

REPUBLIC OF KENYA
LAKE BASIN DEVELOPMENT AUTHORITY

**THE STUDY
OF
INTEGRATED REGIONAL DEVELOPMENT
MASTER PLAN
FOR
THE LAKE BASIN DEVELOPMENT AREA**

FINAL REPORT

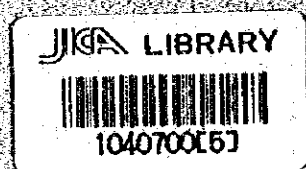
Volume 1

EXECUTIVE SUMMARY REPORT

October 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

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LIST OF REPORTS

- Volume 1. EXECUTIVE SUMMARY REPORT
- Volume 2. MASTER PLAN REPORT
- Volume 3. SECTOR REPORT 1:
Agriculture/Livestock/Fishery
- Volume 4. SECTOR REPORT 2:
Manufacturing/Mineral Resources/Tourism
- Volume 5. SECTOR REPORT 3:
Water Resources/Transportation/Energy
- Volume 6. SECTOR REPORT 4:
Land Use/Human Resources
- Volume 7. REPORT ON PREPARATORY STUDY

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PREFACE

In response to the request of the Government of the Republic of Kenya, the Government of Japan has decided to conduct a study of Integrated Regional Development Master Plan for the Lake Basin Development Area and entrusted the study to the Japan International Cooperation Agency (JICA).

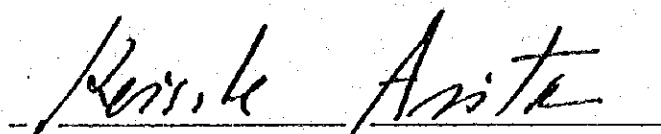
JICA sent to Kenya a study team headed by Mr. Ichiro Kuno, Nippon Koei Co. Ltd. , during the period from January 1986 to March 1987.

The team had discussions on the study with the officials concerned of the Government of Kenya and of the Lake Basin Development Authority, and conducted a field survey in the Lake Basin Development Area. After the team returned to Japan, further studies were made and the present report has been prepared.

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

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

October, 1987

A handwritten signature in dark ink, appearing to read 'Keisuke Arita', is written over a horizontal line.

Keisuke Arita

President

Japan International Cooperation Agency

October, 1987

Mr. Keisuke Arita
President
Japan International Cooperation Agency (JICA)
1-1, Nishi Shinjuku 2-chome
Shinjuku-ku, Tokyo
Japan

Dear Sir,

Letter of Transmittal

We are pleased to submit to you the Final Report of the Study of Integrated Regional Development Master Plan for the Lake Basin Development Area for consideration by the Government of Kenya in contriving the development of the region under the jurisdiction of the Lake Basin Development Authority (LBDA).

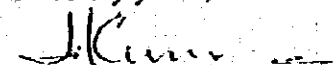
The LBDA region, has high development potential with rich water resources and favourable soil, climate and other conditions. In order to realize this potential, these resources have to be effectively mobilized, and various development efforts have to be well coordinated and integrated.

The Final Report contains a recommended master plan for the development of the region toward the year 2005, and consists of seven volumes: Executive Summary Report, Master Plan Report, Sector Report (four volumes), and Report on Preparatory Study. The Master Plan Report describes the present conditions of the region, alternative courses of development and targets, and presents the recommended master plan. The Executive Summary Report summarizes the contents of Master Plan Report.

The Sector Report contains the results of sector study conducted for each sector associated with this master plan study, covering present conditions, development potential and targets, strategy and specific measures to attain the targets. The Report on Preparatory Study contains the study results of three high priority projects selected from among 27 Master Plan projects: viz. Lake shore irrigation project, pig industry complex project, and animal feed industry project.

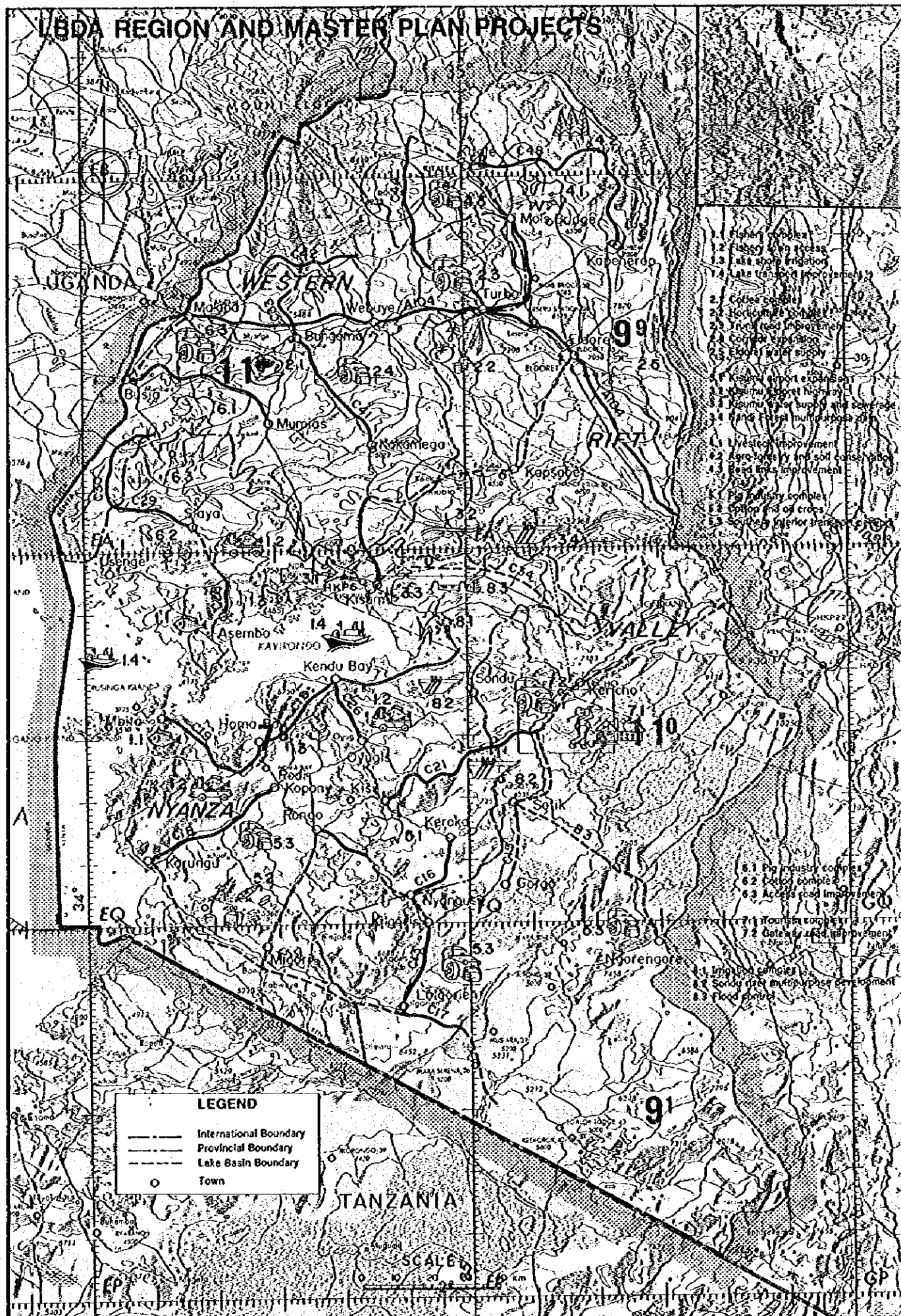
All the members of the Study Team would like to acknowledge gratefully the assistance extended by the officials and other individuals of Kenya, the personnel of your Agency, the Advisory Committee and the Ministries concerned. We sincerely hope that the study results will contribute to the future development of the LBDA region in particular and to the socio-economic development of Kenya and well-being of its people.

Sincerely yours,



Ichiro Kuno, Team Leader
Study of Integrated Regional
Development Master Plan
for the Lake Basin Development Area
Tokyo, Japan

LBDA REGION AND MASTER PLAN PROJECTS



Volume 1. EXECUTIVE SUMMARY REPORT

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1. INTRODUCTION

Background

(1.1) The Kenyan Government has been placing increasing emphasis on regional balance in the Country's socio-economic development. As a main organizational strategy for regional development, the Lake Basin Development Authority (LBDA) was established in 1979 by an Act of Parliament. The prime objective of the authority is to plan, to coordinate and to implement development projects in the Lake Victoria catchment area belonging to Kenya.

(1.2) Since its establishment, LBDA has been conducting a number of studies on different aspects of the development of LBDA Region (the Region), and some projects have been partly implemented. None of the studies, however, has taken into account the overall requirements of the Region nor accorded priorities to different development activities. Also there exist conflicts and contradictions between some of the study results, and the coordination among projects is necessary for more efficient promotion and implementation of the projects. With these in view, the Kenyan Government submitted in February 1984 an official request to the Japanese Government for technical cooperation of preparing an integrated long-term development master plan for the Region.

Study procedure

(1.3) In response to this request, the study of Integrated Regional Development Master Plan for the Region started in January 1986 with the dispatch of a study team by the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation of the Japanese Government. The JICA study team, through a series of stays in Kenya extended in total for 11 months, worked in close collaboration with its LBDA counterpart team and did some additional works in Japan, too. In the course of the study, the Inception Report (January 1986), Progress Report 1 (March), Progress Report 2 (August), Interim Report (November) and Draft Final Report (March 1987) were submitted respectively.

