 in the national level is forecast in the 3rd Five Year Plan (1991/92 - 1996/97). The annual growth rate in the six years period of 1986 - 1992 is calculated at 2.10% based on 1986 CAPMAS census and the figures in the 3rd Five Year Plan. The annual growth rate in the 3rd five year plan period of 1992 - 1997 is forecast at 3.30%. Assuming the adjusted annual growth rate of employment beyond the year 1997 by the change of GDP growth rate of 6.5/5.1, the total employment and related indices is calculated as shown in Table 11-3-1.

Table 11-3-1 Future Total Employment

Item	Unit	Year				
		1986	1992	1997	2002	2012
Population	1,000	48,264	57,060	64,069	71,294	86,907
Employment	1,000	12,270	13,900	16,350	20,090	30,332
Emp/Pop	(%)	25.4	24.4	25.5	28.2	34.9
GDP(91/92 Price)	M.LE		125,399	160,807	220,321	413,573
GDP/Pop	1,000LE		2.20	2.51	3.09	4.76
GDP/Emp	1,000LE		9.02	9.84	10.97	13.63

2) Employment by Sector

The annual growth rates of employment by sector during 1986 - 1992 and 1992 - 1997 were calculated based on 1986 CAPMAS census and the figures in the 3rd Five Year Plan. The annual growth rate in the agriculture sector in the period of 1986 - 1992 shows negative growth rate of -0.67%, however the figures in the 3rd Five Year Plan adopted the positive value of 1.42%. All the rest figures in the both periods are positive.

The annual growth rate of employment by sector in the 3rd Five Year Plan period of 1992 - 1997 adjusting by the change of GDP growth rate is applied to calculate the future employment by sector beyond the year 1997, and the total was also adjusted to the estimated total above. Table 1-3-2 shows the resulted employment by sector and their share in the years 1992, 1997, 2002 and 2012.

3) Employment Distribution

The future employment by zone was calculated based on the employment by zone and by sector in 1986 census, applying the same annual growth rate of employment by sector and adjusting the calculated total to the estimated total above. The estimate process is shown in Fig. 11-3-1.

Table 11-3-2 Future Employment by Sector

Sector	EMPLOYMENT(1,000)					Annual Growth Rate(%)		Structure(%)	
	86	91/92	96/97	2002	2012	86-92	92-97	1992	2012
Total Employment	12,270	13,900	16,350	20,090	30,332	2.10	3.30	100.0	100.0
Total Goods	7,331	7,542	8,664	10,410	15,099	0.47	2.81	54.3	49.8
Agriculture	4,776	4,588	4,922	5,485	6,698	-0.67	1.42	33.0	22.1
Industry/Mining/Petro	1,585	1,940	2,447	3,206	5,413	3.43	4.75	14.0	17.8
Industry/Mining		1,902	2,399	3,143	5,306		4.75	13.7	17.5
Petroleum Product		38	48	63	107		4.78	0.3	0.4
Electricity	97	103	120	145	209	1.01	3.10	0.7	0.7
Build./Construction	873	911	1,175	1,574	2,779	0.71	5.22	6.6	9.2
Total Prod.Services	1,788	2,264	2,839	3,698	6,174	4.01	4.63	16.3	20.4
Comm./Trade	1,788	2,113	2,655	3,465	5,807	2.82	4.67	15.2	19.1
Transport/Comm.	1,529	622	789	1,040	1,775		4.87	4.5	5.9
Suez Canal				0	0				
Trade/Fina/Insu	259	1,491	1,866	2,426	4,032		4.59	10.7	13.3
Trade				0	0				
Finance	259			0	0				
Insurance				0	0				
Tourism/Rest./Hotels		151	184	233	367		4.03	1.1	1.2
Total Soc. Services	3,151	4,094	4,847	5,982	9,060	4.46	3.43	29.5	29.9
Housing/Public Util		220	247	288	385		2.34	1.6	1.3
Housing				0	0				
Public Utilities				0	0				
Other Services		3,874	4,600	5,694	8,674		3.50	27.9	28.6
Governmental Services		2,523	2,865	3,379	4,624		2.57	18.2	15.2
Private Services		1,351	1,735	2,314	4,050		5.13	9.7	13.4

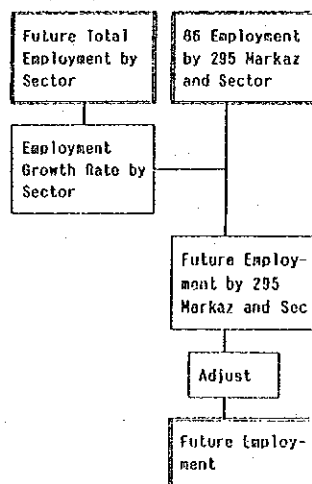


Fig. 11-3-1 Estimate Process of Employment by Semi-Governorate Zone

Fig. 11-3-2 (1) shows the resulted employment by semi-governorate zone. Employment in Greater Cairo in the year 2012 is estimated at 7.5 million, which is 2.5 times and that in Alexandria is 2.5 million, which is 2.0 times the figures in 1986 reflecting the estimate of GDP by sector in the 3rd Five Year Plan, which emphasizes the importance to increase the product in manufacturing sector.

Fig. 11-3-2 (2) shows the change of employment share by semi-governorate zones. The share of Greater Cairo increased by 9%, followed by Alexandria, while those in other zones show the tendency to lose their share.

Table 11-3-3 Estimated Future Employment by Semi-Governorate Zone and by Sector in 2012

Zone	Employment(1,000)							GRDP	GRDP/BMP
	Agr.	Ind.	Elec	Const	Comme	Serv	Total	(MLE)	(1000LE)
1 CAI	151	1,855	52	924	2,110	2,385	7,477	121,832	16.29
2 GIZ	245	267	8	144	212	241	1,117	16,513	14.78
3 QAL	207	216	7	84	193	387	1,094	14,781	13.51
4 SKS	364	151	8	88	200	445	1,256	14,730	11.73
5 SKN	259	42	2	26	82	151	562	5,896	10.49
6 DKE	413	195	8	110	253	506	1,485	17,956	12.09
7 DKW	178	46	5	38	72	136	475	5,393	11.35
8 DAM	96	185	2	46	88	122	539	8,709	16.16
9 PTS	22	39	2	20	151	133	367	5,518	15.04
10 ISM	58	32	6	50	94	114	354	4,720	13.33
11 SUZ	13	66	5	30	78	68	260	4,427	17.03
12 MIF	351	151	9	69	185	428	1,193	14,037	11.77
13 GHS	284	200	6	81	206	394	1,171	15,136	12.93
14 GHN	116	205	1	45	80	164	611	9,390	15.37
15 KAF	395	129	4	45	140	263	976	11,300	11.58
16 BHS	236	38	3	25	71	164	537	5,500	10.24
17 BHN	436	228	11	71	173	283	1,202	15,537	12.93
18 ALX	115	738	24	265	713	642	2,497	43,168	17.29
19 WDS	29	11	1	13	19	23	96	1,231	12.82
20 SIN	28	8	1	17	27	41	122	1,469	12.04
21 FAY	359	81	3	57	116	210	826	9,046	10.95
22 BES	308	59	3	52	104	216	742	7,871	10.61
23 MYA	608	98	6	49	185	374	1,320	13,670	10.36
24 ASY	473	89	5	66	161	328	1,122	11,914	10.62
25 NEW	13	3	0	7	7	34	64	628	9.81
26 SOH	483	81	4	129	189	331	1,217	13,057	10.73
27 QEN	365	120	7	181	172	303	1,148	13,366	11.64
28 ASW	92	50	13	37	79	154	425	5,481	12.90
29 RED	3	29	1	9	12	21	75	1,299	17.32
Total	6,700	5,412	207	2,778	6,172	9,061	30,330	413,575	13.64
(%)	22.1	17.8	0.7	9.2	20.3	29.9	100.0		

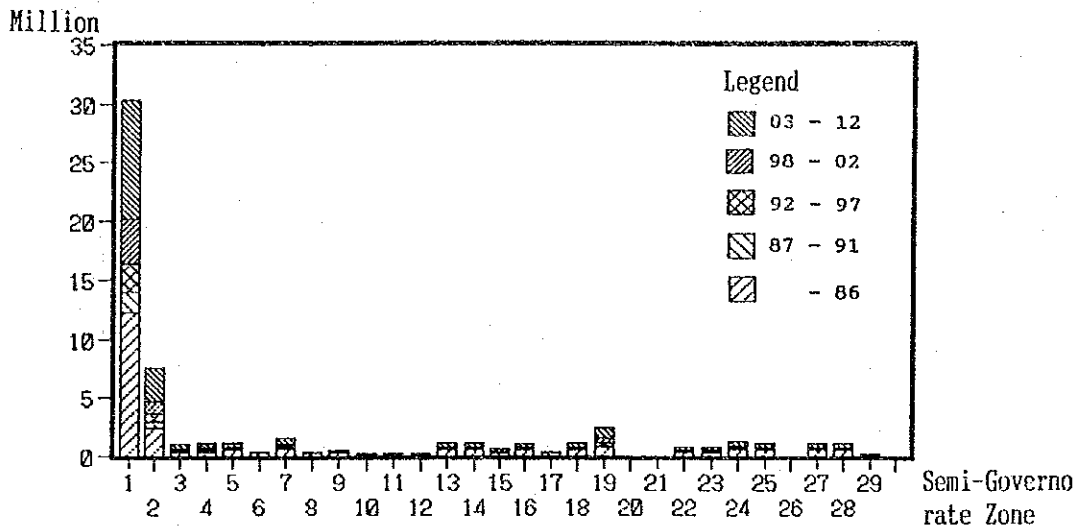


Fig. 11-3-2 (1) Future Employment Distribution by Semi-Governorate Zone

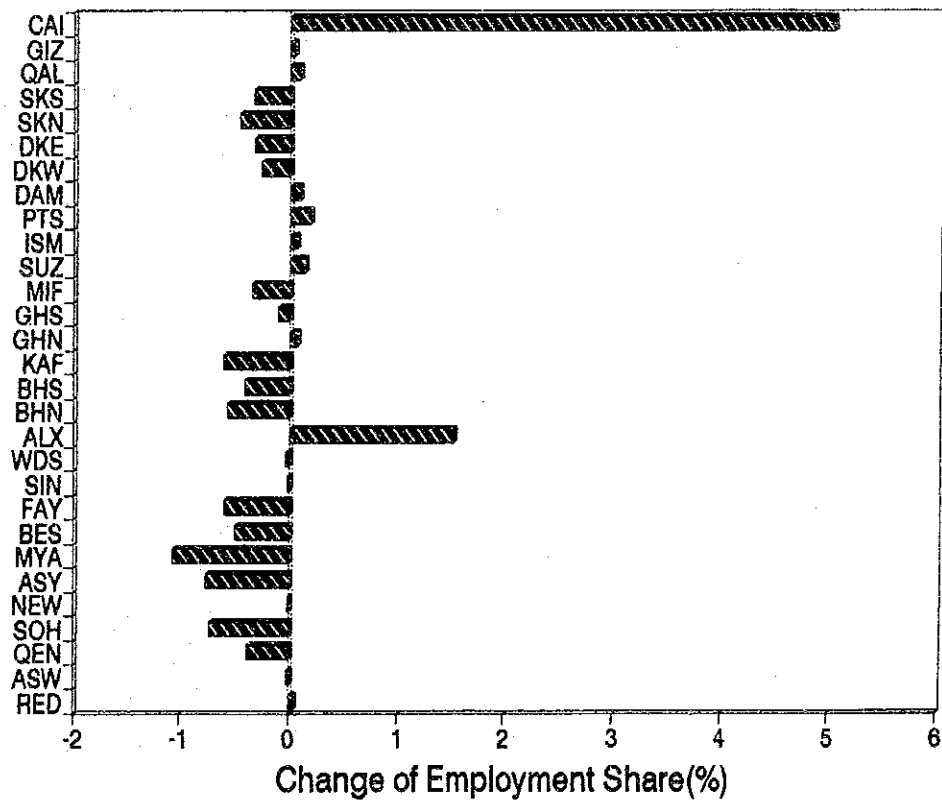


Fig. 11-3-2 (2) Change of Employment Share(%)

11.4 GRDP

GRDP for the years 1997, 2002 and 2012 were calculated based on the productivity by sector in each year, which was calculated dividing GDP by employee by sector in each year, and multiplying employee by zone. The calculated total was adjusted to the total GDP in each year. The estimate process is shown in Fig. 11-4-1.

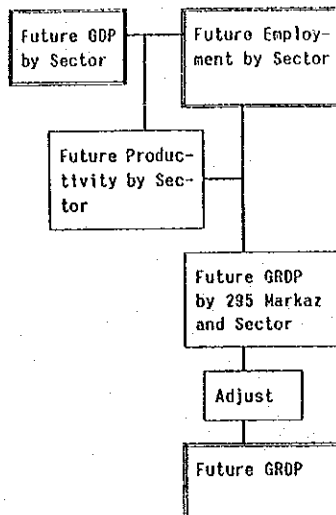


Fig. 11-4-1 GRDP Estimate Process

Table 11-4-1 shows the resulted GRDP per population in each zone for the years 1997, 2002 and 2012.

