

4.1.2 Land development pattern and scheme by district

(1) Land development strategy

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.

Objectives stipulated in SPI 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 Section 2.1, the land development strategy for the Region is drawn up as follows.

First, the intensification of land use in existing agricultural land should be attempted to the maximum possible, maintaining in principle the present cropping patterns. This will cover an area of some 1,549,000 ha cultivated under a variety of crops (see Figure 4.2 for schematic presentation of present land use). With the intensification alone, however, the value-added in agriculture would increase only at the annual average rate of 3% as described in subsection 3.3.1. Thus the expansion of agricultural land should also be attempted.

Second, the horizontal expansion should be conducted in the following way:

- 1) High potential areas should be allocated to each of the national strategic crops to attain the highest possible yields;
- 2) Cash crops should be given a priority in view of their greater contributions to value-added on per hectare basis, employment generation and export expansion in line with the national policies;
- 3) The present shares in national production of food crops should be maintained in view of nation's food security; and
- 4) Expansion of managed pasture and fodder crops production should also be considered, aiming at the Region's self-sufficiency in milk.

Third, proper allocation of land should be considered for those crops for which specific areas in the Region are already major producers or have comparative advantage. The crops include maize, sorghum and millet, beans, wheat and paddy as food crops, and coffee, tea, cotton, sugarcane and horticultural crops as cash crops.

Fourth, the horizontal expansion should not conflict with the catchment conservation, especially in the upper catchment areas of major rivers. For this, forest areas should in principle be protected, tea, coffee and citrus fruits should be selected as cash crops as much

as possible in the upper catchment areas, and proper farming practices should be encouraged for food crops, when their areas are expanded. Sugarcane is another crop effective for protection against soil erosion due to thick and perennial land surface cover.

(2) Land development plan

In line with the land development strategy presented above, the land development plan has been prepared in such a way that the production targets set by the recommended socio-economic framework will be attained. Measures to realize such development are articulated in subsequent sections. This master land development plan is summarized in Table 4.1, and also illustrated in Figure 4.3 (Chapter 10, Sector Report). The explanation follows.

Major food crops, i.e. maize, sorghum and beans, will be expanded in the whole Region with a total of 274,000 ha, of which 206,000 ha or 75% will be allocated to maize. For rice, 27,000 ha will be developed in Nyanza and Western Provinces. Most of this area will be developed under three major projects: i.e. on-going rain-fed rice project, the Kano Plain irrigation project and the Lake shore irrigation project. In the districts of Rift Valley, 98,000 ha will be newly developed for wheat, barley and oat.

For Arabica coffee, 17,000 ha of good potential area will be selected and developed primarily in Kisii, Kakamega, Kericho and Nandi. These expansions correspond to 23% of the national expansion programme with a target area of 75,000 ha by 2000. For Robusta coffee, 32,000 ha of good potential area will be developed mainly in Siaya, South Nyanza and Bungoma accounting for 64% of the national programme with 50,000 ha. For tea, 24,000 ha of very good potential areas are selected mostly in Kisii, Kakamega, Kericho and Nandi accounting for 58% of the national programme with 41,200 ha.

Sugarcane will be expanded in the total area of 25,000 ha in and around the existing sugarcane field in South Nyanza, Bungoma and Kakamega. Cotton will be newly planted in Kisumu, Siaya, South Nyanza and Busia for 7,000 ha. Horticultural crops will be expanded in Kisii, Bungoma, Busia, Kericho and Nandi for 17,000 ha. In addition, 100,000 ha of fodders will also be expanded in Nyanza and Rift Valley Provinces (details in Chapter 1, Sector Report).

There were 2,397,000 heads of local cattle, 647,000 of grade cattle and 1,260,000 sheep and goats in 1985 in the Region. Their feed sources were 165,000 ha of managed pasture, 139,000 ha of fodder field, 2,950,000 ha of natural vegetation land, and some crop residue. Milk production in the same year is estimated to be 507,000 tons. With a target to meet 1,600,000 tons of Region's milk demand by 2005, a livestock development plan is proposed, including the improvement of milk yield with the existing grade cattle, replacement of a half the existing local cattle with cross-bred local cattle and introduction of additional 300,000 heads of grade cattle. In order to meet increased feed requirement, 100,000 ha of natural vegetation land will be developed for fodder crops. Out of total natural vegetation land of 2,950,000 ha, the extent covered by grass is estimated to be 1,772,000 ha. It is estimated that about 1,250,000 ha of natural grass coverage should be set aside for agricultural land development, for the purpose of grazing local cattle and other domestic animals (details in Chapters 2 and 10, Sector Report).