(1.4) In addition to regular collaborative works and occasional discussions between the JICA study team and the LBDA counterpart team, two rounds of district visits were conducted by the joint team covering all the 15 districts in the Region first to explain the purposes, procedure and expected outcomes of the study and second to explain the outline of draft master plan. Moreover, a workshop and a seminar were organized to present interim results of the study to a wider audience and to receive their comments. The workshop was attended by representatives of all the 15 districts and related Ministries, and the seminar was held with the participation of most districts and several Ministries. Very active discussions took place on both occasions, which have been reflected in this Final Report.

Organization of the Final Report

(1.5) This Final Report consists of seven volumes as follows.

- Volume I : Executive Summary Report (this volume)
- Volume II : Master Plan Report
- Volume III : Sector Report 1 : Agriculture, Livestock and Fishery
- Volume IV : Sector Report 2 : Manufacturing, Mineral Resources and Tourism
- Volume V : Sector Report 3 : Water Resources, Transportation and Energy
- Volume VI : Sector Report 4 : Land Use and Human Resources
- Volume VII : Report on Preparatory Study

2. DEVELOPMENT OBJECTIVES

Region's position

(2.1) The LBDA region is defined as the entire catchment areas of all the rivers draining into Lake Victoria. Administratively it includes all the seven districts in Nyanza and Western Provinces, and Kericho, Nandi, Trans Nzoia and Uasin Gishu districts and parts of Narok, Nakuru, West Pokot and Elgeyo Marakwet districts in Rift Valley Province. It occupies 47,709 km², exclusive of the Kenya part of Lake Victoria, in the western part of Kenya, accounting for about 8.4% of the total land area of Kenya, i.e. 569,137 km². Its population of about 8.1 million in 1985 corresponds to about 40% of the total population in Kenya, 20.2 million in the same year.

(2.2) The gross regional domestic product (GRDP) of the Region was estimated to be K£970 million in 1985 or 23.5% of the gross domestic product (GDP) of Kenya, which was K£4,126 million in the same year. The per capita GRDP of the Region was thus K£120, substantially lower than the per capita GDP of Kenya calculated to be K£204 in 1985.

(2.3) Although the share of GRDP of the Region in GDP of Kenya is much smaller than its population share, the Region's economy contributes more significantly to the national economy in some aspects. Region's share in agricultural production in Kenya between 1976 and 1984 was 72% for maize, 66% for tea, 98% for sugarcane and 78% for root crops as shown in Table 1. Also the Region produces most of fresh water fish in Kenya, 88,600 tons out of 99,800 tons in 1985.

Table 1 Region's Shares in Agricultural Production of Kenya

CROPS	KENYA (1000 tons)	LBDA	
		(1000 tons)	Share
Maize	2,084	1,504	72%
Sorghum/Millet	265	54	20%
Beans	244	77	32%
Rice (Dry paddy)	40	8	20%
Root crops	887	693	78%
Sugarcane	3,542	3,488	98%
Seed Cotton	25	15	60%
Coffee	90	5	6%
Tea	190	125	66%
Wheat	204	156	76%

Notes: Figures for Kenya derived from FAO Production Year Book 1979-85, and those for LBDA estimated by JICA Study Team.

(2.4) Within the generally arid to semi-arid tropical savanna dominant in Kenya, the Region is quite conspicuous by ample rainfalls. Over 70% of the total land area in the Region is classified as either high or medium potential based on average annual rainfall. Soil conditions are also generally favourable for cultivation, although some soil types require proper fertilization or intensive drainage. Human resources constitute another important asset of the Region, consisting of many ethnic groups of various socio-cultural backgrounds. Other major resources in the Region include hydropower potential, some mineral resources, tourism attractions and the strategic location in the defunct East African Community being substantially reinstated recently.

Development objectives

(2.5) Taking these characteristics into account, and in line with the national development policies established by the Sessional Paper No. 1 (SP1) of 1986 on Economic Management for Renewed Growth, the following objectives have been set up for the Master Plan.

- (1) to narrow the income disparity between the Region and the whole of Kenya;
- (2) to contribute to national economic development and food security by maximizing agricultural production;
- (3) to improve Region's economic structure by promoting manufacturing industry capitalizing on its agricultural base; and
- (4) to create employment opportunities in order to minimize the drift of people out of the Region.

3. DEVELOPMENT SCENARIOS, STRATEGY AND TARGETS

Development scenarios

(3.1) In order to clarify more specifically what the Region can do to attain the objectives, alternative development scenarios are drawn out as below, each describing the main direction of development, roles and functions of the Region.

(1) Scenario 1: Granary

The Region should increase food crop production as much as possible, aiming at making it a granary of Kenya or even East Africa as a whole. Maize and rice are considered more important strategic crops, and increase in milk production is also emphasized.

(2) Scenario 2: Agro-industrial base

The Region should make maximum contribution to foreign exchange earnings/savings first by diversifying/intensifying cash crops and then also by promoting agro-industries and those crops providing inputs to them. Strategic crops include tea, coffee (Robusta as well as Arabica), cotton, sugarcane, horticultural crops and oil crops. Agro-processing industries of various kinds and other agro-related industries will be induced.

(3) Scenario 3: Intermediate path

The most desirable yet realistic future of the Region is sought between these two distinct scenarios. Under this scenario, the Region should be developed by making use of complementary aspects of Scenarios 1 and 2 with functional divisions among districts, major towns and rural/urban areas. This scenario will be described in more detail in paragraphs (4.23) through (4.26) in the form of development phasing.

Basic strategy

(3.2) Despite the potential described above, the Region faces many problems due to various factors interacting one another to constitute constraints to development. Main factors and more important interactions between them have been analyzed and the problem structure has been obtained as shown on the next page.

(3.3) Based on the problem structure analysis, and distinguishing more fundamental and yet manageable factors, the basic strategy for the Region's development has been drawn up as follows:

- (1) water resources development and management for primary production activities and people's sanitation,
- (2) improvement of infrastructure for agriculture and related economic activities, and
- (3) rationalization of land use.

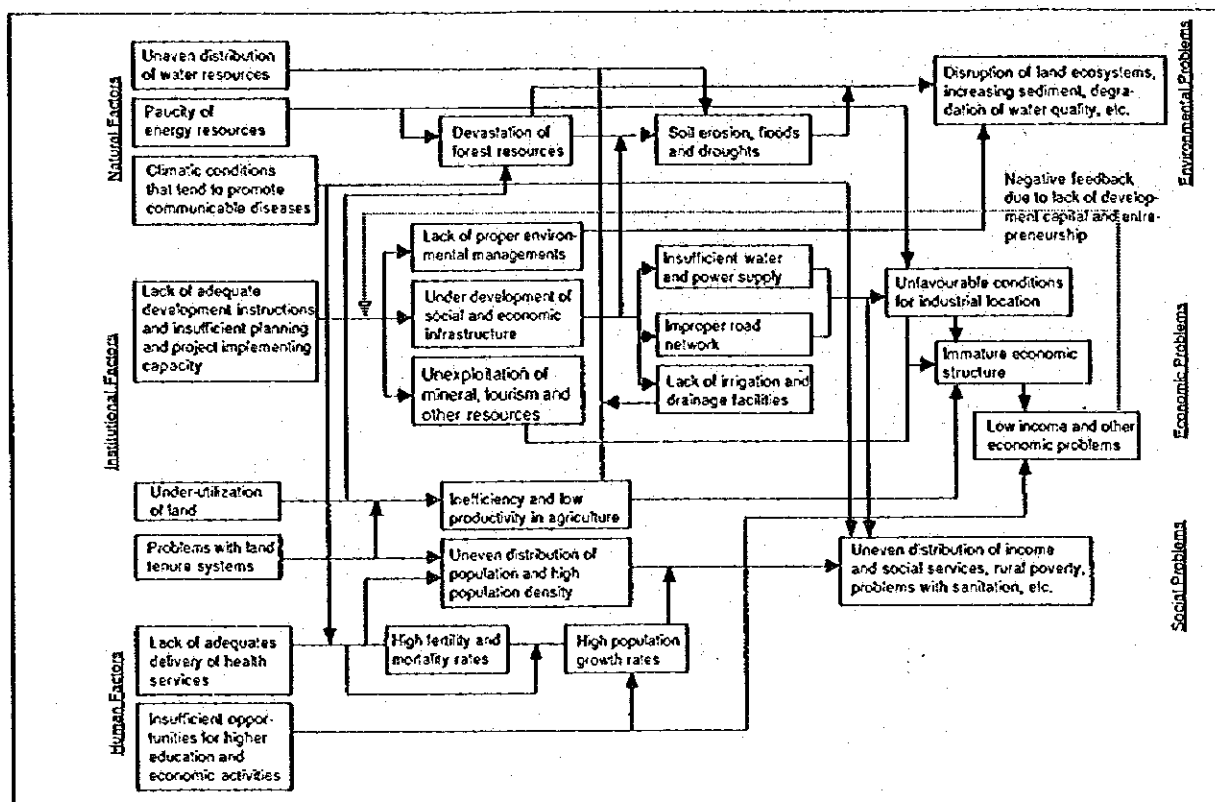


Figure 1 Problem Structure of LBDA Region

Socio-economic frameworks

(3.4) Alternative development frameworks have been worked out, in line with the basic ideas of each development scenario, by projecting socio-economic indices and setting development targets. First, the per capita GRDP for the Region is planned to increase from K£120 in 1985 to K£185 in 2005, at the average annual growth rate of 2.2% in real terms. This target is not only significantly higher than the level expected to be attained following the trend, but also represents substantially higher growth than the national average growth of per capita GDP stipulated at 1.8% per annum in SP1.