Table 11-4-1 Estimated Future GRDP by Semi-Governorate Zone

ZONE	GRDP (MLE in 1991/92)				GRDP/Pop(LE in 1991/92)			
	1991	1997	2002	2012	1991	1997	2002	2012
1 CAI	34,544	44,832	62,535	121,832	3,477	3,941	4,946	7,894
2 GIZ	4,835	6,198	8,572	16,513	2,112	2,157	2,500	3,688
3 QAL	4,433	5,690	7,816	14,781	2,021	2,117	2,483	3,664
4 SKS	4,688	5,987	8,097	14,730	1,789	2,001	2,452	3,696
5 SKN	2,035	2,562	3,394	5,896	1,569	1,737	2,090	3,019
6 DKE	5,666	7,237	9,812	17,956	1,921	2,171	2,689	4,107
7 DKN	1,763	2,240	3,010	5,393	1,749	1,981	2,449	3,686
8 DAM	2,476	3,166	4,414	8,709	2,886	3,198	4,005	6,490
9 PTS	1,699	2,204	3,007	5,518	3,412	3,532	4,042	5,689
10 ISM	1,438	1,863	2,552	4,720	2,109	2,159	2,461	3,463
11 SUZ	1,261	1,634	2,277	4,427	2,946	2,867	3,180	4,508
12 HIF	4,476	5,710	7,719	14,037	1,759	1,972	2,424	3,664
13 GHS	4,658	5,959	8,130	15,136	2,139	2,449	3,083	4,844
14 GHN	2,682	3,426	4,767	9,390	2,500	2,865	3,684	6,137
15 KAF	3,712	4,689	6,292	11,300	1,796	1,998	2,440	3,643
16 BHS	1,894	2,389	3,167	5,500	1,495	1,641	1,961	2,808
17 BHN	4,871	6,174	8,384	15,537	1,991	2,233	2,767	4,278
18 ALX	12,197	15,769	22,019	43,168	3,692	4,265	5,490	9,071
19 WDS	383	490	668	1,231	1,974	2,076	2,420	3,487
20 SIN	461	594	807	1,469	1,996	2,242	2,754	4,138
21 FAY	3,030	3,825	5,107	9,046	1,665	1,795	2,127	3,056
22 BES	2,653	3,356	4,474	7,871	1,594	1,765	2,133	3,109
23 MYA	4,741	5,964	7,896	13,670	1,572	1,747	2,112	3,053
24 ASY	4,037	5,100	6,793	11,914	1,585	1,753	2,115	3,073
25 NEW	199	260	352	628	1,432	1,512	1,717	2,326
26 SOH	4,348	5,518	7,381	13,057	1,567	1,770	2,175	3,230
27 QEN	4,183	5,352	7,274	13,366	1,601	1,778	2,175	3,289
28 ASW	1,684	2,172	2,965	5,481	1,811	2,041	2,519	3,849
29 RED	352	454	642	1,299	3,061	3,068	3,547	5,390
Total	125,399	160,814	220,323	413,575	2,252	2,510	3,090	4,759

11.5 Vehicle Ownership

The passenger car ownership has a close relation with per capita GDP as seen in the chapter 3, while the number of buses, taxis and trucks will increase in relation with the public passenger and commodity transport demand. Therefore the future passenger car ownership is discussed in this section. The future bus, taxi and truck numbers will be discussed in the section of transport industries taking transport efficiency by size and capacity into consideration.

According to the past trend of passenger car ownership by per capita GDP, the car ownership in the long term target year of 2012 will increase by 5.0 times the 1991 level as summarized in Table 11-5-1, and the number will reach to 4.3 million.

Table 11-5-1 Passenger Car Ownership and other Economic Indices.

Items	1991	1997	2002	2012	2012/1991
Population(1,000)	55,680	64,070	71,293	86,907	1.56
GDP(MLE in 1991/92)	125	161	220	413	3.30
GDP/Pop. (LE in 1991/92)	2,245	2,510	3,090	4,752	2.12
P.Car Ownership(Veh./1000Pop)	20.4	22.7	28.0	50.4	2.47
	(15.7)				(3.21)
P.Car (1,000)	876	1,457	1,996	4,380	5.00

Note: Figures in () shows observed figures.

CHAPTER 12 PRODUCTION AND CONSUMPTION FORECAST

12.1 Methodology

Consumption, production and foreign trade volumes for the target years 1997, 2002 and 2012 for each of the twenty-nine commodity sub-groups were forecast principally through modeling. Modeling as a data oriented processing system ensures elasticity with future socio-economic indices as GDP and population, so that the outputs can be reviewed in accordance with changes of Egypt's economy when necessary.

The long term transport master plan should be incorporated with national development plans, and production, consumption and foreign trade will be the basis for estimating future freight demand. Therefore data obtained from official documentation or approved sources, which had to be checked by various organizations concerned from the various aspects, were applied in the procedure as much as possible. The Egyptian government's authorized Third 5-Year Plan served as a base for the forecast process.

12.1.1 Past Data and Future Plans

As a first step data on production, export and import amounts for each of the individual study commodities for the period of 1987 to the present were collected from the following sources;

- CAPMAS Year Book statistics
- Central Bank of Egypt annual reports
- Statistics published by relevant ministries/authorities
- JICA Study Company Survey

Based on these data, consumption values for the commodities were calculated. The results of this exercise is reviewed in Chapter 3.

Following the first step of fixing present (1990) consumption and production, the second step of collecting existing plans for future production and consumption was implemented. The Third 5-Year Plan (1992/93 - 1996/97) was referred to for obtaining future planning figures. This plan contains product studies for 188 commodities. Production, consumption, export and import figures for 1992, 1993 and 1997 were identified.

The Third 5-Year Plan also briefly outlined some target production figures for a number of commodities (examples; Crude Oil, Phosphate) for the year 2002 (the Fourth Five Year Plan). These were also considered. However, past or future data for a small number of commodities could not be found in either of the above two steps. For example the 1987 production amount for Crude Oil had to be estimated based on the available results. On the other hand no forecasts for

Lumber/Timber were available.

Other published materials were researched as necessary to augment the above sources. One very valuable source of information was the comprehensive study on Egypt, its resources and economy authored by Dr. Gamal Hamdan in 1984 in four volumes under the title "The Characteristics of Egypt".

As a result of these two steps, a table showing past and future production, consumption and foreign trade figures for the 29 study commodity groups, for years 1987 to 1990, 1992, 1993 and 1997 was produced. These materials were used for the forecasting volumes in subsequent years.

12.1.2 Forecast models applied

Four types of multi-variable linear regression models and a growth factor method were employed to obtain the most suitable forecasts for each of the production and consumption amounts for each of the commodity sub-groups for the years 2002 and 2012. For the year 1997, the Third Five Year Plan figures were adopted. In most cases forecasting was done for the commodity group as a whole. However for such commodity groups as Coal/Coke forecasting was done for each of coal and coke independently. In some cases export and import amounts were also forecast by modeling.

Independent variables used in the models were such socio-economic indices as GDP, GDP/capita, GDP by sectors (agriculture, industry & mining, construction), and employment by sector. In the forecasting of production amounts, production figures themselves were calculated as dependent variables, while in the case of consumption forecasting both gross consumption and consumption/capita were calculated as suitable.

When applying growth factor method various growth rates were considered, such as the growth rates projected in the Third 5-Year Plan (1992-1997), the past growth rates in the 1987-1992 period, and the growth rates projected for the 1987-1997 period.

As a first step consumption was estimated, followed by projections for production and foreign trade (exports and imports), so as to adjust the total production + import to the total consumption + export in each commodity group.

A total of five models including growth factor method were tested for each commodity group and based on comparison of the resulting projections of each model with independent variable combinations, and in general the most suitable model in terms of its correlation coefficient (R^2) approaching 1.0 was selected. Table 12-1-1 shows the model type adopted for each commodity sub-group and the parameters.

Table 12-1-1 Model Type and Variables used in Commodity Consumption and Production Forecasts

(A) Commodity Consumption Forecast

COM	Model Type (1-5)	Variables							Parameters			R ²
		GDP	Pop.	GDP	GDP	Empl	Empl	Empl.	Year	Other	a	
		Agr	Ind	Cons	Agr	Ind	Const					
1	3						o		5.0	0.3520		0.847
2	3	o	o						6.7	-0.1100		0.444
3	2	o	o						4.3	0.0003		0.855
4	5(&1)		o					o	-78773.0	40.0450		0.953
5	5							o	-84.7	0.0488		0.999
6	4						o		4.5	0.0000	14	0.630
7	1						o		1858.6	0.0009		0.769
8.1	4		o						1.9	0.0000	6	0.961
8.2	1						o		-500.3	0.0008		0.956
9	1						o		856.5	0.0045		0.795
10	3	o	o						2.0	0.4050		0.638
11	3	o	o						4.0	0.2700		0.838
12	2	o	o						5.5	0.0001		0.846
13	Sugar cane consumption equals the amount produced											
14	5(&2)		o					o	19.7	-0.0082		0.999
15	1	o	o						42.8	-0.0010		0.400
16	3	o	o						4.1	-0.0600		0.230
17	5(&2)		o					o	-74.3	0.0390		0.999
18	3	o	o						4.2	-0.0970		0.729
19	1	o	o						8.5	0.0030		0.774
20	1		o						-2012.4	0.3360		0.977
21	5(&2)		o					o	-48.8	0.0260		0.980
22	5(&1)		o					o	41.6	-0.0174		0.993
23	3	o	o						4.3	-0.1890		0.696
24	3	o	o						1.2	0.4100		0.810
25	1	o	o						32.0	0.0034		0.630
26	2		o						8.3	0.0000		0.973
27	1	o	o						8.0	0.0030		0.895
28	1							o	-155082.8	79.0630		0.987
29	1							o	-28283.8	14.3145		0.987

(B) Commodity Production Forecast

COM	Model Type	Variables							Parameters			R ²
		GDP	Pop.	GDP	GDP	Empl	Empl	Empl.	Year	Other	a	
		Agr	Ind	Cons	Agr	Ind	Const					
1	4		o						-1.9	-0.00005	47	0.656
2	3							(1)	-0.8	1.08000		0.652
3	1						o		-5594.5	0.00660		0.974
4	4		o						1.6	-0.00003	170	0.949
5	5(&2)							o	-84.7	0.04879		0.999
6	4		o						3.7	-0.00003	20	0.953
7	1						o		404.5	0.00110		0.809
8.1	Coal production projections extracted from reference materials											
8.2	1						o		-620.4	0.00090		0.979
9	1						o		2027.7	0.00380		0.709
10	1		o						770.3	0.17750		0.895
11	1		o						5596.4	0.89700		0.967
12	5(&3)							o	101.8	-0.05040		0.976
13	3		o						6.0	0.34170		0.673
14	5(&4)							o	182.0	-0.09223	1.8	0.729
15	2		o						7.0	0.00040		0.983
16	2		o						7.2	0.00002		0.961
17	5(&4)							o	-98.8	0.05354		0.999
18	5(&4)							o	-15.8	0.01163		0.999
19	5(&2)							o	-99.1	0.05280		0.998
20	1		o						1869.7	0.08790		0.927
21	5(&2)							o	-92.6	0.05003		0.999
22	1						o		241.3	0.00008		0.500
23	4		o						1.5	-0.00002	3	0.982
24	3		o						1.9	0.60000		0.911
25	4		o						0.8	-0.00002		0.857
26	4		o						1.8	-0.00002		0.979
27	4		o						1.7	-0.00003		0.943
28	1							o	-73750.4	37.59790		0.988
29	1						o		146.3	0.00220		0.530

Other Variables: (1) Crude Oil Consumption

The five models employed were as follows;

Model 1: Normal Regression

$$Y = a.X_1 + b.X_2 + c$$

where: Y: Dependent variable
X: Independent Variables

Model 2: Semi-Logarithmic Regression

$$Y = a.b^{X_1}.c^{X_2}$$

Model 3: Logarithmic-Logarithmic Regression

$$Y = a.X_1^b.X_2^c$$

Model 4: Logistic Curve

$$Y = Y_{max}/[1 + \text{Exp}(a.X + b)]$$

Model 5: Growth Factor Method

$$Y = (1 + r)^n.X$$

12.1.3 Distribution of Projections

Production and consumption projections for the years 1997, 2002 and 2012 were distributed by governorate based upon 1990 patterns, forecast socio-economic indices in each governorate and outside reference material as possible (such as studies on new mining locations).

Exports and imports were distributed taking into consideration 1990 patterns, existing and planned port capacities and expected trading partners.

12.1.4 Summation of Production and Consumption Forecast Results

1) Total Production and Consumption Forecasts

The total production and consumption forecasts are summarized in Tables 12-1-2 and 12-1-3 respectively.

Total production in the year 2012 is expected to be 3.3 times that in 1990. By category construction materials will show the largest increase, exceeding four times the 1990 production. Industrial commodities category will increase by 3.4, above the average of 3.3, while increase in agricultural commodities production will be less than average at 2.1.

In terms of commodity sub-groups, the highest production increase is forecast for phosphate (2012 production is 16.5 times 1990 production amount) which is due to the exploitation of new fields. On the other hand, the government's stated policy to reserve crude oil resources by maintaining crude oil production at the present level is reflected in the 2012 production estimate (only 1.1 times 1990 production).

Table 12-1-2 Total Production by Commodity

Commodity	Production (1000 t)				97/	02/	12/
	1990	1997	2002	2012	90	90	90
(1)Crude Oil	43,952	46,408	45,000	46,996	1.1	1.0	1.1
(2)Petr. Product	23,157	25,700	28,466	34,093	1.1	1.2	1.5
(3)Natural Gas	6,110	11,025	15,000	29,943	1.8	2.5	4.9
TOTAL Petroleum	73,219	83,133	88,466	111,032	1.1	1.2	1.5
(4)Cement	44,926	70,400	98,686	158,522	1.6	2.2	3.5
(5)Other Const. Mat.	155,073	341,973	436,937	710,937	2.2	2.8	4.6
TOTAL Constr.	199,999	412,373	535,623	869,459	2.1	2.7	4.3
(6)Phosphate	947	2,600	3,750	15,644	2.7	4.0	16.5
(7)Iron Ore	2,405	3,000	3,868	6,253	1.2	1.6	2.6
(8)Coal/Coke	1,131	2,161	3,014	5,503	1.9	2.7	4.9
(9)Other Minerals	9,773	11,807	14,320	22,782	1.2	1.5	2.3
TOTAL Mining	14,256	19,568	24,952	50,182	1.4	1.8	3.5
(10)Wheat	4,268	5,280	6,369	8,889	1.2	1.5	2.1
(11)Other Cereals	19,725	27,750	33,887	46,618	1.4	1.7	2.4
(12)Fruit/Vegetable	15,285	22,305	26,295	36,542	1.5	1.7	2.4
(13)Sugar Cane	11,144	12,330	13,580	15,418	1.1	1.2	1.4
(14)Fibre Crop	1,428	1,717	1,745	1,803	1.2	1.2	1.3
(15)Livestock	2,159	2,446	2,600	3,100	1.1	1.2	1.4
(16)Animal Product	1,703	2,051	2,233	2,431	1.2	1.3	1.4
(17)Other Agric.	1,452	3,324	4,344	7,421	2.3	3.0	5.1
TOTAL Agriculture	57,164	77,203	91,053	122,222	1.4	1.6	2.1
(18)Sugar Product	1,068	1,639	1,737	1,951	1.5	1.6	1.8
(19)Edible Oil/Fat	138	565	741	1,271	4.1	5.4	9.2
(20)Animal Feed	3,219	6,190	7,950	15,290	1.9	2.5	4.7
(21)Beverage	599	1,440	1,853	3,069	2.4	3.1	5.1
(22)Other Food Prod	370	456	514	701	1.2	1.4	1.9
(23)Chemical Prod.	779	1,137	1,457	2,543	1.5	1.9	3.3
(24)Metal/Met. Prod	3,127	4,129	5,516	8,866	1.3	1.8	2.8
(25)Textile	2,388	3,200	3,577	5,203	1.3	1.5	2.2
(26)Manf. Fertilizer	5,695	8,352	10,520	20,760	1.5	1.8	3.6
(27)Pulp/Paper	237	440	596	1,014	1.9	2.5	4.3
(28)Lumber/Timber	1,030	1,380	1,536	1,873	1.3	1.5	1.8
(29)Other Manf. Good	144	263	296	477	1.8	2.1	3.3
TOTAL Industry	18,794	29,191	36,293	63,018	1.6	1.9	3.4
Total	363,432	621,468	776,387	1,215,913	1.7	2.1	3.3

Total local consumption in 2012 is forecast to reach 3.4 times that of 1990. By category, the highest consumption increase is in construction materials (4.3 times 1990 consumption). In the crude oil and petroleum products, while 1990 production will multiply by 1.5 times the 2012 production, the respective local consumption increase will be larger at 1.8. Therefore a decrease in the amount allocated for foreign partners and export is forecast. On the other hand, production increase in the industrial commodities category (3.4 times 1990 production) exceeds the respective growth in local consumption (2.5) thereby showing an increase in exports of industrial commodities in the future. Consumption of agricultural commodities in 2012 will multi-

ply by 2.2 the 1990 corresponding figure, and an increase of consumption over demand is forecast.