(3.5) The growth of the economy and population in the Region has been projected in mutually consistent way so that the target per capita GRDP will be attained. The results are summarized in Table 2 below, together with the results of trend projection, and also compared in Table 3 with the national target growth rates set by SP1.

Table 2 Projections of Socio-Economy in LBDA Region for 2005

	1985	Trend Projection	Scenario Projection		
			Scenario 1	Scenario 2	Scenario 3
Per Capita GRDP K£	120	126 (0.2)	185 (2.2)	185 (2.2)	185 (2.2)
GRDP-Total K£x10 ⁶	970	1,968 (3.6)	2,880 (5.6)	3,190 (6.1)	3,090 (5.9)
Subsistence and Modern Agriculture	610	1,168 (3.3)	1,632 (5.0)	1,777 (5.5)	1,752 (5.4)
Manufacturing and Mining	75	199 (5.0)	303 (7.2)	357 (8.1)	324 (7.6)
Services	285	601 (3.8)	945 (6.2)	1,056 (6.8)	1,014 (6.5)
Population-Total 10 ³	8,116	15,547 (3.3)	15,600 (3.3)	17,000 (3.8)	16,700 (3.7)
Urban	633	1,700 (5.1)	1,900 (5.6)	2,200 (6.2)	2,200 (6.2)
Rural	7,483	13,900 (3.1)	13,700 (3.1)	14,800 (3.5)	14,500 (3.4)
Employment opportunities 10 ³	2,500	4,900 (3.4)	5,800 (4.3)	6,300 (4.7)	6,200 (4.6)
Agricultural land area 10 ³ ha	1,549	1,642 (0.3)	2,114 (1.6)	1,892 (1.0)	2,114 (1.6)
Share in assumed national production (%)					
Maize	72	48	78	45	73
Wheat	76	61	117	58	86
Tea	66	59	56	95	85
Sugarcane	98	85	80	99	99

Notes: Average annual growth rates are in parentheses.

Projections were made by JICA Study Team as described in Master Plan Report.

Table 3 Comparison of Growth Rate, Kenya and LBDA

	Kenya 1984-2000	LBDA 1985-2005
GDP/GRDP	5.6%	5.9%
Agriculture	5.0	5.4
Manufacturing	7.2	7.6
Total population	3.7	3.7
Urban population	7.1	6.2
Per capita GDP/GRDP	1.8	2.2

Sources: Sessional Paper No.1 of 1986 (Kenya)
The Master Plan (LBDA)

(3.6) The recommended socio-economic framework, corresponding to Scenario 3, is as follows. Being basically rural/agricultural society, the Region aims at attaining the growth rate of the agricultural sector higher than the national average. To attain the growth of 5.4% per annum, some 565,000 ha of land would be developed for agriculture, consisting of 345,000 ha for food crops,

120,000 ha for cash crops and 100,000 ha for fodder crops (Table 4). Cultivation on existing agricultural land of 1,549,000 ha will be intensified too.

Table 4 Agricultural Land Development Plan by Scenario

	(Unit: 1,000 ha)		
	Scenario 1	Scenario 2	Scenario 3
Food crops			
Maize	235	0	206
Sorghum & Milk	25	0	25
Beans	49	0	43
Wheat	98	0	44
Rice	27	15	27
Root crops	24	0	0
Others	0	0	0
Sub-total	458	15	345
Cash crops			
Arabica coffee	0	27	17
Robusta coffee	0	40	32
Tea	0	32	24
Cotton	0	10	7
Sugarcane	0	25	25
Others	0	30	0
Sub-total	0	164	105
Fruits & Vegetables			
Fruits	0	40	10
Vegetable	0	17	5
Sub-total	0	57	15
Fodder	107	107	100
Managed Pasture	0	0	0
Fallow	0	0	0
Total	565	343	565

Source: JICA Study Team (Chapter 10, Sector Report)

(3.7) As the manufacturing sector in the Region is quite small at present, contributing to about 7.7% of GRDP in 1985, it has to be grown at the rate higher than the national average, capitalizing primarily on its agricultural base. To attain the average growth of 7.6% per annum, many industries will have to be newly introduced or much enhanced, in addition to the growth of existing industries. The former include edible oil, canned fruits and vegetables, instant coffee, fish fillet and fish oil, ceramics and animal feed in a shorter run, and hides and skins, and machinery and metal works in a longer run (Table 5). Informal sector industries are also expected to grow at 7.7% per annum on average.

Table 5 Estimated Value Added in Manufacturing Sector, 1985 and 2005

	Value-added 1985	(K£ 10 ³) 2005	Growth Rate per Annum %
All the existing industries	71.5	204.1	5.4
Introduced/enhanced industries	-	103.4	-
Edible oil		17.0	
Canned fruit		0.7	
Fish fillet and fish oil etc.		6.3	
Instant coffee		34.1	
Animal and fish feeds		8.3	
Cotton products		1.8	
Hides and skins		8.9	
Briquets		negligible	
Pulp and paper		1.8	
Printing		0.7	
Power alcohol		4.0	
Ceramic products		1.0	
Cement		1.2	
Machinery and metal works		13.4	
Packing materials		4.2	
Informal sector industries	3.7	16.4	7.7
Total	75.2	323.9	7.6

Note: Estimated by the JICA Study Team as described in Chapter 4, Sector Report.

(3.8) With these sectors as the driving force, the Region's economy is expected to grow at the average annual rate of 5.9% for the next two decades, which may be compared with the national average of 5.6% per annum for the period 1984 - 2000. With such a growth, the Region's economy will be able to provide about 6.2 million employment opportunities. Unemployment ratio will decrease from 17% at present to about 10% in 2005.

(3.9) Specific development measures to be taken to attain these targets consist basically of development projects and associated institutional measures. Some of institutional measures can be taken only at the level of Central Government and thus beyond the scope of regional planning. It has been assumed in the Master Plan study that those measures stipulated in SP1 will be taken by the Central Government. They include measures (1) to increase the productivity of Government investments and services, (2) to improve economic balance between the rural and urban sectors, (3) to revitalize the informal sector for increasing jobs and incomes, (4) to encourage agriculture for achieving food

security, income growth, employment creation and export expansion, and (5) to extend and intensify Kenya's structural adjustment in modern industry and trade.

4. DEVELOPMENT PLAN

4.1 Spatial System

Spatial development policy

(4.1) The Government has been placing increasing emphasis on rural-urban balance, as further stressed by SP1. The paper has clarified that the basic idea of rural-urban balance is to promote the development of an urban system that supports the development of agriculture and rural areas, generating employment opportunities close to where rural workers already live.

Spatial structure

(4.2) The spatial structure of the Region is typically rural. Variation in population density within the Region reflects more the difference in population distribution in rural areas due to difference in land productivity for agriculture rather than the degree of urbanization. Each urban center, being primarily a service center for respective rural hinterland, does not have sufficient capacity to attract and assimilate people from the hinterlands. Thus most people moving out of the rural areas in search of better employment opportunities find their ways to outside the Region. Some districts in the Region, such as Nandi, Uasin Gishu and Trans Nzoia, are receiving areas of migrating population, but this represents mostly rural to rural migration and is not due to assimilative capacity of any urban centers.

Spatial development potential

(4.3) The spatial development potential has been evaluated by using two criteria in order to identify priority areas where development efforts should be concentrated. The first criterion is accessibility to urban services measured by distance from major transportation infrastructure and urban and rural centers including all the prospective Rural Trade and Production Centers announced by SP1. The second criterion is general prospect of water availability based on the water demand-supply balance by subcatchment.

(4.4) The results of evaluation are illustrated in Figure 2, where the Region is classified into four zones. Implications to development of each zone may be as follows.

Zone 1: (high accessibility to urban services; high water availability). Agricultural development can be promoted intensively, if soil and other natural conditions allow; otherwise more urbanization/industrialization should be considered.

Zone 2: (high accessibility to urban services; low water availability). Judgement has to be made as to whether to accelerate water resources development and urban water supply, including trans-basin diversion or rather to encourage less water-intensive development.

Zone 3: (low accessibility to urban services; high water availability.) Improved transportation infrastructure should be provided to support agriculture and/or agro-industries with associated activities.

Zone 4: (low accessibility to urban services; low water availability.) Low priority is accorded to the development, except the provision of basic needs, unless other natural conditions are found superb.