In overall terms, the 1990 deficits in the categories of construction materials, minerals and industrial products are projected to be replaced by surpluses in 2012. However the 1990 deficit in agricultural commodities is expected to more than double in the year 2012.

Table 12-1-3 Total Consumption by Commodity

Commodity	Consumption (1000 t)				97/	02/	12/
	1990	1997	2002	2012	90	90	90
(1)Crude Oil	24,339	26,800	30,000	35,480	1.1	1.2	1.5
(2)Petr. Product	21,655	22,261	24,447	28,422	1.0	1.1	1.3
(3)Natural Gas	6,110	8,891	13,254	27,399	1.5	2.2	4.5
TOTAL Petroleum	52,104	57,952	67,701	91,301	1.1	1.3	1.8
(4)Cement	45,163	70,105	97,986	156,508	1.6	2.2	3.5
(5)Other Const. Mat.	155,166	342,014	436,850	710,937	2.2	2.8	4.6
TOTAL Constr.	200,329	412,119	534,836	867,445	2.1	2.7	4.3
(6)Phosphate	639	1,500	2,375	8,282	2.3	3.7	13.0
(7)Iron Ore	3,578	4,010	4,704	6,663	1.1	1.3	1.9
(8)Coal/Coke	2,535	4,061	5,745	9,598	1.6	2.3	3.8
(9)Other Minerals	9,912	11,949	15,195	25,065	1.2	1.5	2.5
TOTAL Mining	16,664	21,520	28,019	49,608	1.3	1.7	3.0
(10)Wheat	9,706	10,830	14,610	21,212	1.1	1.5	2.2
(11)Other Cereals	22,132	29,648	36,652	50,285	1.3	1.7	2.3
(12)Fruit/Vegetable	14,576	20,910	24,156	36,012	1.4	1.7	2.5
(13)Sugar Cane	11,143	12,329	13,579	15,417	1.1	1.2	1.4
(14)Fibre Crop	1,315	1,733	1,850	2,077	1.3	1.4	1.6
(15)Livestock	2,164	2,500	2,800	3,260	1.2	1.3	1.5
(16)Animal Product	2,106	2,421	2,740	3,259	1.1	1.3	1.5
(17)Other Agric.	1,725	3,679	4,981	8,987	2.1	2.9	5.2
TOTAL Agriculture	64,867	84,050	101,368	140,509	1.3	1.6	2.2
(18)Sugar Product	1,720	1,929	2,089	2,442	1.1	1.2	1.4
(19)Edible Oil/Fat	588	1,014	1,260	1,967	1.7	2.1	3.3
(20)Animal Feed	3,295	6,473	8,590	13,360	2.0	2.6	4.1
(21)Beverage	447	1,440	1,837	2,942	3.2	4.1	6.6
(22)Other Food Prod	471	437	480	570	0.9	1.0	1.2
(23)Chemical Prod.	1,111	1,125	1,324	1,900	1.0	1.2	1.7
(24)Metal/Met. Prod	4,305	5,430	7,014	10,223	1.3	1.6	2.4
(25)Textile	2,179	2,563	3,018	4,277	1.2	1.4	2.0
(26)Manf. Fertilizer	6,125	8,077	9,193	13,233	1.3	1.5	2.2
(27)Pulp/Paper	652	1,010	1,280	2,027	1.5	2.0	3.1
(28)Lumber/Timber	2,170	2,907	3,234	3,943	1.3	1.5	1.8
(29)Other Manf. Good	198	320	356	521	1.6	1.8	2.6
TOTAL Industry	23,261	32,725	39,675	57,405	1.4	1.7	2.5
Total	357,225	608,366	771,599	1,206,268	1.7	2.2	3.4

2) Production/Consumption Distribution by Governorate

Forecast production and consumption figures for 2012 are distributed among the governorates as shown in Table 12-1-4. For Crude Oil and Petroleum Products, 2012 production in Dakahlia and North Sinai is forecast to multiply by 5 times the 1990 figure. This is due to the expected increase in natural gas production in these governorates. Production in the remaining governorates will increase by 1-2 times the corresponding 1990 figures. All governorates are projected to have a 2012 production increase of 3.7-4.7 times the 1990 figures in the Construction Materials category.

The two governorates of Aswan and New Valley are together projected to produce over 60% of the total Minerals category production in 2012. New Valley, expected to produce 10 million tons of phosphate in 2012, was not a producer of minerals in 1990.

Minya governorate, in Upper Egypt region, is projected to continue to be the largest producer of Agricultural Products commodity accounting for 17% of the total, due to its high production of cereals and milling industry. In the Industrial Commodities category Fayoum governorate output will more than quadruple in 2012 from the 1990 level. This is due to that governorate's projected increased animal feed production. The title of leading industrial products producer, claimed by Alexandria governorate in 1990, is forecast to shift to Gharbia in 2012, with Alexandria as a very close second. Over 88% of Gharbia's projected industrial production is related to agriculture, such as animal feed, textiles, and manufactured fertilizers.

Table 12-1-4(1-1) Total Production by Governorate
(unit: 1000 t)

Governorate	Crude Oil/Petr.		2012/Construct. Mat.		2012/		Minerals		2012/	
	1990	2012	1990	2012	1990	2012	1990	2012	1990	2012
01 Cairo	6,195	9,121	1.5	74,906	314,150	4.2	1,134	4,510	4.0	
02 Alexandria	9,399	18,696	2.0	21,588	91,708	4.2	852	1,986	2.3	
03 Port Said	0	0	-	1,124	5,191	4.6	195	455	2.3	
04 Suez	5,931	8,732	1.5	3,661	14,651	4.0	520	1,213	2.3	
11 Damietta	0	0	-	2,298	10,469	4.6	244	569	2.3	
12 Dakahlia	2,628	12,877	4.9	8,580	39,345	4.6	1	1	2.3	
13 Sharkia	0	0	-	6,384	29,309	4.6	0	0	-	
14 Qalyubia	0	0	-	8,937	40,859	4.6	0	0	-	
15 K.el Sheikh	0	0	-	2,502	11,659	4.7	0	0	-	
16 Gharbia	1,400	2,062	1.5	7,048	32,272	4.6	2	6	2.3	
17 Minufia	0	0	-	3,754	17,326	4.6	0	0	-	
18 Beheira	0	0	-	5,388	24,593	4.6	93	217	2.3	
19 Ismailiya	0	0	-	2,809	12,783	4.6	3	6	2.3	
21 Giza	0	0	-	8,043	36,836	4.6	2,182	5,955	2.7	
22 Beni Suef	0	0	-	2,885	13,302	4.6	0	0	-	
23 Fayoum	0	0	-	3,166	14,557	4.6	972	2,266	2.3	
24 Minya	0	0	-	2,732	12,524	4.6	52	121	2.3	
25 Asyut	1,480	2,180	1.5	8,233	33,061	4.0	0	0	-	
26 Sohag	0	0	-	7,175	33,116	4.6	0	0	-	
27 Qena	0	0	-	10,137	46,310	4.6	0	0	-	
28 Aswan	0	0	-	2,668	11,505	4.3	7,453	20,562	2.8	
31 Red Sea	30,406	36,331	1.2	536	2,379	4.4	491	1,169	2.4	
32 N. Valley	0	0	-	383	1,817	4.7	0	10,000	-	
33 Matrouh	5,049	8,469	1.7	4,091	15,281	3.7	10	23	2.3	
34 N. Sinai	267	1,310	4.9	638	2,855	4.5	13	1,030	79.3	
35 S. Sinai	10,463	11,255	1.1	332	1,601	4.8	40	93	2.3	
TOTAL	73,218	111,032	1.5	199,999	869,459	4.3	14,257	50,182	3.5	

Table 12-1-4(1-2) Total Production by Governorate
(unit: 1000 t)

Governorate	Agriculture		2012/ 1990		Industrial		2012/ 1990		Total		2012/ 1990	
	1990	2012			1990	2012			1990	2012		
01 Cairo	2,239	5,208	2.3	2,117	6,060	2.9	86,591	339,048	3.9			
02 Alexandria	1,122	2,486	2.2	2,908	9,940	3.4	35,870	124,816	3.5			
03 Port Said	94	163	1.7	25	65	2.6	1,437	5,874	4.1			
04 Suez	85	169	2.0	1,569	5,705	3.6	11,767	30,470	2.6			
11 Damietta	560	1,269	2.3	238	841	3.5	3,340	13,148	3.9			
12 Dakahlia	2,960	6,490	2.2	896	3,891	4.3	15,064	62,605	4.2			
13 Sharkia	3,993	8,874	2.2	1,868	5,405	2.9	12,245	43,587	3.6			
14 Qalyubia	2,468	5,629	2.3	1,182	4,206	3.6	12,587	50,694	4.0			
15 K.el Sheikh	2,607	7,204	2.8	30	102	3.3	5,139	18,965	3.7			
16 Gharbia	2,145	4,745	2.2	2,874	9,990	3.5	13,469	49,074	3.6			
17 Minufia	2,011	4,526	2.3	140	335	2.4	5,905	22,187	3.8			
18 Beheira	4,754	10,715	2.3	528	1,644	3.1	10,763	37,170	3.5			
19 Ismailiya	773	1,831	2.4	75	247	3.3	3,659	14,868	4.1			
21 Giza	2,579	5,924	2.3	810	2,650	3.3	13,614	51,365	3.8			
22 Beni Suef	1,739	3,992	2.3	8	14	1.9	4,632	17,309	3.7			
23 Fayoum	1,938	4,483	2.3	72	323	4.5	6,149	21,629	3.5			
24 Minya	9,315	21,012	2.3	61	169	2.8	12,160	33,826	2.8			
25 Asyut	1,629	3,802	2.3	955	3,450	3.6	12,297	42,492	3.5			
26 Sohag	2,820	5,748	2.0	234	1,035	4.4	10,229	39,898	3.9			
27 Qena	7,631	11,789	1.5	1,346	4,290	3.2	19,115	62,388	3.3			
28 Aswan	3,096	4,818	1.6	818	2,583	3.2	14,035	39,467	2.8			
31 Red Sea	104	215	2.1	8	17	2.0	31,545	40,111	1.3			
32 N. Valley	123	283	2.3	8	14	1.8	514	12,113	23.6			
33 Matrouh	188	414	2.2	9	22	2.3	9,347	24,209	2.6			
34 N. Sinai	181	414	2.3	8	14	1.8	1,108	5,623	5.1			
35 S. Sinai	10	20	2.0	4	8	1.8	10,849	12,977	1.2			
TOTAL	57,163	122,222	2.1	18,792	63,018	3.4	363,429	1,215,913	3.3			

Table 12-1-4(2-1) Total Consumption by Governorate
(unit: 1000 t)

Governorate	Crude Oil/Petr.		2012/ 1990		Construct. Mat.		2012/ 1990		Minerals		2012/ 1990	
	1990	2012			1990	2012			1990	2012		
01 Cairo	13,306	22,367	1.7	57,992	230,677	4.0	12,020	32,012	2.7			
02 Alexandria	11,405	19,085	1.7	26,540	103,031	3.9	2,505	5,672	2.3			
03 Port Said	152	244	1.6	1,414	7,791	5.5	12	29	2.5			
04 Suez	7,520	12,902	1.7	6,313	24,119	3.8	7	18	2.5			
11 Damietta	708	2,423	3.4	2,230	8,862	4.0	15	38	2.5			
12 Dakahlia	1,872	5,409	2.9	12,151	45,438	3.7	72	181	2.5			
13 Sharkia	817	1,118	1.4	6,838	26,956	3.9	71	181	2.5			
14 Qalyubia	1,228	3,459	2.8	7,422	30,509	4.1	510	3,833	7.5			
15 K.el Sheikh	433	613	1.4	3,499	13,283	3.8	43	109	2.5			
16 Gharbia	2,357	3,738	1.6	5,757	23,901	4.2	309	2,942	9.5			
17 Minufia	636	1,632	2.6	4,728	25,650	5.4	46	116	2.5			
18 Beheira	2,452	4,448	1.8	9,274	42,743	4.6	67	170	2.5			
19 Ismailiya	892	2,026	2.3	2,204	10,904	4.9	12	29	2.5			
21 Giza	1,679	2,309	1.4	12,291	68,467	5.6	399	1,009	2.5			
22 Beni Suef	322	468	1.5	3,203	16,880	5.3	60	131	2.2			
23 Fayoum	269	399	1.5	3,631	16,077	5.0	32	81	2.5			
24 Minya	555	773	1.4	6,489	30,924	4.8	54	138	2.5			
25 Asyut	2,418	3,436	1.4	10,472	42,678	4.1	227	2,402	10.6			
26 Sohag	476	671	1.4	6,159	41,194	6.7	104	263	2.5			
27 Qena	544	759	1.4	5,342	24,717	4.6	46	117	2.5			
28 Aswan	267	396	1.5	3,598	16,045	5.0	43	108	2.5			
31 Red Sea	669	1,083	1.6	296	1,613	5.4	2	5	2.5			
32 N. Valley	58	86	1.5	364	1,867	5.1	2	6	2.5			
33 Matrouh	644	855	1.3	1,151	4,691	4.1	3	8	2.5			
34 N. Sinai	122	170	1.4	764	3,363	4.4	4	9	2.5			
35 S. Sinai	304	435	1.4	203	1,063	5.2	1	2	2.5			
TOTAL	52,104	91,301	1.8	200,328	867,445	4.3	16,665	49,608	3.0			

Table 12-1-4(2-2) Total Consumption by Governorate
(unit: 1000 t)

Governorate	Agriculture		2012/ 1990	Industrial		2012/ 1990	Total		2012/ 1990
	1990	2012		1990	2012		1990	2012	
01 Cairo	6,764	14,781	2.2	2,839	6,398	2.3	92,921	306,235	3.3
02 Alexandria	3,519	8,186	2.3	1,503	3,480	2.3	45,472	139,453	3.1
03 Port Said	559	1,678	3.0	135	341	2.5	2,272	10,083	4.4
04 Suez	477	1,679	3.5	245	623	2.5	14,563	39,341	2.7
11 Damietta	751	1,250	1.7	914	1,995	2.2	4,618	14,569	3.2
12 Dakahlia	3,552	5,918	1.7	1,943	4,615	2.4	19,591	61,561	3.1
13 Sharkia	3,565	5,889	1.7	1,296	3,308	2.6	12,587	37,451	3.0
14 Qalyubia	2,666	4,397	1.6	1,353	2,866	2.1	13,178	45,064	3.4
15 K.el Sheikh	1,823	3,047	1.7	848	1,897	2.2	6,646	18,950	2.9
16 Gharbia	2,883	4,821	1.7	1,458	3,601	2.5	12,765	39,005	3.1
17 Minufia	2,597	6,750	2.6	1,471	3,643	2.5	9,478	37,790	4.0
18 Beheira	3,698	9,024	2.4	1,337	3,545	2.7	16,829	59,930	3.6
19 Ismailiya	629	1,625	2.6	241	570	2.4	3,979	15,154	3.8
21 Giza	4,854	15,602	3.2	1,188	3,185	2.7	20,410	90,572	4.4
22 Beni Suef	1,673	4,189	2.5	749	2,017	2.7	6,006	23,685	3.9
23 Payoum	1,742	4,189	2.4	747	1,984	2.7	6,421	24,730	3.9
24 Minya	4,629	9,816	2.1	998	2,678	2.7	12,725	44,329	3.5
25 Asyut	2,606	6,385	2.5	1,176	3,229	2.7	16,899	58,130	3.4
26 Sohag	3,156	10,380	3.3	1,077	3,228	3.0	10,972	55,734	5.1
27 Qena	8,756	12,764	1.5	651	1,577	2.4	15,340	39,934	2.6
28 Aswan	3,321	6,494	2.0	491	1,254	2.6	7,719	26,297	3.4
31 Red Sea	102	261	2.6	298	656	2.2	1,366	3,618	2.6
32 N. Valley	130	348	2.7	125	288	2.3	679	2,595	3.8
33 Matrouh	188	458	2.4	98	237	2.4	2,085	6,250	3.0
34 N. Sinai	196	497	2.5	59	137	2.3	1,144	4,176	3.6
35 S. Sinai	32	81	2.5	20	53	2.7	560	1,633	2.9
TOTAL	64,869	140,509	2.2	23,261	57,405	2.5	357,226	1,206,268	3.4

Consumption distribution will closely follow population distribution for the majority of commodities. Overall Cairo's share of the total consumption will slightly fall from 26% in 1990 to 25% in the year 2012. Cairo governorate is projected to consume more than it produces for all the commodity categories, except for Construction Materials.

12.1.5 Production/Consumption Forecast under Low GDP Growth Alternative

According to the Third 5-Year Plan the GDP is projected to grow by a rate of 5.1% in the Third 5-Year Plan, and 6.5% in the Fourth 5-Year Plan. As discussed in Chapter 10, the 6.5% growth has been projected to continue up to the year 2012. Production and consumption of the study commodities were forecast under these conditions.

However as an alternative, under a GDP low-growth scenario, production and consumption figures were forecast for the twenty-nine commodity sub-groups using socio-economic indices under a lower GDP growth rate of 5.1%, and the results for the year 2012 are shown in Table 12-1-5.

Under this alternative both consumption and production in the year 2012 are forecast to grow by 2.9 times the corresponding 1990 figures. The respective figures under the high GDP growth rate alternative of 6.5% are 3.4 and 3.3.

Table 12-1-5 Production/Consumption Forecast by Low GDP Growth Rate Alternative

Commodity	Prod. (1000t)		2012/	Consump.(1000t)		2012/
	1990	2012	1990	1990	2012	1990
(1)Crude Oil	43,952	46,981	1.1	24,339	34,016	1.4
(2)Petr. Product	23,157	32,583	1.4	21,655	26,626	1.2
(3)Natural Gas	6,110	23,596	3.9	6,110	20,824	3.4
TOTAL Petroleum	73,219	103,160	1.4	52,104	81,466	1.6
(4)Cement	44,926	125,246	2.8	45,163	119,735	2.7
(5)Other Const. Mat.	155,073	615,894	4.0	155,166	615,948	4.0
TOTAL Constr.	199,999	741,140	3.7	200,329	735,683	3.7
(6)Phosphate	947	10,070	10.6	639	5,056	7.9
(7)Iron Ore	2,405	5,164	2.1	3,578	5,766	1.6
(8)Coal/Coke	1,131	4,549	4.0	2,535	8,228	3.2
(9)Other Minerals	9,773	18,845	1.9	9,912	20,518	2.1
TOTAL Mining	14,256	38,628	2.7	16,664	39,568	2.4
(10)Wheat	4,268	7,394	1.7	9,706	20,647	2.1
(11)Other Cereals	19,725	46,494	2.4	22,132	48,833	2.2
(12)Fruit/Vegetable	15,285	27,980	1.8	14,576	30,900	2.1
(13)Sugar Cane	11,144	14,468	1.3	11,143	14,468	1.3
(14)Fibre Crop	1,428	1,742	1.2	1,315	1,913	1.5
(15)Livestock	2,159	2,810	1.3	2,164	2,920	1.3
(16)Animal Product	1,703	2,820	1.7	2,106	3,244	1.5
(17)Other Agric.	1,452	6,273	4.3	1,725	8,361	4.8
TOTAL Agriculture	57,164	109,981	1.9	64,867	131,286	2.0
(18)Sugar Product	1,068	1,900	1.8	1,720	2,430	1.4
(19)Edible Oil/Fat	138	1,094	7.9	588	1,775	3.0
(20)Animal Feed	3,219	12,638	3.9	3,295	10,717	3.3
(21)Beverage	599	3,069	5.1	447	2,871	6.4
(22)Other Food Prod	370	614	1.7	471	570	1.2
(23)Chemical Prod.	779	2,238	2.9	1,111	1,652	1.5
(24)Metal/Met. Prod	3,127	7,789	2.5	4,305	10,035	2.3
(25)Textile	2,388	4,750	2.0	2,179	4,113	1.9
(26)Manf. Fertilizer	5,695	17,196	3.0	6,125	10,847	1.8
(27)Pulp/Paper	237	921	3.9	652	1,850	2.8
(28)Lumber/Timber	1,030	1,654	1.6	2,170	3,483	1.6
(29)Other Manf. Good	144	411	2.9	198	434	2.2
TOTAL Industry	18,794	54,274	2.9	23,261	50,777	2.2
Total	363,432	1,047,183	2.9	357,225	1,038,780	2.9

12.2 Crude Oil and Petroleum Products

12.2.1 Crude Oil (Sub-group 1)

(1) Consumption

The government's policy to expand dependence upon other sources of fuel is reflected in low growth in consumption projections for 1997 and 2002 which were set in the Third 5-Year Plan. Consumption shall grow at an annual rate of 1.018 under this Study projections during 2002-2012, slightly less than that of the Fourth 5-Year Plan (1.02).

(2) Production

The government's projected production figures for 1997 and 2002 are 46.4 and 45 million tons respectively. However rather than continuing to decrease production beyond 2002, the government's policy is to maintain production amounts at the above mentioned figure levels. This condition is satisfied by the 47 million tons production forecast for 2012.

(3) Foreign Trade

Egypt does not import any crude oil, and this is expected to continue up to 2012. Export amounts for 2002 and 2012 shall be the surplus after deleting projected consumption amounts and foreign partners' shares from the projected production. Study team projections for foreign partners' share in 2002 and 2012 are 0.8 and 0.6 of the corresponding 1990 figure, showing a continuing decrease. The exploration and extraction of crude oil activities are expected to be increasingly executed by Egyptian companies and therefore obligations toward foreign partner is expected to decrease.

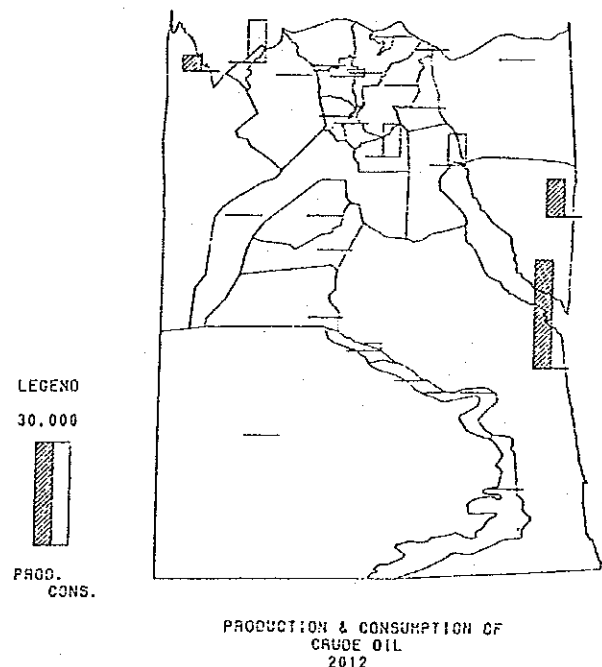
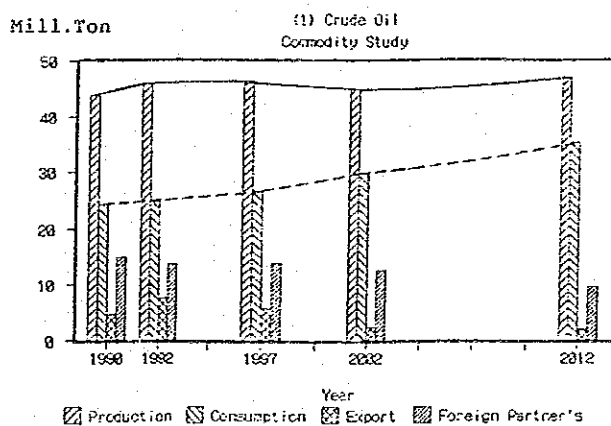


Fig. 12-2-1 Crude Oil Projection

12.2.2 Petroleum Products

(1) Consumption

While gross consumption projected by Study team in 2012 will be 1.3 times that in 1990, the 2012 consumption/capita will actually fall to 0.82 that of 1990. This reflects the government's strategy towards diversifying fuel sources and maintaining crude oil production at Third and Fourth 5-Year Plans levels.

(2) Production

Although consumption rate is projected to decrease based on government policy to diversify energy resources, the production projections for 2002 and 2012 will grow at the same level of the Third 5-Year Plan. This will allow for export levels set in the Third 5-Year Plan to continue which is in the interest of the country's foreign trade in view of the commodity's export value.

(3) Foreign Trade

Imports are projected to decrease over the forecast period. Major imports in the Third 5-Year Plan are solar and turbine fuel. However dependence on solar will continuously decrease and turbine fuel is expected to be manufactured locally in the future.

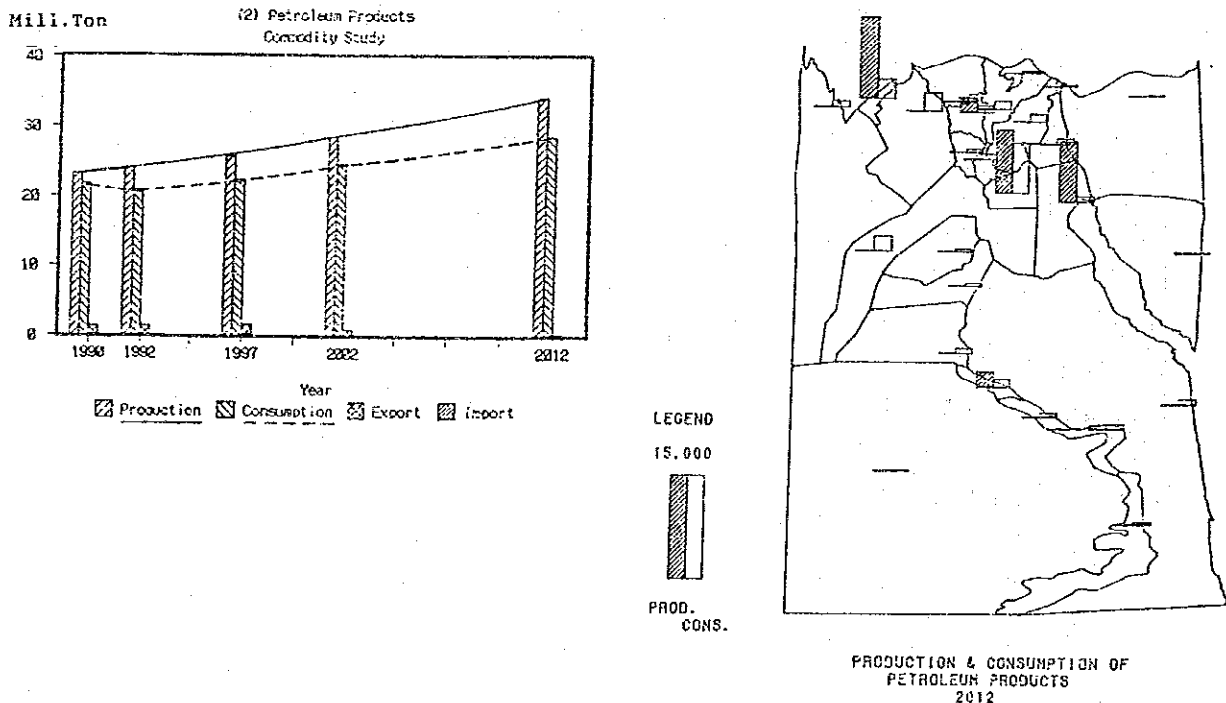


Fig. 12-2-2 Petroleum Products Projection

12.2.3 Natural Gas

(1) Consumption

In accordance with this Study's projected consumption amounts in 2002 and 2012, growth rate during that period shall be 1.08 p.a., higher than the rate of 1.05 projected by the Third 5-Year Plan for the 1992-1997 period. This result falls in line with the government's intention to extend gas services to all residential areas as well as expand reliance of various industries on natural gas.