(4.5) From Figure 2, the following major areas may be identified, representing each of three relatively high potential zones (except Zone 4)

- Zone 1:** (a) Area between the national trunk road A104 and Kisumu municipality, including Kakamega municipality, Mumias and Butere
(b) Area connecting Londiani, Kericho and Solik (gateway area)
- Zone 2:** (a) Lake shore area centering around Kisumu municipality including Kano Plain
(b) Area connecting Kisii, Rongo, Migori and Homa Bay
(c) Area around Eldoret
(d) Area around Kitale
- Zone 3:** (a) Most part of Busia
(b) Western part of Bungoma
(c) North-eastern corner area covering parts of West Pokot, Trans Nzoia and Elgeyo Marakwet districts
(d) Hinterland area of Zone 1 area (b)

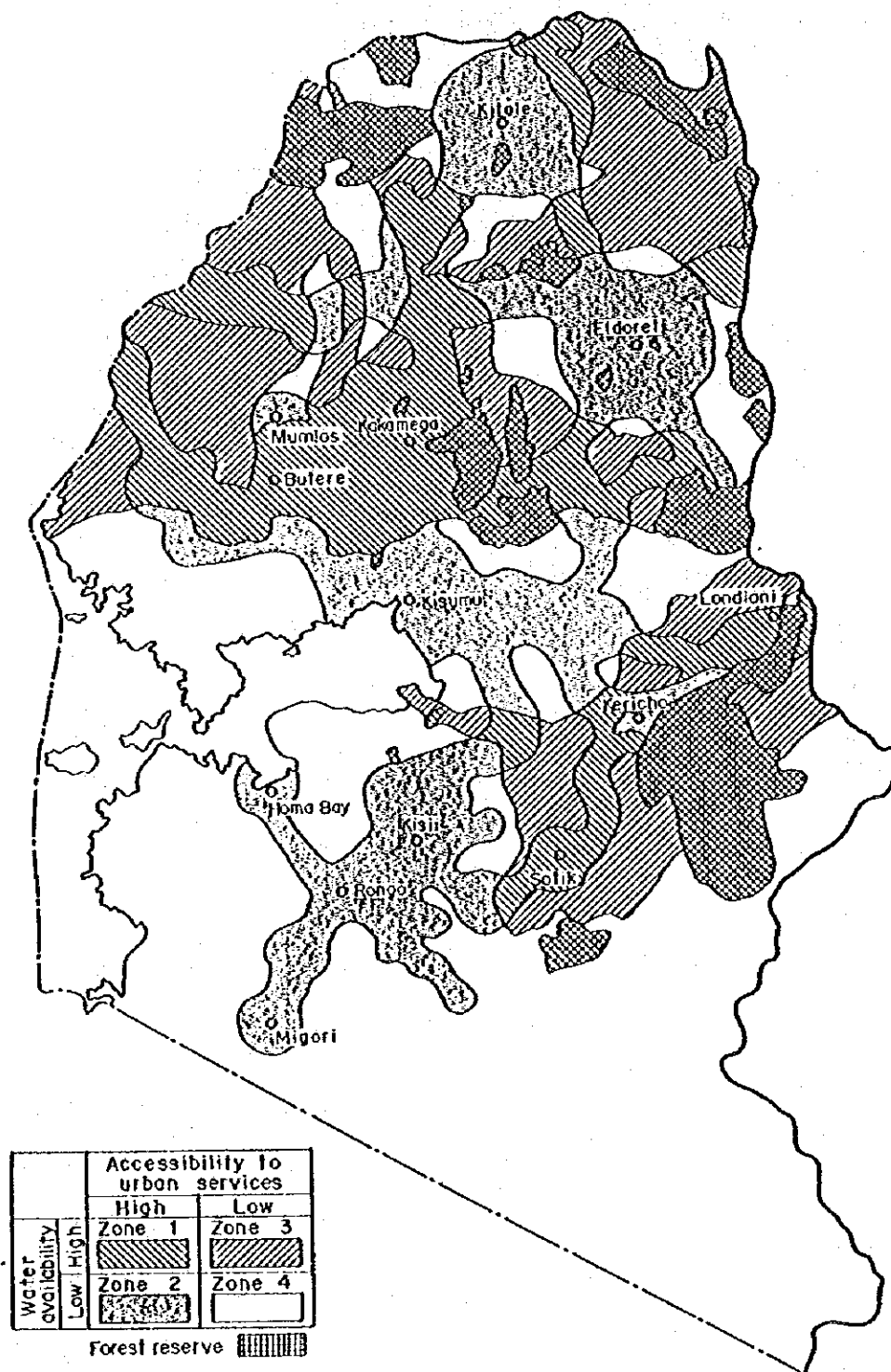


Figure 2 Spatial Development Potentials of LBDA Region

Spatial development strategy

(4.6) The foregoing analyses dictate that the basic strategy for the Region's spatial development should be to improve the provision of infrastructure and utilities to those areas identified above to be of high potential, aiming at inducing the development of respective hinterlands. Combining those strategic areas, more specific strategies may be presented as follows:

- (1) Consolidation of east-west corridor;
- (2) Establishment of north-south axis; and
- (3) Enhancement of the development core area.

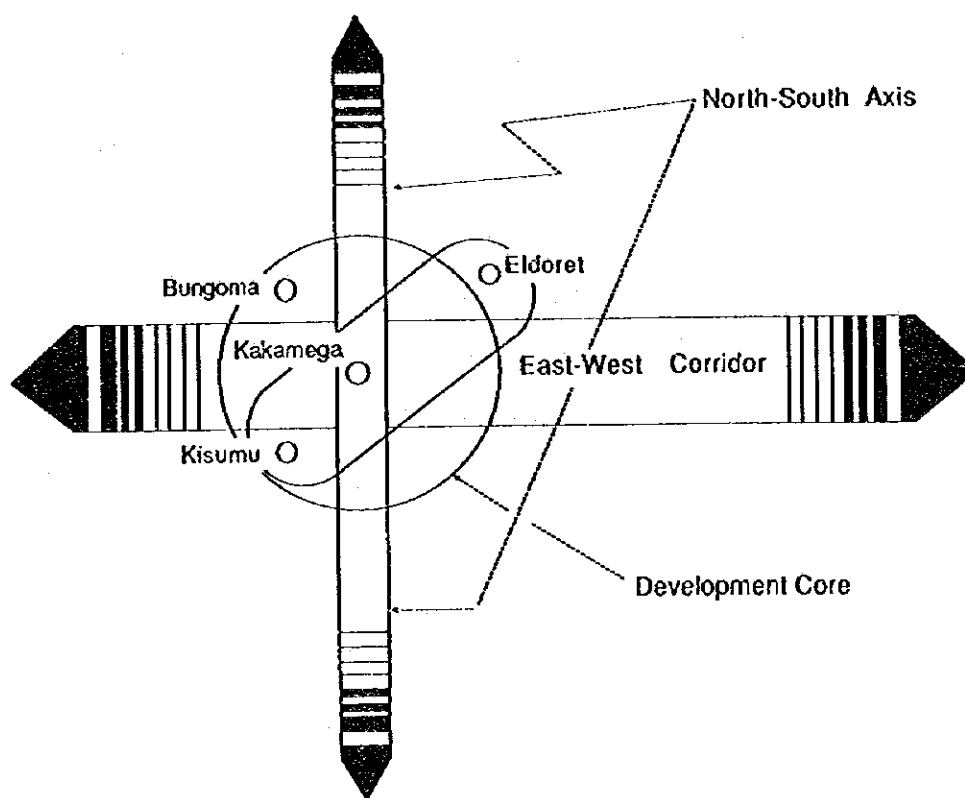


Figure 3 Spatial Development Strategy

(4.7) The strategy (1) reflects the idea that higher returns on investment can be expected in such an area where there already exists certain accumulation of economic activities, being served by better infrastructure and utilities. Zone 1 area (a) and Zone 2 area (c) are just such areas. As compared with the east-west communication, the north-south axis has not been well established in the Region, as the northern peripheries and the southern interior are less developed. The strategy (2) is meant to remedy such a situation, capitalizing on the potential of Zone 2 areas (b) and (d), and Zone 3 area (c). It will also contribute to the development of Zone 3 areas (a) and (b). The development of

Zone 2 area (b) will be aided by the development of gateway area: i.e. Zone 1 area (b), and Zone 3 area (d).

(4.8) The area generally north of the Kisumu municipality and bordered by the national trunk road A104, i.e. Zone 1 area (a), may be regarded as a core of the development in the Region, with the population and economic activities most heavily concentrated. Over 25% of the Region's total population live in this area of some 100 km diameter. Further development of this area with the strategy (3) would help to attract more people drifting out from rural areas who would otherwise find their ways to outside the Region. Particularly assimilative capacity of Kisumu and Eldoret municipalities should be enhanced. The development of the neighbouring areas, especially the Lake shore area and Kano Plain, i.e. Zone 2 area (a), should be treated in relation to this core area.

Land development strategy

(4.9) The land development pattern in the Region has been determined largely by agricultural development, and urban and transportation systems have developed rather incidentally associated with the agricultural development. No structural change is expected in such a land development in the future, as the land occupied by infrastructure and urban areas is small, and no large industrial estate is planned. Thus the land development planning in this study deals primarily with the agricultural land use. Present land use pattern is shown in Figure 4.

(4.10) Objectives stipulated in SP1 related to agriculture are to provide food security, to increase incomes of farm families, to create sufficient employment in rural areas, and to expand exports. More emphasis is placed on coffee and tea as cash crops, maize and wheat as food crops, and milk and meat production. In line with these national policies as well as the Region's potential outlined in paragraph (2.4), the land development strategy for the Region is drawn up as follows.