(2) Production

Projections for 1997 and 2002 have been obtained from the Third 5-Year Plan. Growth rate in the Fourth 5-Year Plan is projected to fall to 1.06 p.a. from the corresponding value of 1.11 in the preceding plan period. However growth rate will increase to 1.14 for the 2002-2012 period.

(3) Foreign Trade

The Third 5-Year Plan indicates that surplus in production shall be the share of the foreign partner up to the year 2002. This situation has been projected to extend to 2012 by the Study, and therefore exports and imports are forecast to continue to remain at zero levels.

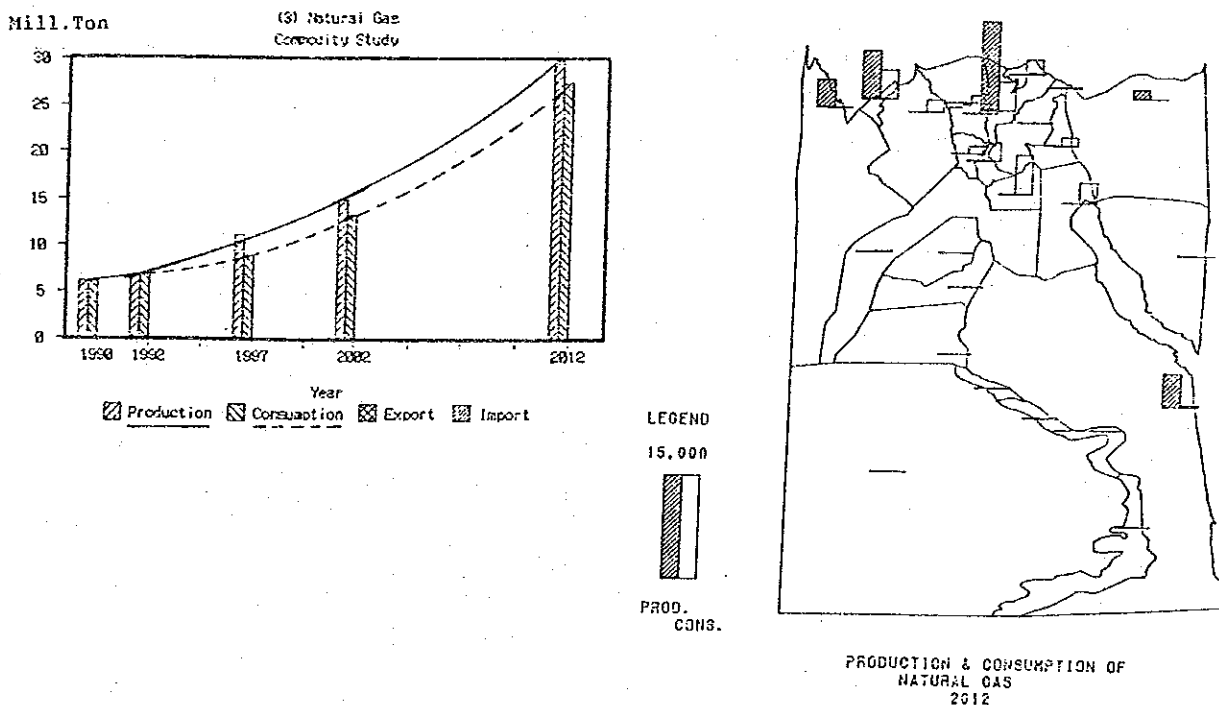


Fig. 12-2-3 Natural Gas Projection

12.3 Construction Materials

12.3.1 Cement

(1) Consumption

This commodity is the backbone of the construction industry and its consumption levels accurately reflect the country's development. The 1987-1992 period witnessed a 1.04 p.a. growth in consumption per capita. This period coincided with the nation's efforts in construction of new population centers, infrastructure and housing. The Third 5-Year Plan projected a drop in growth rate to 1.02 p.a. However 1997 projected consumption/capita is 1.08 that of the corresponding 1992 figure. This Study projects a 1.03 p.a. growth rate for consumption/capita during 1997-2012 period (2012 projected consumption/cap. is 1.76 that of 1992). During the Third 5-Year Plan large-scale projects currently under construction shall be completed while plans for new projects to meet demand in the coming century shall be prepared. Therefore the 2002-2012 period is expected to witness an increased activity in the construction sector.

(2) Production

Cement industry witnessed a large growth in production (1.09 p.a.) during 1987-1992 period by the end of which local production had satisfied demand. In early 1980's to meet a large consumption demand in cement, projected by the government at that time to reach between 35 and 42 million tons in 2000, a grand plan to increase production was launched. During 1982-1992 period local production increased by approximately 10-12 million tons. Growth rate projected for production in the Third 5-Year Plan declined to 1.04. Under this study consumption projection for 2002 has been downgraded to 30 million tons and to meet that demand and demand in 2012, production is forecast to grow at a rate of 1.06 during 1997-2012 period.

(3) Foreign Trade

Surplus production in 1997, 2002 and 2012 shall be exported.

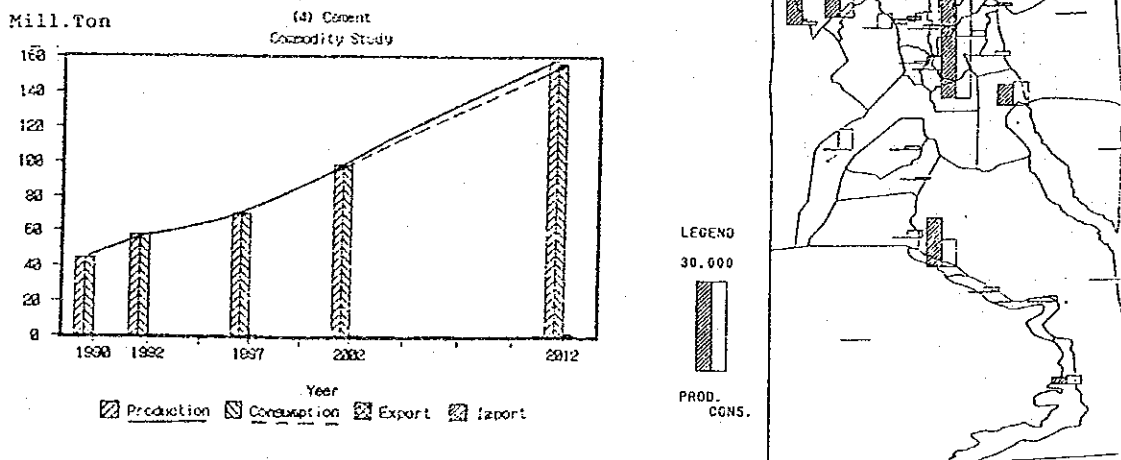


Fig. 12-3-1 Cement Projection

12.3.2 Other Construction Materials

(1) Consumption

As in cement, growth in consumption/cap. will decline from 1.07 p.a. in 1987-1992 period to a projected 1.06 in the Third 5-Year Plan. In terms of gross consumption by weight share of bricks is 60% of the total of this commodity. Brick industry is presently undergoing a change in reliance on red bricks through the introduction of various types of bricks of better characteristics and lesser weight. Bearing this in mind a conservative growth rate of 1.03 for the weight consumed/capita for 1997-2012 has been projected under this Study.

(2) Production

Production in 1987-1992 period grew at a 1.1 p.a. rate. This rate is projected to decline to 1.08 in the Third 5-Year Plan and 1.05 during the 1997-2012 period. However gross production amount in 2002 is projected to almost double the 1990 figure and treble it in 2012.

(3) Foreign Trade

In light of high production projections and increased self sufficiency of the domestic market, no imports are projected under this Study and the surplus in the year 2002 is forecast to be exported. Both export and import values in 2012 are projected to be zero.

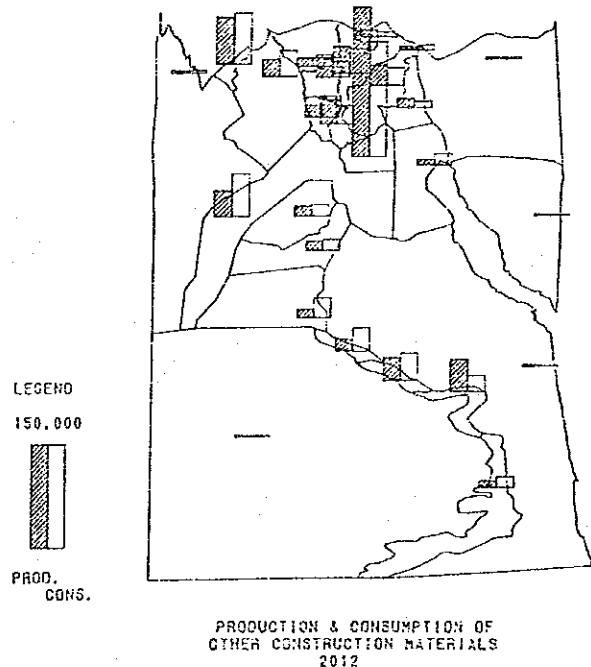
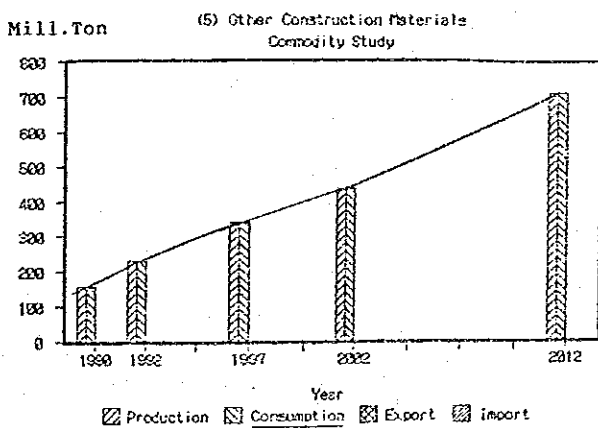


Fig. 12-3-2 Other Construction Materials Projection

12.4 Mining Commodities

12.4.1 Phosphate (Sub-group (6))

(1) Consumption

While gross consumption during 1987-1992 period experienced a no-growth rate the Third 5-Year Plan forecasts a growth of 1.17 p.a. Furthermore in line with this Study's anticipated production growth, the consumption during 1997-2012 period is anticipated to grow at 1.12 p.a.

(2) Production

For this commodity production governs consumption. Presently phosphate is produced from Aswan and Red Sea governorates. However during the Third 5-Year Plan the government has plans to start production in Abou Tartour fields where maximum production is calculated to reach 10 million tons annually after about 10 years from commencement of exploitation. The Third 5-Year Plan projects a 1.15 p.a. production growth rate and a production amount in 1997 at almost triple the 1990 figure. By 2012 maximum production in the New Valley fields is projected by existing studies and total production in that year is estimated to be 16 times 1990 production. Growth rate for 1997-2012 period is expected to be 1.12 p.a.

(3) Foreign Trade

In 2012 roughly 50% of total production is projected to be exported and at present plans are underway to accommodate such a large export volume at Safaga port along the Red Sea.

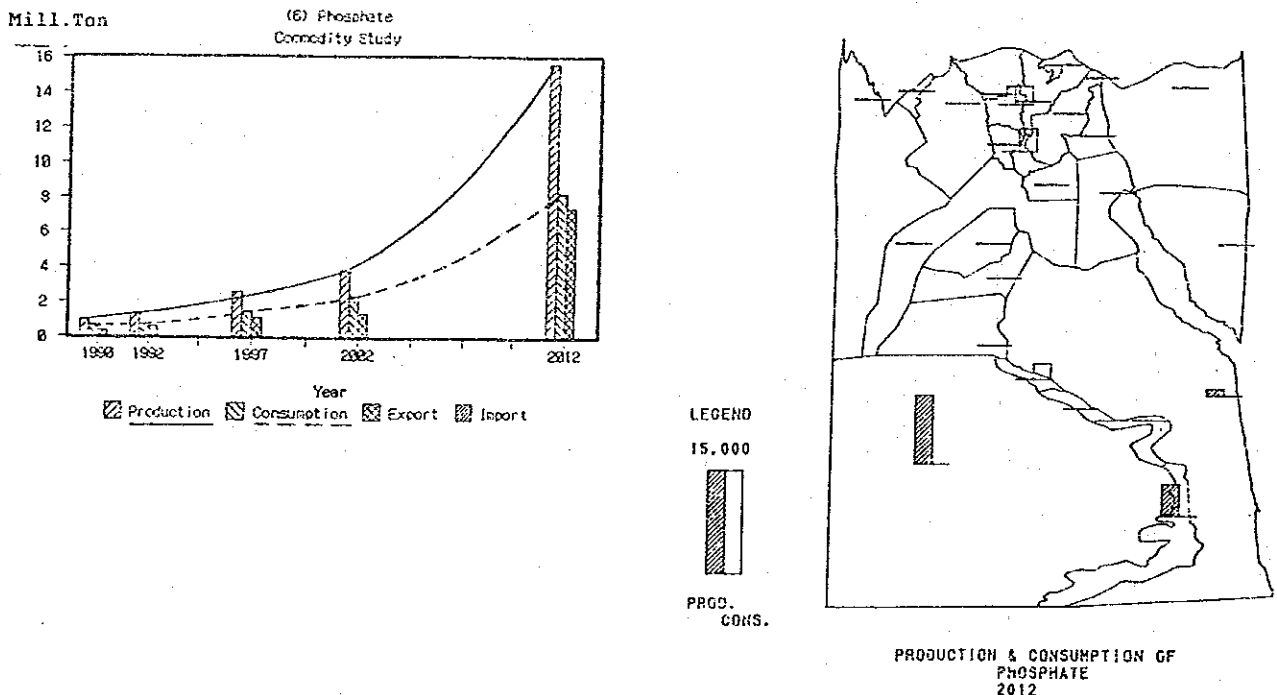


Fig. 12-4-1 Phosphate Projection

12.4.2 Iron Ore (Sub-group (7))

(1) Consumption

Gross consumption grew at a 1.01 p.a. rate during 1987-1992 period and growth rate in the Third 5-Year Plan is projected to increase to 1.03 p.a. Consumption is forecast to grow at the same rate of 1.03 p.a. during 1997-2012 period in this Study, with consumption in 2012 almost doubling that of 1990.