- (1) To increase crop yield and cropping intensity to the extent possible on the existing agricultural land of 1,549,000 ha;
- (2) To expand agricultural land on high potential areas with the following criteria:
 - cash crop is given a priority,
 - present shares in national production of food crops are maintained, and
 - fodder crop area is developed in order to attain Region's self-sufficiency in milk; and
- (3) To give priority to those crops for which the Region has a comparative advantage.

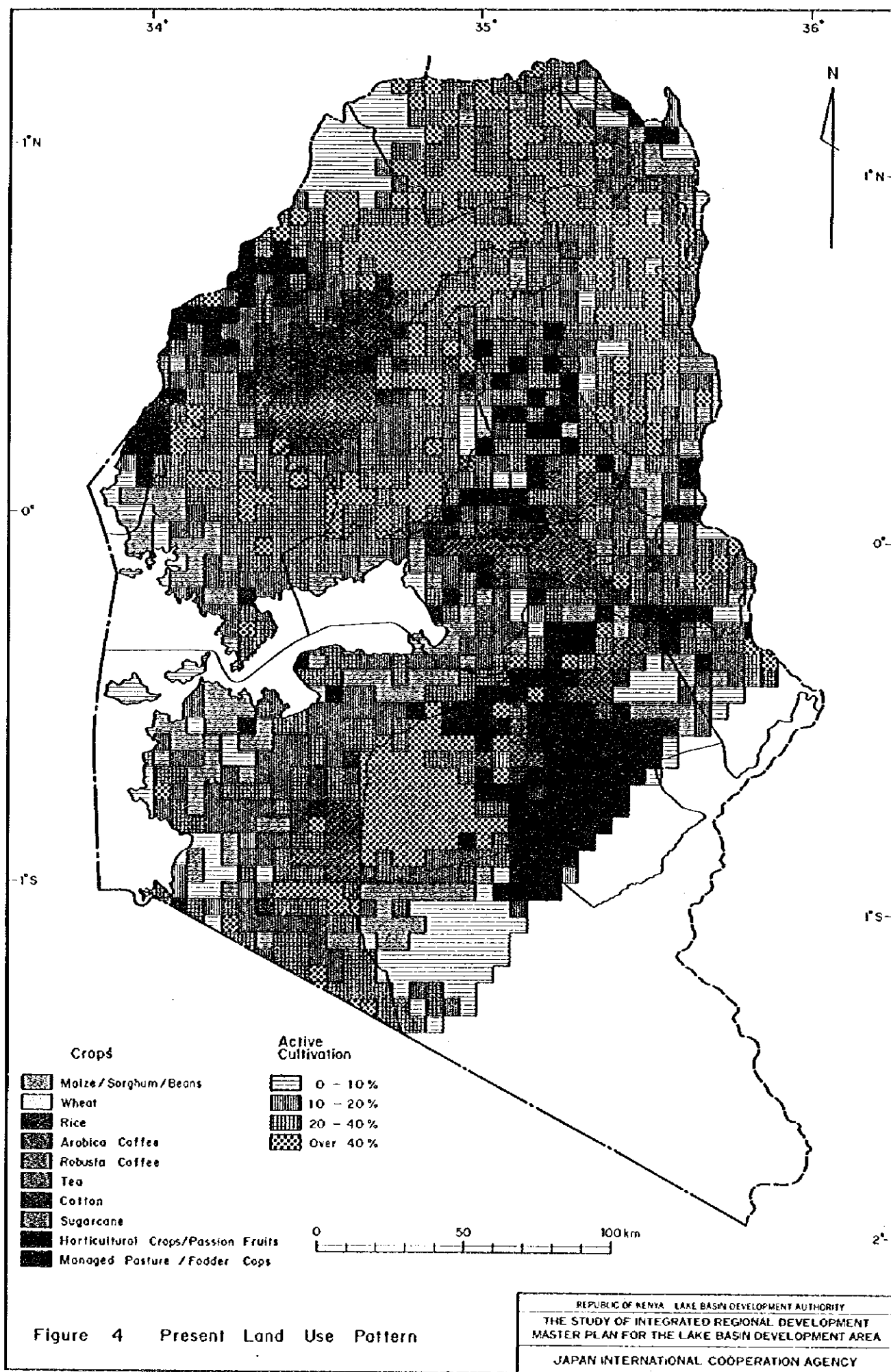


Figure 4 Present Land Use Pattern

Land evaluation

(4.11) Land development potential for agriculture has been evaluated in two steps. First, the expansible area for agriculture has been selected from the land currently covered by grassland or light bush by applying a few criteria. No agricultural development is considered in the land under forest or registered as national park or reserve. Steep land and existing agricultural land already intensively used and land occupied by infrastructure are eliminated from expansible area. Thus, the expansible area of 1,311,000 ha has been extracted. Second, the expansible area has been further divided into three potential yield classes: viz. very good, good and fair for different crops according to agro-climatic conditions.

Land development plan

(4.12) Based on the results of land evaluation, and taking account also of soil suitability, the land development plan for agriculture has been prepared as shown in Figure 5. The expansion area of 565,000 ha comprises 345,000 ha for food crops, 120,000 ha for cash crops and 100,000 ha for fodder crops. The expansion area by district and by crop is summarized in Table 6.

Table 6 Agricultural Land Development Plan

(Unit: 1000ha)

District	Maize	Sorghum	Beans	Wheat	Rice	Arabica Coffee	Robusta Coffee	Tea	Sugar cane	Cotton	Fruit & Veg.	Fodder Crop	Total
Nyanza													
Kisli	3	0	1	0	0	3	0	6	0	0	2	0	15
Kisumu	15	4	2	0	15	0	1	0	0	2	0	11	50
Siaya	19	5	6	0	3	0	7	0	0	1	0	7	48
S. Nyanza	47	7	8	0	4	0	5	0	5	3	0	12	91
Total	84	16	17	0	22	3	13	6	5	6	2	30	204
Western													
Bungoma	12	0	3	0	2	4	3	0	10	0	0	0	34
Busia	10	4	6	0	2	0	8	0	0	1	0	0	31
Kakamega	14	3	8	0	1	2	8	7	10	0	3	0	56
Total	36	7	17	0	5	6	19	7	20	1	3	0	121
Rift Valley													
Kericho	20	1	4	5	0	4	0	7	0	0	5	0	46
Nandi	15	0	2	10	0	3	0	4	0	0	5	7	46
Narok	10	1	1	0	0	0	0	0	0	0	0	32	44
T. Nzoia	10	0	2	10	0	1	0	0	0	0	0	10	33
U. Gishu	16	0	0	19	0	0	0	0	0	0	0	13	48
Others	15	0	0	0	0	0	0	0	0	0	0	8	23
Total	86	2	9	44	0	8	0	11	0	0	10	70	240
Total	206	25	43	44	27	17	32	24	25	7	15	100	565

Note: Expansion of root crops is not planned.