(2) Production

Production grew at a rate of 1.03 p.a. during the Second 5-Year plan, larger than the corresponding rate for consumption. The rate is projected to increase to 1.05 p.a. in the Third 5-Year Plan, and a similar 1.05 p.a. during 1997-2012 period. Presently iron ore is extracted from Baharia Oasis in Giza (reserves estimated at 380 million tons of which over half may be feasibly extracted) and Aswan (reserves estimates at 87 million tons). The iron and steel industry mainly depends upon Baharia ore so this Study forecasts extraction there is forecast to grow at a larger rate than that in Aswan.

(3) Foreign Trade

The gap in supply and demand shall continue to be covered by imports throughout the plan period, however as production growth rate increases, import amount will decrease. Import volume in 2012 is projected to be one-third that of 1990.

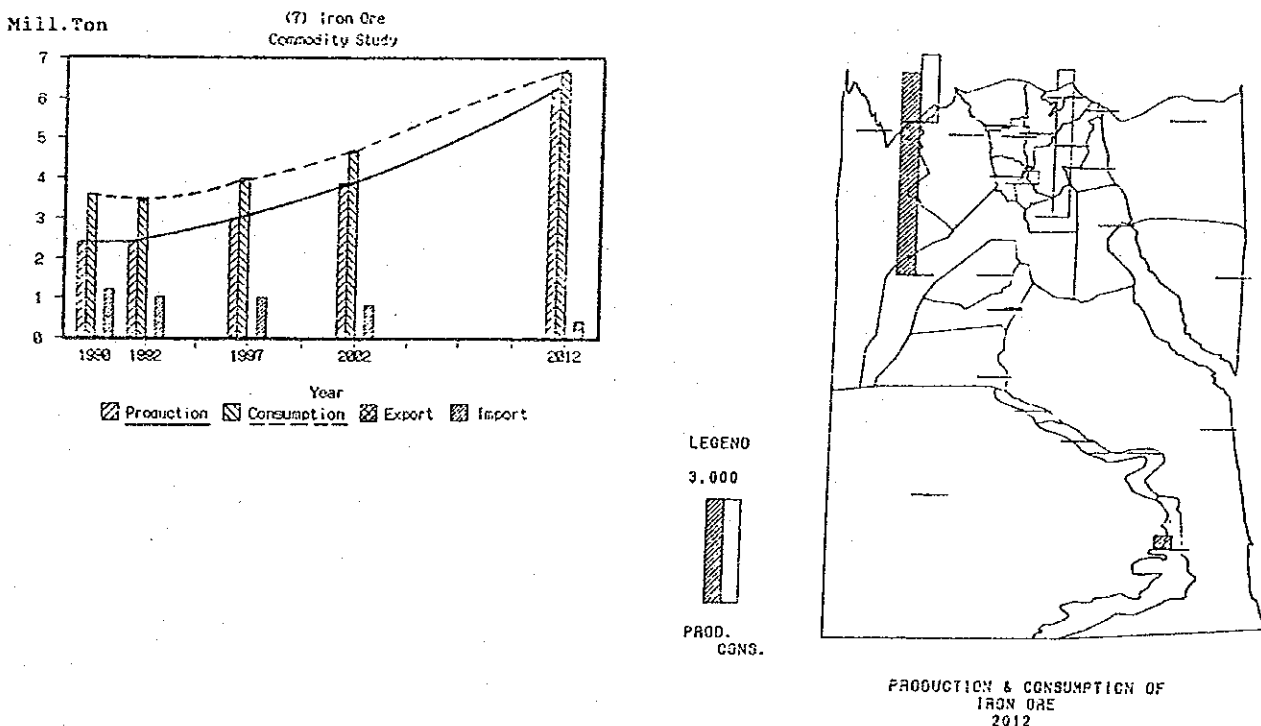


Fig. 12-4-2 Iron Ore Projection

12.4.3 Coal/Coke (Sub-group (8))

(1) Consumption

Consumption figures cover coal which is consumed to produce coke, which in turn is consumed by other industries. Growth rate in the Third 5-Year Plan, forecast at 1.06 p.a. will decline from the 1987-1992 period rate (1.08). Consumption rate is expected to continue to grow at a healthy 6% per annum during 1997-2012 by this Study due to commencement of local coal production and expected increased production in the steel industry. Consumption in 2012 is forecast to be 3.8 times that of 1990.

(2) Production

In 1990 there was no coal production. However the government intends to commence extraction of coal from Sinai during the Third 5-Year Plan. Government estimates put the reserves there at about 100 million tons. The government's plans call for extraction of 125,000 tons in the first year, 500,000 tons/year after 5 years, 600,000 tons annually after 10 years and reaching 1 million tons/year by 2010. On the other hand, coke production during 1987-1992 grew at a 1.07 annual rate, in the Third 5-Year Plan is forecast to grow at a 1.06 annual rate, and the rate for 1997-2012 is projected to be 1.07 p.a.

(3) Foreign Trade

Consumption demand will continue to exceed production supply, however with the introduction of local coal production total import amount is expected to fall below production amount. In 2012, 700,000 tons of coke shall be exported and 4.8 million tons of coal imported. Under these projections export and import volumes shall grow by 1.07 and 1.06 per annum during 1997-2012 period.

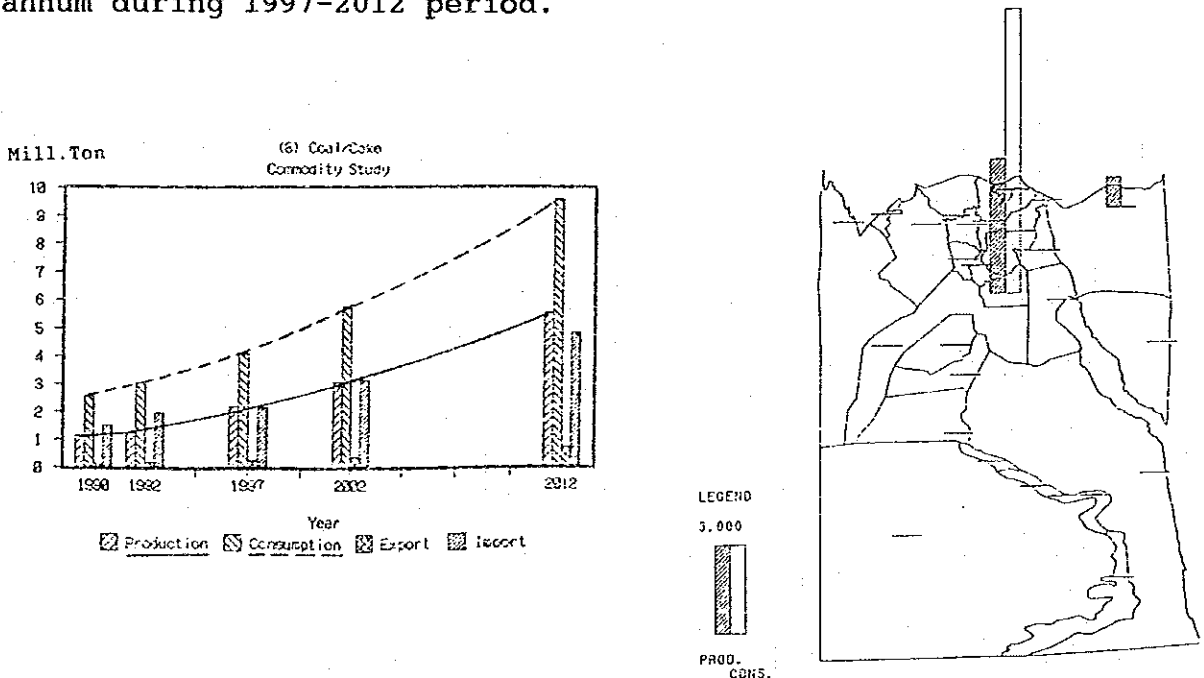


Fig. 12-4-3 Coal/Coke Projection

12.4.4 Other Minerals (Sub-group (9))

(1) Consumption

Consumption grew at an annual rate of 1.03 during 1987-1992 period and is projected to grow at 1.05 p.a. in the Third 5-Year Plan. Projections of this Study for 2002 and 2012 show consumption growing at 1.05 p.a. during 1997-2012 period. Consumption amount in 2012 is expected to more than double the 1990 amount.

(2) Production

Actual production growth rate in 1987-1992 period was sluggish, at only 1.01 p.a. However the government, considering the importance of some of the minerals under this commodity to other industries, has set an ambitious production growth rate of 1.06 p.a. under the Third 5-Year Plan. The projections of this study for the years 2002 and 2012 continue the growth rate for the 1997-2012 period at a healthy 1.05 p.a.

(3) Foreign Trade

As consumption grows, imports are forecast to increase and exports to decrease. Therefore 1987-1992 growth rate of 0.91 p.a. was adopted to project exports in 2002 and 2012. Based on these projections imports for the two years were calculated.

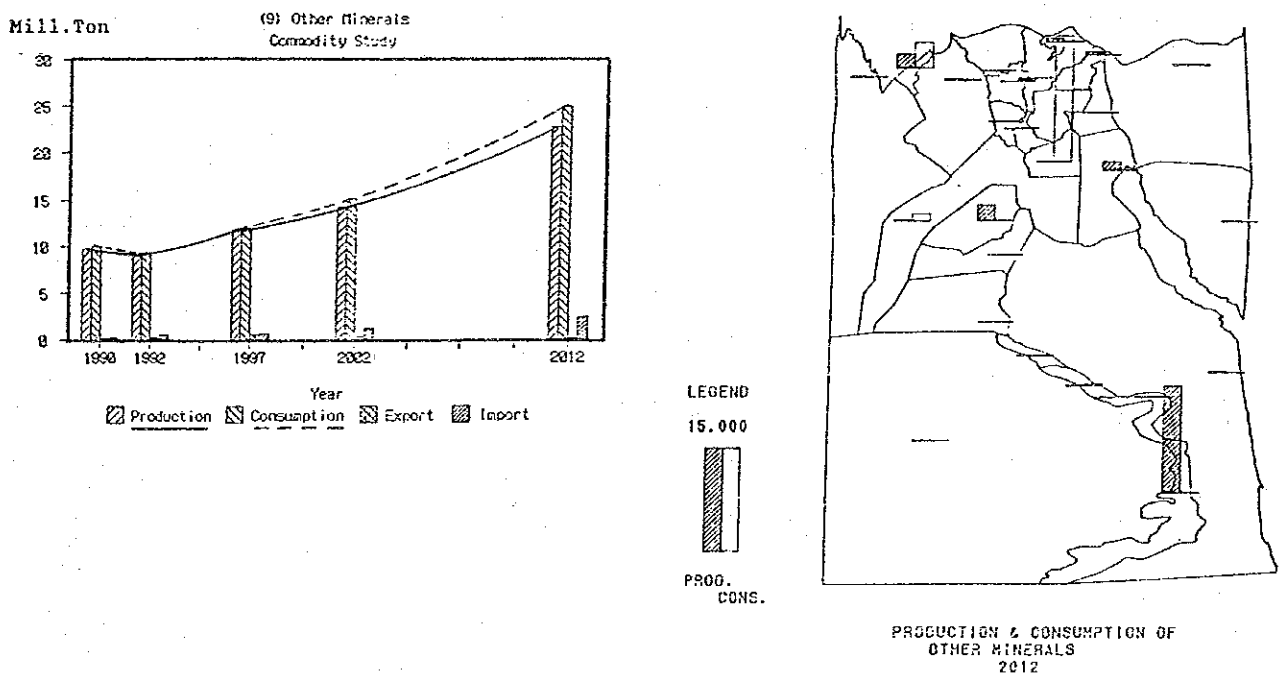


Fig. 12-4-4 Other Minerals Projection

12.5 Agricultural Commodities

12.5.1 Wheat (Sub-group 10)

(1) Consumption

During 1987-1992 period wheat consumption/capita grew at a rate of 1.08 p.a. However the Third 5-Year Plan has actually projected a decrease in growth rate and consumption/capita in 1997 is forecast at 0.9 that of 1992. This is due to the authorities policies to limit losses and improve storage facilities. The study's projections for 1997-2012 period show a slow growth of 1.02 p.a. Although inhabitants will become more affluent as forecast by the high GDP growth rate and argument for a higher consumption growth rate may therefore be warranted, it is considered that the importance of wheat in the Egyptians' diet will cause the government to continue efforts to properly store and distribute this strategic commodity.

(2) Production

In 1987, cultivated area of 1.4 million feddans produced 2.7 million tons of wheat (productivity 1.98 ton/feddan). In the last year of the Third 5-Year Plan, 1997, production is projected to be 5.3 million tons from a cultivated area of 2.4 million feddans (productivity to increase by 2.2 ton/feddan). The government plans to increase cultivated area by 107,000 feddan/year during 1987-1997 period. Production is forecast to reach 8.9 million tons in 2012 by this study. This will require a cultivated area of 3.8 million feddans (i.e. 90,000 additional feddan/year during 1997 to 2012) and an improved productivity of 2.3 ton/feddan.

(3) Foreign Trade

The continuing gap between domestic production and consumption of this commodity is projected to be covered by imports.