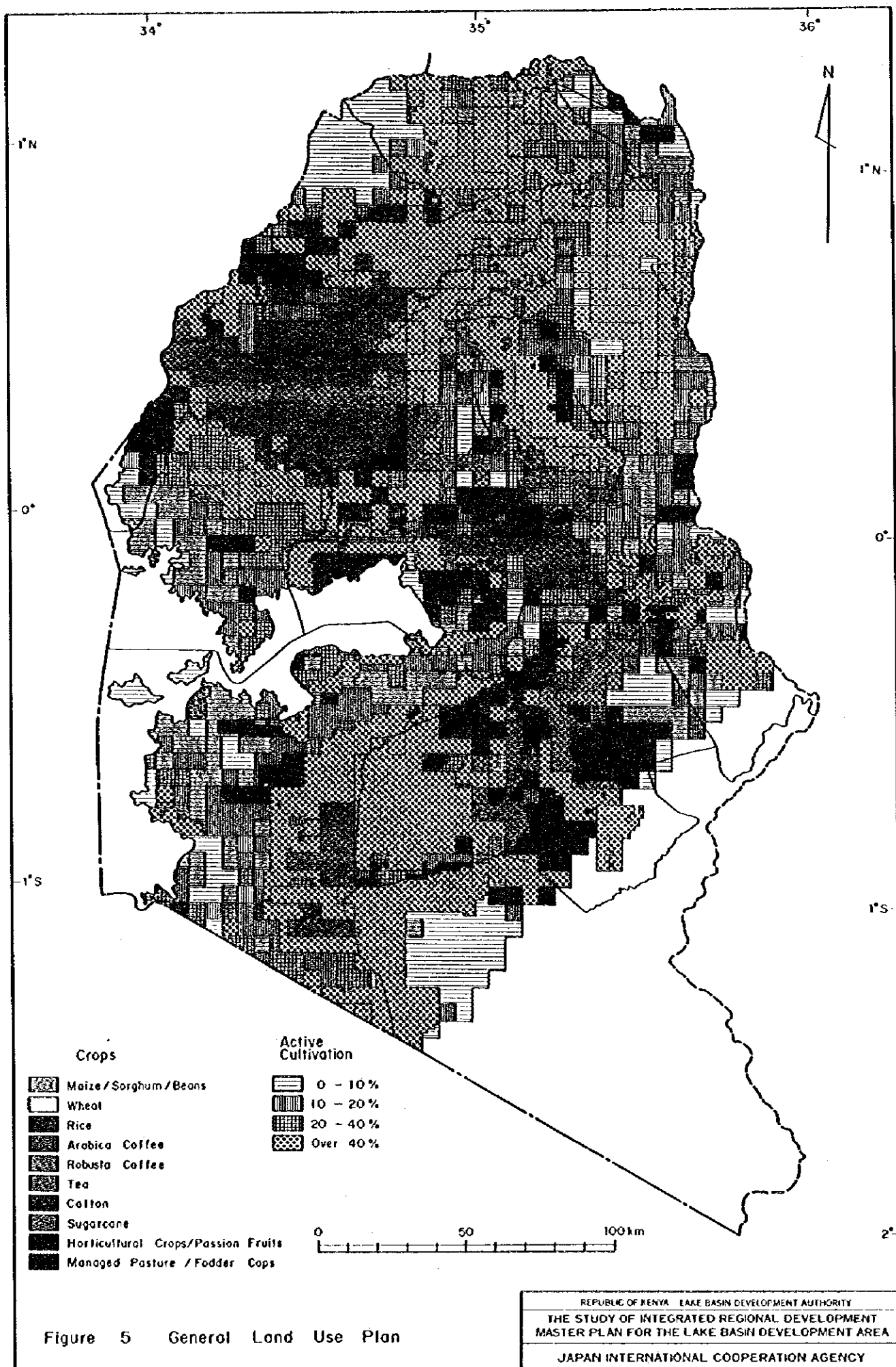


Figure 5 General Land Use Plan

4.2 Development Schemes and Projects

(4.13) Measures to be taken to attain the development targets as set for the Region by the socio-economic framework consist of specific development projects to be undertaken directly or indirectly by the public sector, institutional measures to induce the private sector activities and combinations of the two kinds, i.e. programmes. Some measures are already taken or included in existing plans and programmes and expected to take effect without this Master Plan. If no additional measures are taken, however, the Region's development will be nothing greater than indicated by the trend projection. The additional measures to be taken by the public sector in order to attain the envisioned targets are articulated by the Master Plan.

(4.14) The potential development areas identified in paragraph (4.5) are viewed in the light of general land capability described in paragraph (4.11) as well as existing conditions and development potentials and the basic strategy for spatial development which emphasizes inter-connections between rural and urban areas for further enhancing agricultural production. As a result eight broad areas have been identified as shown in Figure 6, where major development efforts should be devoted in the coming two decades.

Area development schemes

(4.15) The purposes of each area development scheme and main projects included are as follows. The 27 priority projects, called the Master Plan projects, are illustrated in Figure 7.

(1) Integrated Lake shore development scheme

Purposes of this scheme are:

- 1) To increase and sustain fishery production by promoting Lake fishery with appropriate technology and by establishing fish farms;
- 2) To protect and enhance Lake water quality and Lake shore environment, while utilizing productive capacity of the area; and
- 3) To promote tourism in a longer run.

Priority projects in the scheme are the following.

- 1.1 Fishery complex project
- 1.2 Fishery town access improvement project
- 1.3 Lake shore irrigation project
- 1.4 Lake transport improvement project

(2) East-west corridor development scheme

Purposes of this scheme are:

- 1) To improve the provision of infrastructure and utility facilities with the view to encouraging further accumulation of economic activities along the national trunk road A104; and

- 2) To induce the agricultural development in the hinterlands by establishing processing industries and improving access to the interior.

This scheme is composed of the following priority projects.

- 2.1 Coffee complex project
- 2.2 Horticulture complex project
- 2.3 Trunk road improvement project
- 2.4 Corridor expansion project
- 2.5 Eldoret water supply project

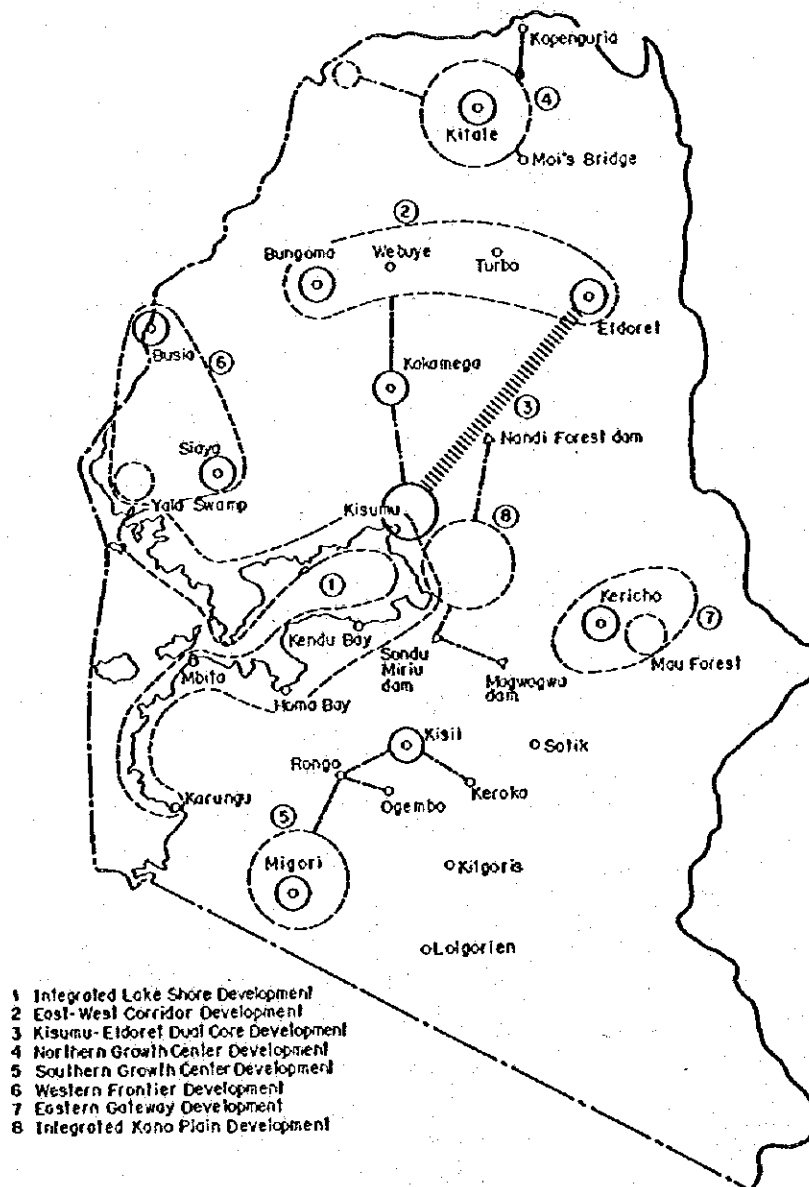


Figure 6 Area Development Schemes

(3) Kisumu - Eldoret dual core development

Purposes of this scheme are:

- 1) To provide better infrastructure and utility facilities for the two major municipalities in order to improve comparative advantage of the area for establishing economic activities; and
- 2) To contribute to minimizing the drift of people out of the Region by increasing the assimilative capacity with a variety of functions.

This scheme consists of the following priority projects.

- 3.1 Kisumu airport improvement project
- 3.2 Kisumu - Eldoret highway upgrading project
- 3.3 Kisumu municipality water supply and sewerage project
- 3.4 Nandi Forest multipurpose dam project.

(4) Northern growth center development scheme

Purposes of this scheme are:

- 1) To promote the development of the northern area by:
 - i) intensifying livestock production,
 - ii) encouraging agro-forestry, and
 - iii) improving road links between productive hinter lands and distribution centers for agricultural and livestock products and also along the northern borders for tourism related activities; and
- 2) To contribute in a longer run to strengthening north - south communication in the Region and interactions with the outer territory.

This scheme includes the following priority projects:

- 4.1 Livestock improvement project
- 4.2 Agro-forestry and soil conservation project
- 4.3 Road links improvement project

(5) Southern growth center development scheme

Purposes of this scheme are:

- 1) To promote the development of the southern interior area by:
 - i) much intensifying livestock production,
 - ii) establishing a few strategic cash and food crops, and
 - iii) improving access roads; and
- 2) To contribute in a longer run to strengthening north - south communication in the Region and International linkage with Tanzania.

This scheme consists of the following priority projects.

- 5.1 Pig industry complex project
- 5.2 Cotton and oil crops complex project
- 5.3 Southern interior transport network project

(6) Western frontier development scheme

Purposes of this scheme are:

- 1) To vitalize the economy of the area along or near the Ugandan borders by establishing new economic activities: viz.pig and cotton industries; and**
- 2) To improve access to the area for better procurement of production inputs and marketing of products.**

This scheme is composed of the following priority projects.

- 6.1 Pig industry complex project**
- 6.2 Cotton complex project**
- 6.3 Access road improvement project**

(7) Eastern gateway development scheme:

Purposes of this scheme are:

- 1) To enhance the attractiveness of the gateway area by promoting tourism; and**
- 2) To contribute to opening up the southern interior of the Region.**

This scheme is composed of the following priority project.

- 7.1 Tourism complex project**
- 7.2 Gateway road improvement project**

(8) Integrated Kano Plain development scheme

Purposes of this scheme are:

- 1) To increase the production of rice and other strategic crops by providing irrigation and drainage facilities as well as storage and marketing facilities;**
- 2) To protect and enhance the environment by controlling floods and sediment transport, conserving swamp areas, properly managing fertilizer use and other related measures; and**
- 3) To improve social capacity of smallholders by proper organization and provision of extension services.**

This scheme consists of the following priority projects.

- 8.1 Irrigation complex project**
- 8.2 Sondu River multipurpose development project**
- 8.3 Nyando River and Kano Plain flood control and drainage project**

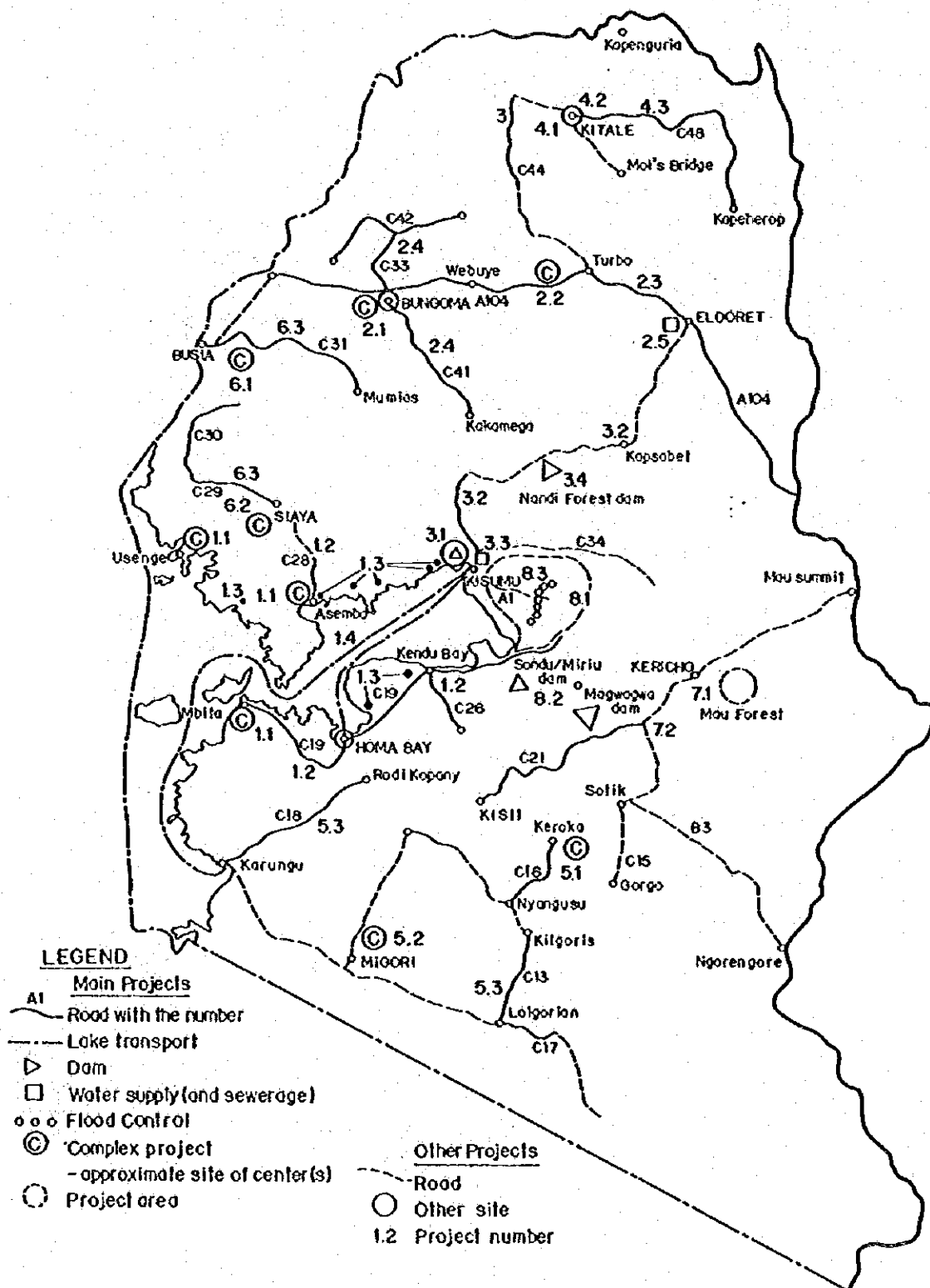


Figure 7 Project Map

Integrated rural development

(4.16) Given the present development status of the LBDA region, what is most needed is the overall development of agriculture, with services reaching as many farmers as possible. Industrial development in rural areas and active informal sector would be concomitant with, if not preceded by a dynamic agricultural sector and a growing rural economy. Also the provision for basic human needs such as health, sanitation and education/training is a prerequisite not only to economic development but also to general welfare in rural areas. Many small projects are conceivable to meet those requirements suggested above. Most of them are complementary to one another so that their overall effects would be much higher, if they are properly combined to make them what could be called an Integrated Rural Development (IRD) project.

(4.17) The purposes of IRD project are:

- 1) To enhance the agricultural activities and general social and economic conditions in rural areas in each district by implementing a set of mutually inter-related projects; and
- 2) To complement the implementation of area development schemes.

(4.18) In formulating an IRD project for a particular area in any district, the components to be included may be selected from the following list, which nevertheless is not exhaustive.

- (a) Agricultural production/distribution
 - (1) Delivery of improved seeds/seedlings and fertilizers
 - (2) Diffusion of market posts
 - (3) Improved agricultural extension services
 - (4) Fish culture with small ponds
 - (5) Improved livestock production
- (b) Agricultural infrastructure
 - (6) Small irrigation projects
 - (7) Rehabilitation of dams
 - (8) Drainage improvement
 - (9) Agricultural land reclamation
- (c) General infrastructure
 - (10) Improvement of rural access roads
 - (11) Rural electrification
 - (12) Urban and rural water supply
 - (13) Industrial estates
 - (14) Training centres

4.3 Conditions for Development

Resource capacity

(4.19) In order to attain the increase in GRDP by K£2,120 million from K£970 million in 1985 to K£3,090 million in 2005, the gross investment of K£9,540 million would be required, assuming that investment efficiency would improve as represented by the incremental capital-output ratio of 4.5 as indicated by SP1. Cumulative private investment is expected to be about K£5,650 million in this period with its ratio to GRDP maintained at 16%. Thus the public investment will have to make up the balance of K£3,890 million. The development expenditure of the project executing sector Ministries would be about 70% of the total public expenditure or about K£2,700 million.

(4.20) The total cumulative public investment of Kenya is calculated to be about K£12,000 million over the period 1985 - 2005, assuming that GDP will grow at the average annual rate of 5.6% as stipulated in SP1 and the ratio of public investment to GDP will be the same as observed in recent years. Thus the allocation of public development expenditure to the Region will have to increase from some 25% at present to slightly over 30%.

(4.21) As the economy develops, a wider range of technical and managerial skills and expertises of higher quality will be required. The total demand for quality labour in modern and informal sectors is estimated to increase from about 500 thousand in 1985 to about 1.5 million in 2005. Additional quality labour to be provided presumably by secondary school leavers is calculated to be about 1.1 million in the next 20 years, assuming the enrollment ratio of 25%, just sufficient to meet the requirement. In order to sustain this enrollment ratio, however, facilities of both primary and secondary schools will have to be expanded significantly.

(4.22) The energy supply in the Region will continue to depend heavily on woodfuel. Currently about 84% of the total regional demand is met by woodfuel, consuming about 9.3 million tons of wood, of which only about 3 million tons are from yield. If concerted efforts are made to increase the yield by promotion of agro-forestry and on-farm tree planting, aggressive re-forestation and establishment of peri-urban charcoal plantations, some 9.5 million tons of woodfuel may be supplied in 2005 on a sustainable basis. This will contribute greatly to delaying the timber depletion and gaining time for developing alternative sources of energy.

Development phasing

(4.23) The Region's development under the recommended socio-economic framework, corresponding to Scenario 3: Intermediate path, may be conceived to take place broadly in three phases:

Phase 1: up to 1993 (end of sixth five-year development plan period)

Phase 2: from 1994 through 2000, and

Phase 3: beyond 2001

Expected performance of Region's development in each phase is described below.

(4.24) Phase 1 (up to 1993)

As the Region is more rural/agriculture-based, the growth of its economy will have to rely first on the enhancement of productivity on existing farm lands. Based on the existing land use patterns, such measures that would involve smaller costs per hectare and have more immediate effects should be taken to increase agricultural production. The measures should include adoption of better varieties and farming practices as well as rehabilitation of planted areas. Information systems and other institutions have to be arranged to support such measures. At the same time, measures to increase cash crop production have to be initiated in this phase. They would include the expansion in small scale of areas under those cash crops to be newly introduced or much intensified with the provision of seeds, seedlings and other inputs as well as extension services. By the same token, development efforts should be concentrated in already more developed areas, and within those areas in such sub-sectors or projects having relatively small cost and immediate effects such as rehabilitation of existing facilities and overlaying of roads. During this period, utilization of resources for development will be basically the continuation of what has been realized in the past, but they should be channelled into more effective course of actions, and for this, various institutional measures have to be taken. Operation of DDC's will also be strengthened.