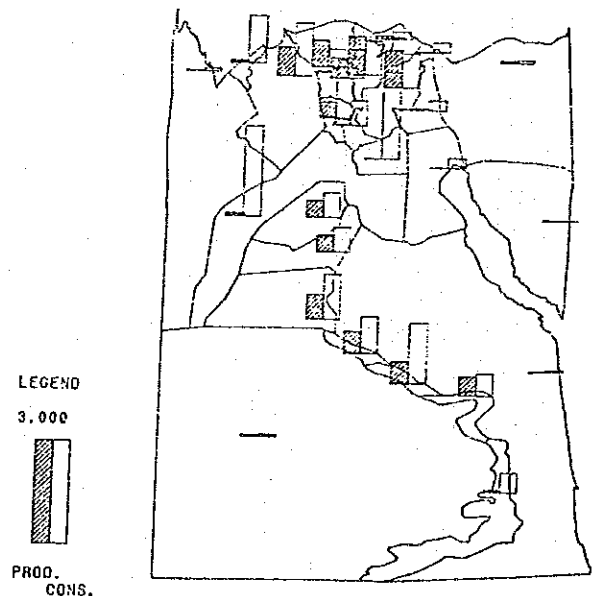
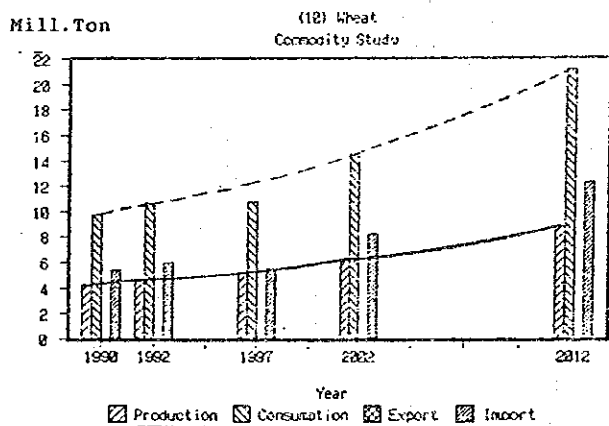


Fig. 12-5-1 Wheat Projection PRODUCTION & CONSUMPTION OF WHEAT 2012

12.5.2 Other Cereals (Sub-group 11)

(1) Consumption

The 1987-1992 period witnessed a growth rate of 1.04 p.a in consumption/capita of this commodity, however the Third 5-Year Plan projects a negative growth rate of 0.99 p.a. Consumption/capita in 1997 is forecast to be 0.96 that of 1992. This decrease in consumption/capita may also be explained by the government's intention to decrease waste. This Study projects a slow growth of 1.02 p.a. for consumption/capita during 1997-2012 period. In 2012, consumption/capita is projected to be 1.4 times the corresponding value in 1990.

(2) Production

A sharp growth rate of 1.09 p.a. in production was recorded in 1987-1992 period. Rate projected in the Third 5-Year Plan, however dropped to 1.02 per annum. The projections of this study for 2002 and 2012 identify a 1.04 annual growth rate. It is expected that the government will continue to exert efforts to increase production in order to improve upon the foreign trade imbalance currently overwhelmingly in favor of imports.

(3) Foreign Trade

Exports and imports shall grow in 2012 by 1.86 and 1.92 the projected corresponding values in 1997.

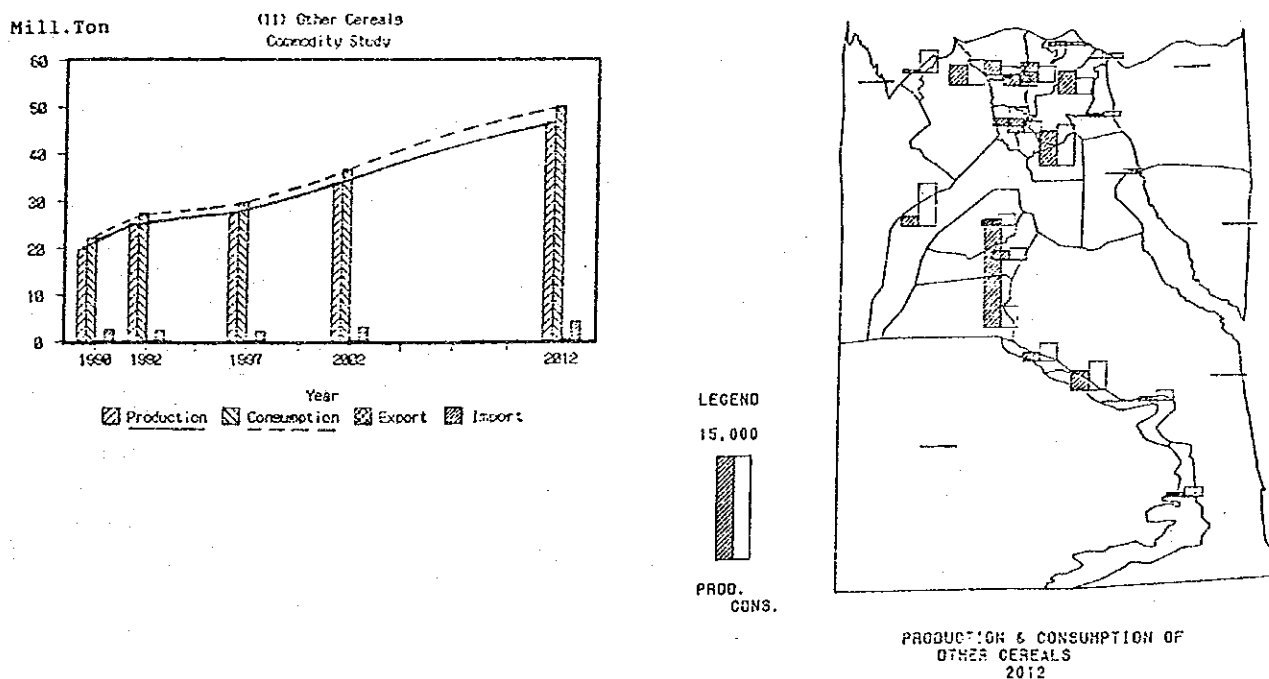


Fig. 12-5-2 Other Cereals Projection

12.5.3 Fruits/Vegetables (Sub-group 12)

(1) Consumption

Consumption/cap. growth declined during 1987-1992 period by an annual rate of 0.99. However the government's Third 5-Year Plan has set a 1.02 p.a. growth rate and consumption/cap. in 1997 is projected to be 1.1 times that at the start of the Plan in 1992. In this Study, growth rate of 1.02 p.a. is forecast to continue during 1997-2012 period and consumption/cap. in 2012 is estimated to be 1.4 times that of 1992.

(2) Production

Production grew at an annual rate of 1.02 in 1987-1992 period and the Third 5-Year Plan projects growth will continue at a greater rate of 1.05 p.a. Projections of this study for 2002 and 2012 have lowered the growth rate to 1.03 p.a over 1997-2012 period. Under this condition production in 2012 will more than double that of 1990.

(3) Foreign Trade

In accordance with the government's stated policy on decreasing imports of foodstuffs, the Third 5-Year Plan has maintained import amounts at the same value throughout the planning period. This tendency has been projected to continue up to 2012. Export projections were accordingly calculated and due to increased consumption export amount in 2012 is expected to be roughly 40 percent that projected for 1997.

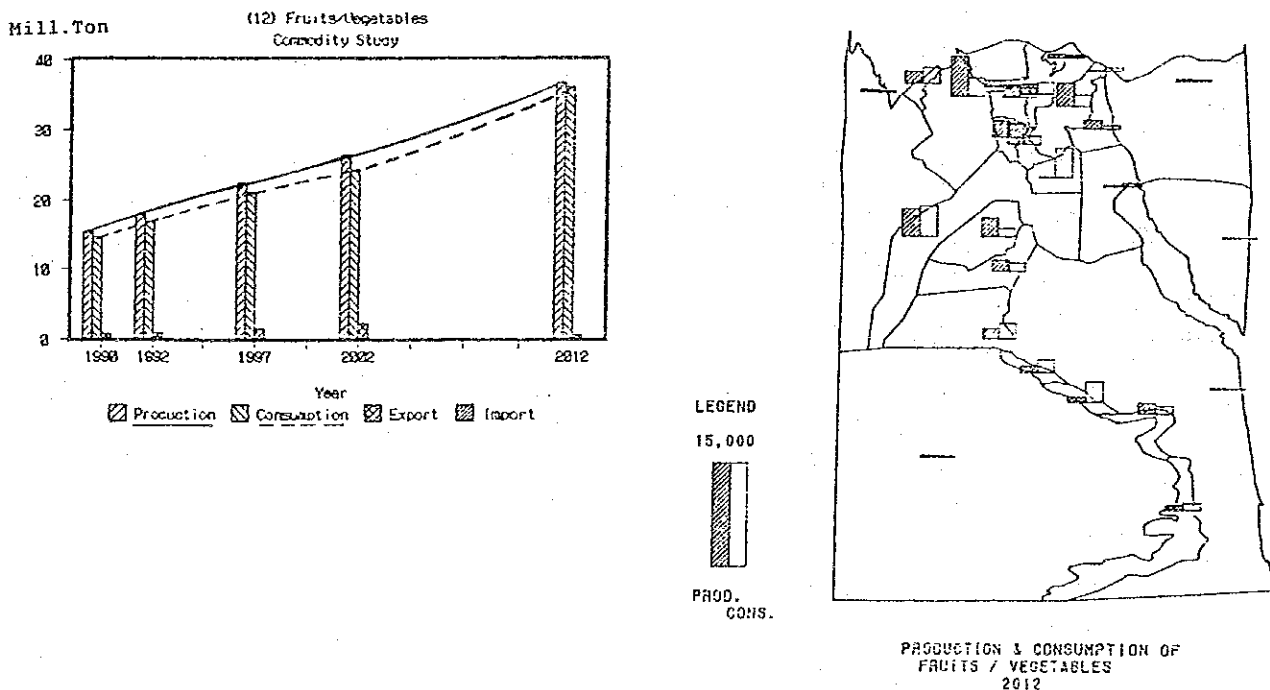


Fig. 12-5-3 Fruits/Vegetables Projection

12.5.4 Sugar Cane (Sub-group 13)

(1) Consumption

Sugar cane consumption has in the past been equal to whatever amount is produced with no imports and negligible exports. This tendency is projected to continue in the future and consumption figures will therefore equal projected production figures. Although the 1987-1992 period consumption/cap. grew at a rate of 1.04 p.a., the Third 5-Year Plan forecasts a decline in annual growth of 0.99. Projected consumption/capita in 1997 is 0.94 that of 1992. Growth rate of 0.99 is expected to continue during 1997-2012 and projected consumption/capita in 2012 will fall to 0.86 that of 1992.

(2) Production

The 1987-1992 period realized a high growth rate of 1.07 p.a. in production. The Third 5-Year Plan projections show a much slower growth rate of 1.01. This study's conservative projections for 2002 and 2012 (employing the lowest results of the regression models) forecast a growth rate of 1.02 p.a. for 1997-2012 period. The cultivated area in 1987 was 250,000 feddans and production 8.4 million tons (productivity of 33.7 ton/feddan). In 1997 the Third 5-Year Plan projects 12.3 million tons to be produced from a cultivated area of 280,000 feddans (productivity per feddan to improve to 44 ton). This will call for an increase in the cultivated area of 3000 feddans/year during 1987-1997.

The 2012 projected production of 15.4 million ton will require cultivating an area of 320,000 feddans (under an improved productivity of 48 ton/feddan). The cultivated area would have to be increased by 2600 feddan/year over 15 years.

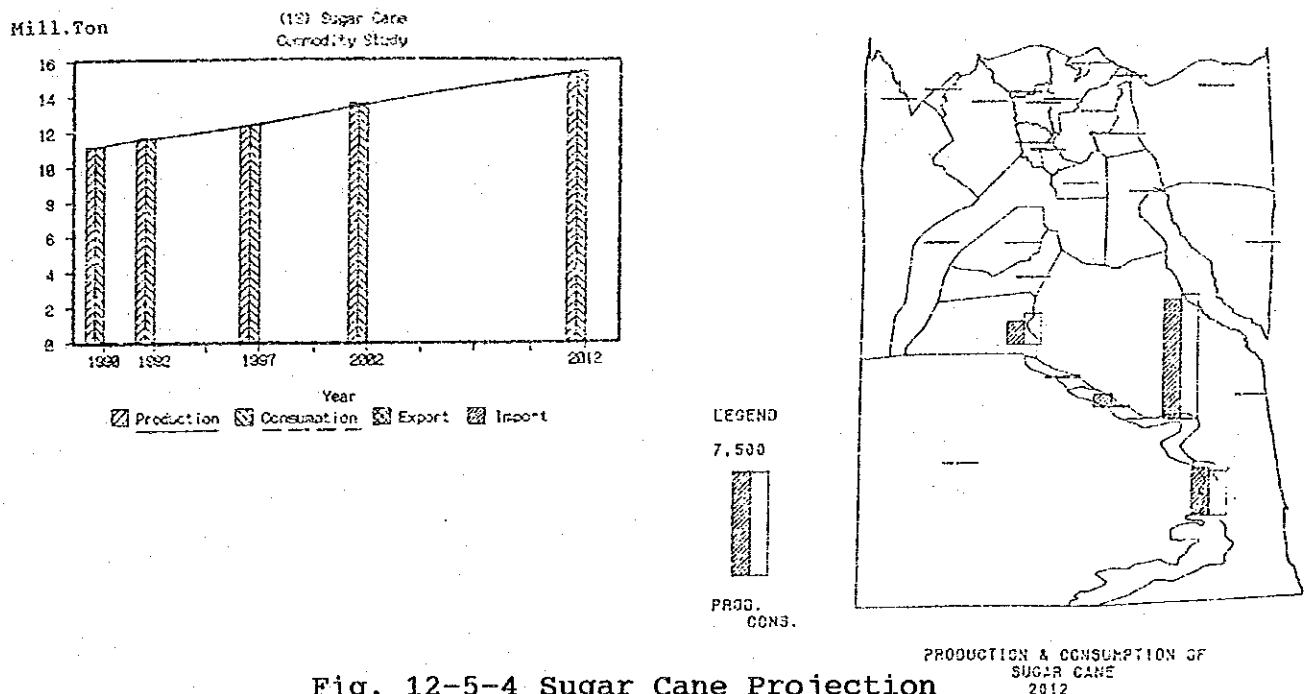


Fig. 12-5-4 Sugar Cane Projection

12.5.5 Fibre Crops (Sub-group 14)

(1) Consumption

During 1987-1992 period, consumption/capita fell from 29 kg in 1987 to 25 kg in 1992, i.e. a growth rate per annum of 0.97. Third 5-Year Plan projections show a turnaround in growth rate of 1.02 p.a. and consumption/capita in 1997 is projected at 1.08 times that of 1992. This study's projections for 2002 and 2012 show that consumption/capita annual growth rate during the 1997-2012 period is 1.0. This is based on the reasoning that as long as cotton crop production continues to be slow, new industries consuming this crop will not grow quickly.