(4.25) Phase 2 (1994-2000)

This should be the period when active measures for economic re-structuring would actually take place. With more consolidated base of Region's agriculture and institutional arrangements, a wide range of activities would be introduced or induced. The agricultural growth will increase the income level and create a growing domestic market and investment opportunities for industrialization. In addition to expansion and full capacity utilization of existing agro-industries, a few major industries will be newly established. Other related industries and service activities, including those in informal sector will gradually be induced. This period should be characterized by mutually assisting activities in agriculture and manufacturing with related services. For this, the provision of infrastructure and utilities has to be strategically improved, and the development should also result in much expansion of the Region's resource base consisting of development capital, energy and human resources.

(4.26) Phase 3 (beyond 2001)

With the expanded resource base and re-structured economy, a stage will be set for the Region to introduce new elements for development. It may take a form of internationalization of Kisumu airport with the extension of oil pipeline or establishment of a basic industry such as metal and machinery. By this time, the Region should be equipped not only with a variety of production and related services functions but also with some higher order functions, represented by those in Kisumu municipality of international communication/conference center or education/technology development. A range of projects that can be conceived under such a situation would be much wider, including international tourism-related activities and horticultural production aiming at export to foreign countries. At the same time, the development should penetrate into remote hinterlands.

Institutional aspect

(4.27) Various institutional measures have to be taken to complement the project implementation. In agriculture, marketing systems will have to be strengthened especially for grains, cotton, oil crops and horticultural crops. Agricultural credits should be directed more to smallholders as well as to contract farmers expanding the area for the strategic crops such as Robusta coffee, cotton and passion fruits. Also a crop insurance system should be introduced to help small farmers to hedge against drought. Information services should be established to promote utilization of better varieties and existing facilities and to provide also meteorological information for timely land preparation and information on opportunities for new crops and markets. Demonstration activities of LBDA should be promoted and research on smallholders' farming practice including inter-cropping should be conducted.

(4.28) For livestock, education and training for both livestock farming including disease control and processing of livestock products should be carried out, utilizing existing institutions. For instance, pasture management, livestock feeding and tannery courses may be offered at youth polytechnics. Marketing and pricing systems should be established for a whole range of activities to be newly introduced or much intensified, such as pig industry, hides and skins and tanneries.

(4.29) For further promotion of fishery, a range of technical assistance should be provided to fishermen through cooperative societies, covering fish handling, storage and processing, distribution/marketing and research/training. Fishermen's cooperative should be reorganized into a few consolidated ones.

(4.30) The public-private partnership would be indispensable for industrial development in the Region, given the various constraints facing this sector such as the lack of entrepreneurship, technology, capital and market information as well as the weak industrial structure dominated by agro-industries. Alternative schemes of the partnership should be examined, taking account of profitability, resource requirements and other conditions of each project to be implemented.

In order to realize such a scheme, a ledger of potential entrepreneurs should be prepared, training be provided as necessary to candidate entrepreneurs for each particular project and exact terms of partnership be negotiated.

(4.31) Each District Development Committee should take initiative on the preparation and implementation of an IRD project in cooperation with relevant sector Ministries, local governments, self-help groups and others, in accordance with the "District Focus" strategy. To assist the District Planning Unit for drawing up a plan for the IRD project, the planning section of LBDA should be strengthened with additional staff members.

(4.32) Local governments' right to borrow from the Central Government's lending agencies may increase importance in the regional development in the future. In this connection, the responsibilities of local governments of different kinds should be clarified.

4.4 Effects of Proposed Projects

(4.33) The direct effects of the priority projects included in the proposed area development schemes are preliminarily evaluated with respect to the public fund requirement, number of direct employees, number of direct beneficiaries, degree of inducement of informal sector activities and environmental impact.

(4.34) The total public investment required for implementation of the 27 Master Plan projects of the area development schemes are estimated to be K£850 million. This corresponds to about 30% of the public development expenditure K£2,700 million expected to be allocated to the Region for the next two decades as estimated in paragraph (4.19). Other projects which are on-going or included in the existing plans/programmes would require about K£1,030 million. Thus the total investment costs of all the priority projects would be about K£1,880 million or 66% of the public development fund to be available in the 1985 - 2005 period. The balance could be used to finance rural development projects of various kinds.

(4.35) The employment opportunities to be generated by implementing the Master Plan projects except the IRD project would be 215.4 thousand. This corresponds to about 17% of the additional employment opportunities which will be generated in the course of attaining the development targets set by the Master Plan framework. The number of direct beneficiaries is calculated to be 3,005 thousand or 18% of the total population in the Region estimated for 2005 within the Master Plan framework. The recommended development plan will induce a variety of informal sector activities as listed in Table 7, and overall effect on the environment would not be negative as seen from Table 8.

Table 7 Evaluation of Inducement of Informal Sector Activities

Area Development Scheme	Informal Sector Activities to be induced	Evaluation
(1) Integrated Lake shore	<ul style="list-style-type: none"> - Fish processing by sun-drying and smoking - Packaging and labelling of processed fish - Fishing gears production - Boat workshops - Service activities associated with tourism 	High
(2) East-west corridor	<ul style="list-style-type: none"> - Dehydration of vegetables - Packaging, printing and labelling for horticultural products - Charcoal making from coffee husks etc. 	Medium
(3) Kisumu-Eldoret dual core	<ul style="list-style-type: none"> - Variety of activities in manufacturing and services sectors due to accumulation effects, which would be furthered by this scheme 	High
(4) Northern growth center	<ul style="list-style-type: none"> - Small-scale dairy production by utilizing uncollected milk-cheese making by conventional methods etc. 	Low
(5) Southern growth center	<ul style="list-style-type: none"> - Feed collection and animal feed production - Manure and biogas production from livestock/agricultural wastes - Packing materials production - Packing, printing and labelling for pig industry and cotton products - Reclamation of waste bottles for edible oil etc. 	High
(6) Western frontier	<ul style="list-style-type: none"> - Manure and biogas production from livestock/agricultural wastes - Packaging, printing and labelling for pig industry and cotton products 	Medium
(7) Eastern gateway	<ul style="list-style-type: none"> - Baskettery, arts and crafts from agricultural wastes - Pottery, roofing tiles and bricks production - Service activities associated with tourism 	Medium
(8) Integrated Kano Plain	<ul style="list-style-type: none"> - Wall-board manufacturing from bagasse - Papyrus mats - Arts and crafts based on papyrus, sugarcane straw etc. 	Low

Table 8 Evaluation of Environmental Effects

Area development Scheme	Possible Environmental Effects	Evaluation
(1) Integrated Lake shore development	<ul style="list-style-type: none"> - Protection of Lake water quality by intensified monitoring and effluent discharge regulations - Enhancement of Lake shore environment associated with fishery complex and tourism development 	Positive
(2) East-west corridor development		Neutral/mixed
(3) Kisumu-Eldoret dual core development	<ul style="list-style-type: none"> - Better water quality due to regulations of industrial effluents, industrial location and urban land use - Contribution to protecting forests by the establishment of woodfuel plantations - Negative effects due to construction of a dam in Nandi Forest and diversion of Yala River water 	Neutral/mixed
(4) Northern growth center development	<ul style="list-style-type: none"> - Improvement of watersheds by soil conservation program and agro-forestry - Slightly negative effects due to intensification of livestock production 	Neutral/mixed
(5) Southern growth center development	<ul style="list-style-type: none"> - Slightly negative effects due to expansion of various livestock activities - Increased inflow of nutrients and chemicals into water bodies due to higher utilization of agricultural inputs 	Slightly negative
(6) Western frontier development	<ul style="list-style-type: none"> - Slightly negative effects due to expansion of various livestock activities - Mixed effects of swamp reclamation 	Slightly negative
(7) Eastern gateway development		Neutral/mixed
(8) Integrated Kano Plain development	<ul style="list-style-type: none"> - Increased inflow of nutrients and chemicals into water bodies due to higher utilization of agricultural inputs - Changes in sediment transport and oxygen-deficient swamp water to be caused by flood protection of Nyando River by dikes 	Slightly negative

(4.36) Overall, the Master Plan projects formulated within the eight area development schemes will require 30% of the total public investment fund to be available for the Region, generating the sufficient number of employment opportunities and reaching the sufficient number of beneficiaries to justify the expense, induce a variety of informal sector activities, and will not involve any serious environmental effects (Table 9). These projects will be a driving force for the development of the Region as stipulated by the Master Plan framework.

Table 9 Evaluation of Area Development Schemes by Five Alternative Criteria

Area Development Scheme	Primary criteria with Quantitative Evaluation			Secondary Criteria with Qualitative Evaluation	
	Investment Costs Kshsx10 ⁶	Employment Opportunitiesx10 ³	No. of Direct Beneficiariesx10 ³	Inducement of Informal Sector	Environmental Effects
1. Integrated Lake shore	1,327	0.6	88	High	Positive
2. East-west corridor	1,755	147.5	711	Medium	Neutral/mixed
3. Kisumu-Eldoret dual core	2,164	0.3	801	High	Neutral/mixed
4. Northern growth center	274	2.6	41	Low	Neutral/mixed
5. Southern growth center	2,135	13.4	88	High	Slightly negative
6. Western frontier	1,231	8.8	63	Medium	Slightly negative
7. Eastern gateway	392	0.2	36	Medium	Neutral/mixed
8. Integrated Kano Plain	7,654	42.0	1,177	Low	Slightly negative
Overall evaluation	16,930	215.4	3,005	Medium	Neutral/mixed

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