(2) Production

Past trends show that up to 1992 production exceeded gross consumption, and exports were more than imports. However during 1987-1992 period production growth rate per annum dropped to 0.96. After 1992 positions reversed. The Third 5-Year Plan while attempting to increase production recognizes that gross consumption will continue to surpass production. Growth rate adopted for the Third 5-Year Plan, 1.04 p.a., appears optimistic when compared to past trends, or projected growth rate in the first year of that plan (0.9). This Study's projections for 2002 and 2012 adopted more modest growth of 1.003 p.a. which is projected for 1987-1997 period. Under this growth rate production in 2012 is forecast to be 1.3 that of 1990.

(3) Foreign Trade

As consumption projections exceed production projections exports are projected to fall to zero, and imports will be required. Projected import figures are calculated from the gap in consumption and production.

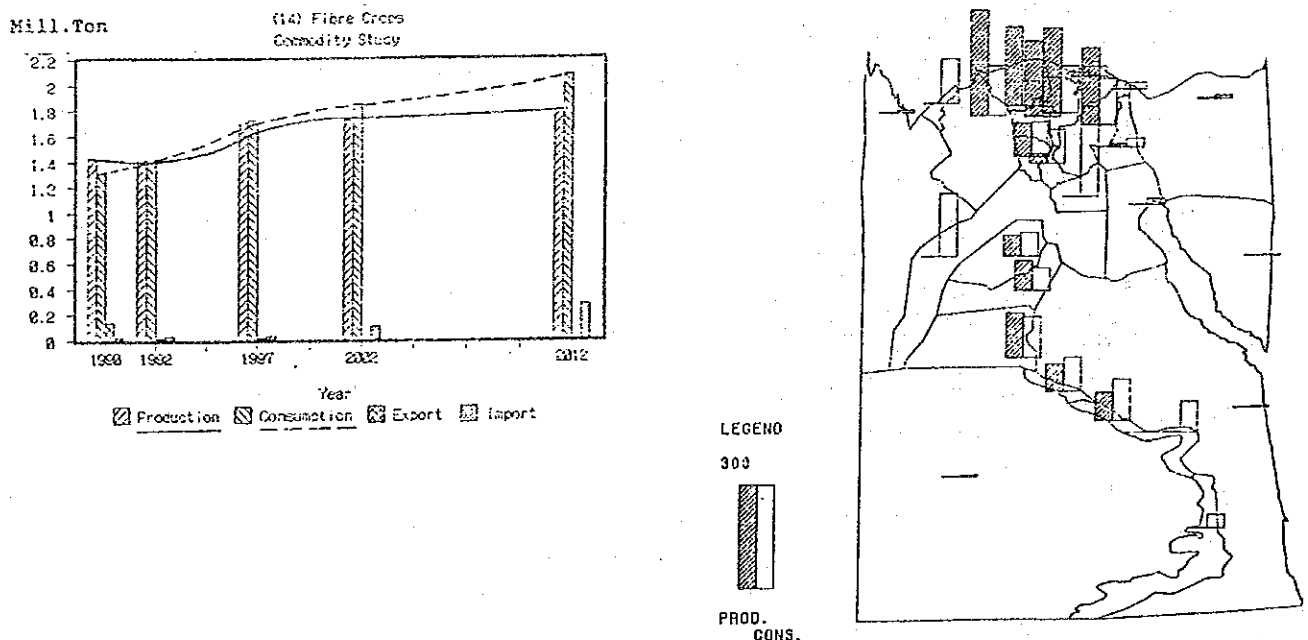


Fig. 12-5-5 Fibre Crops Projection PRODUCTION & CONSUMPTION OF FIBRE CROPS 2012

12.5.6 Livestock (Sub-group 15)

(1) Consumption

Consumption/capita grew at a rate of 1.0 p.a. during 1987-1992 period. Gross consumption at the end of that plan period, in 1992 equaled production. The Third 5-Year Plan projects a drop in consumption/cap. growth rate at 0.99 p.a. Consumption/capita in 1997 is forecast to be 0.93 that of 1992. This study's projections for 2002 and 2012 show that growth rate during 1997-2012 period will continue at 0.99 p.a. rate. Projected decrease in consumption/cap. in 2012 may be explained by improved storage and packing facilities.

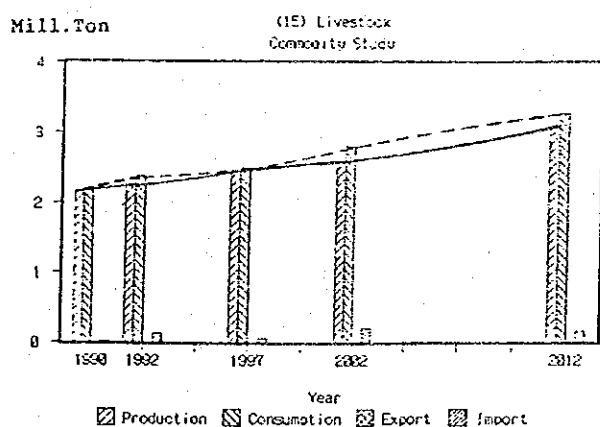
In gross consumption terms growth rate for the same period shall be 1.02 p.a.

(2) Production

The Second and Third 5-Year Plans both show an annual production growth rate of 1.02. Projections of this Study for 2002 and 2012 show a similar growth rate.

(3) Foreign Trade

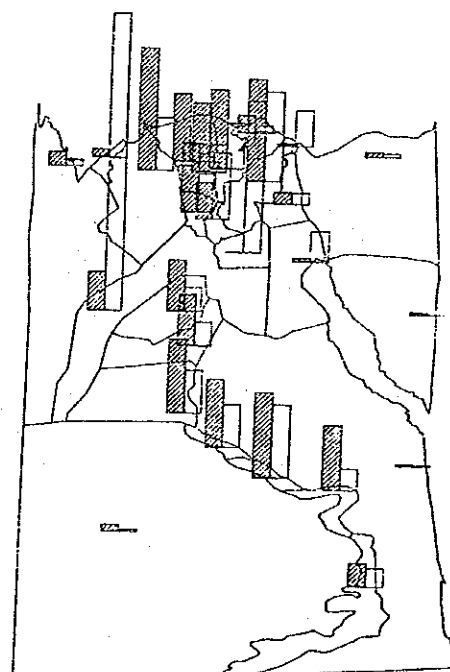
Projected consumption figures exceed those of production and the gap shall be bridged by imports. Exports are projected to be zero, in conformity with past trend. Imports shall peak to 200,000 tons in 2002 but shall then fall to 160,000 tons in 2012 as production picks up and consumption/capita decreases.



LEGEND

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PRODUCTION & CONSUMPTION OF
LIVE STOCKS
2012

Fig. 12-5-6 Livestock Projection

12.5.7 Animal Products (Sub-group 16)

(1) Consumption

The 1987-1992 period recorded an annual growth rate of 0.99 and consumption/capita fell from 43 kg/cap. in 1987 to 41 kg/cap. in 1992. The Third 5-Year Plan projected growth rate continues at 0.99 p.a. and consumption/cap. in 1997 equals 0.92 that of 1992. This Study's projections for 2002 and 2012 show a constant consumption/capita (growth rate = 1.0).

(2) Production

Recorded production growth rate in 1987-1992 period and that projected for the Third 5-Year Plan are both 1.02 p.a. Projections under this study also show a 1.02 p.a. growth rate for 1997-2012 period.

(3) Foreign Trade

Imports of this commodity are projected to continue to cover the gap between consumption and production, although a drop is projected from 2002 (imports of 523,000 tons) to 2012 (imports = 455,000 tons).

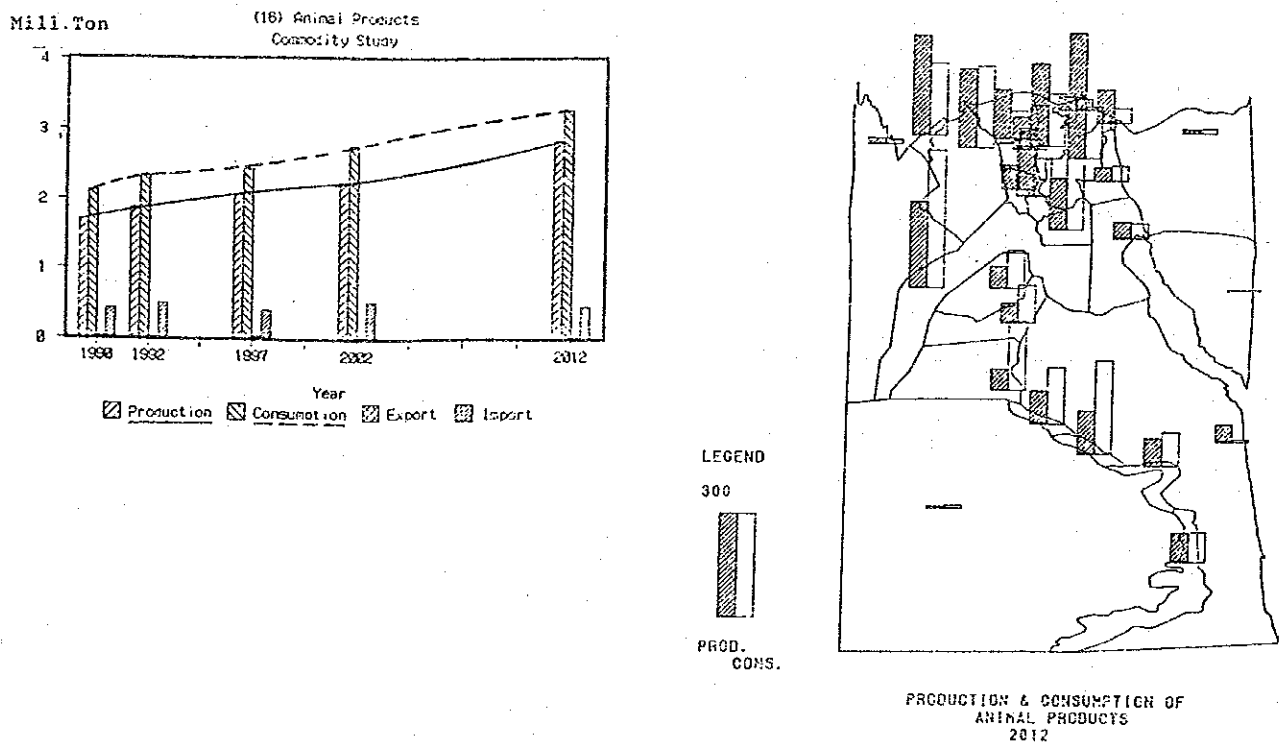


Fig. 12-5-7 Animal Products Projection

12.5.8 Other Agricultural Products (Sub-group 17)

(1) Consumption

Consumption/capita grew at a constant rate of 1 per annum during 1987-1992 period. The Third 5-Year Plan projects a large growth rate of 1.11 p.a. and consumption/capita in 1997 is forecast at 1.7 that of 1992. This Study, taking into consideration overall trend of both plans periods (1987-1997) has made projections for 2002 and 2012 which show an annual growth rate of 1.04. Consumption/cap. in 2012 shall treble that of 1992.

(2) Production

While the 1987-1992 period recorded an annual growth rate of 0.98, the Third 5-Year Plan has projected a healthy growth rate 1.16 p.a. Projections under this study however show a more conservative growth rate for 1997-2012 period of 1.06 p.a. Nevertheless, and due to the influence of the Third 5-Year Plan, production in 2012 is forecast to be 5 times that of 1990.

(3) Foreign Trade

Exports are projected to maintain the same levels as that of the Third 5-Year Plan, while import amounts are projected to cover the gap between demand and supply. This gap is expected to continue to grow and 2012 imports are projected to be 5.4 that of 1990.

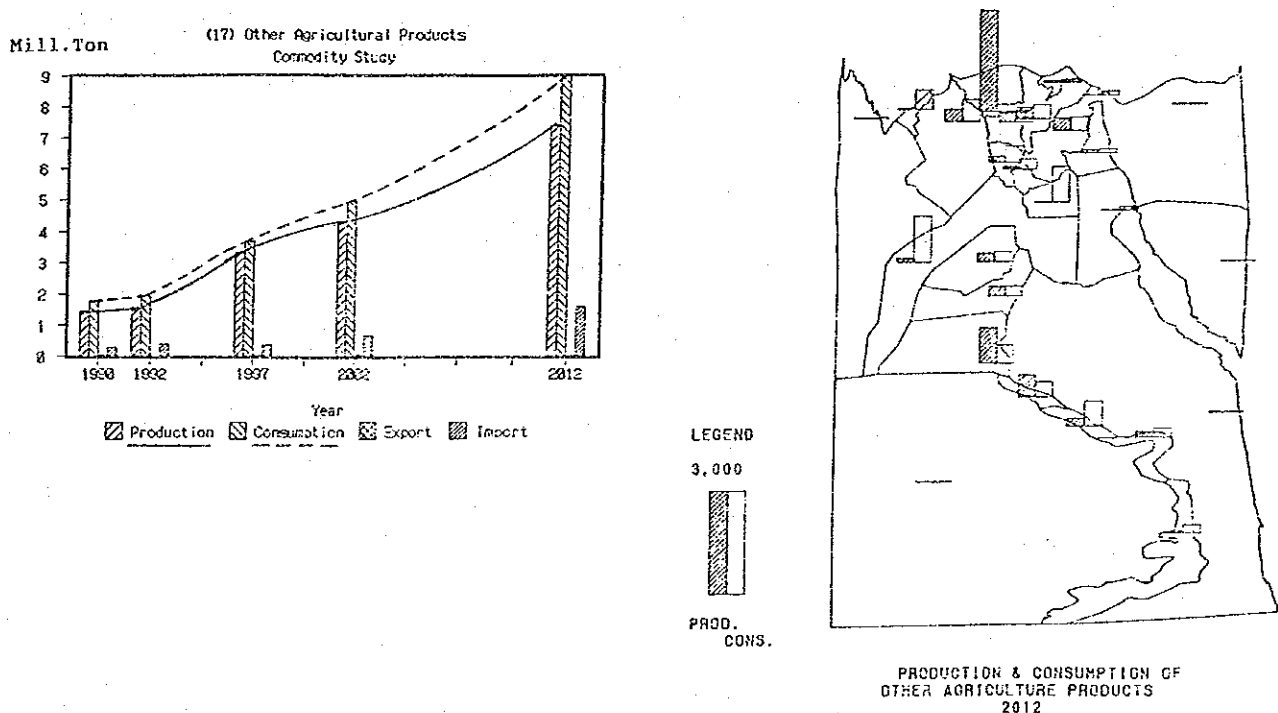


Fig. 12-5-8 Other Agricultural Products Projection