(3) Land development scheme by district

In accordance with the land development pattern of the entire Region described above as well as the basic development strategy presented in Section 3.2, the land development scheme has been prepared by district as presented below (details in Chapter 10, Sector Report). These schemes are consistent with the area development schemes presented in subsection 4.2.1 formulated for high potential areas identified in subsection 4.1.1 in the sense that the agricultural development in line with these schemes would support each area development scheme. They should also constitute a basis for formulating an IRD project presented in subsection 4.2.2.

Kisii

In the agricultural land development, the priority should be given to cash crops of high value, as the expansible area in the district is limited. The Master Plan proposes the further expansion of tea, Arabica coffee and horticultural crops. By 2005, 6,000 ha of tea fields will be newly established in the south of the existing tea fields near Keroka under Tea-Dairy Zone (LH1) and Wheat/Maize-Pyrethrum Zone (LH2). This expansion accounts for 15% of the national tea expansion programme aiming at 41,200 ha by 2000. Arabica coffee will be expanded in the north of Nyamira division. The total expansion is 3,000 ha under Coffee-Tea Zone (UM1). Horticultural crops will be expanded for 2,000 ha in the north and the east of Kisii town. Passion fruit is one of the promising crops for this expansion.

Food crops will also be expanded. Total expansion is 4,000 ha along the district boundary with Narok district, i.e. Nyangusu and Monianku, under Coffee-Tea Zone (UH1). Maize, sorghum and beans are the main crops to be introduced.

In order to feed 29,000 heads of grade cattle, which account for 94% of the total grade cattle in Nyanza Province, 26,000 ha of managed pasture and 21,000 ha of fodders are required. The present study has clarified that the potential feed productivity of the managed pasture and the fodder fields is high enough to sustain all the existing cattle in the district, i.e. 29,000 heads of grade cattle and 133,000 heads of local cattle. In addition, 84,000 heads of grade cattle can also be sustained if the maximum productivity of feed is realized. Thus no expansion of pasture and fodders is planned.

Kisumu

A large scale irrigation project is one of the central measures to enhance the land productivity in Kano Plain. It is proposed that about 20,000 ha, of which more than 90% falls in the district, will be irrigated by using the river water of Söndu and Nyando. Under the year-round irrigated condition, double cropping of maize, rice and other crops will be carried out.

The Master Plan fully takes this irrigation development into consideration. Under the proposed irrigation project, the agriculture in the district will be drastically improved with significant increase in crop yields and cropping intensity. The yield of maize can be increased from 2.0 tons/ha to 5.5 tons/ha not only through intensification, but also as a result of expansion of maize field which would allow better farm management and farming practices. The total expansion is to be 15,000 ha within the irrigation scheme. Besides,

sorghum and beans will be expanded with 4,000 ha and 2,000 ha respectively. Irrigated rice will be established with 15,000 ha, capitalizing on the experience gained through the past operation of Ahero Scheme.

There are 1,000 heads of grade cattle, 161,000 heads of local cattle and 69,000 heads of sheep and goats in the district amounting to 126,000 LU's in total. In contrast, the total feed availability remains at 82,000 LU's equivalent even under the assumption that natural grass coverage is fully utilized for grazing. In order to overcome such feed shortage, 11,000 ha of fodder crops will be expanded in and around the proposed irrigation scheme. The total feed availability will increase up to 155,000 LU's equivalent by 2005.

Siaya

The Master Plan places the priority on food production. Under Sugarcane Zone (LM1) and Marginal Sugarcane Zone (LM2), 30,000 ha will be reclaimed for food crops. Moreover, the current efforts for rainfed rice will be further intensified in the low-lying swampy land of 3,000 ha.

As mentioned in SP1, 50,000 ha of new planting of Robusta coffee are scheduled by 2000 under the national coffee expansion programme. SP1 recognizes the high potentiality for Robusta in both western and coastal areas of Kenya, and the Master Plan endorses such a position. The total area allocated to the district is 10,000 ha accounting for 20% of the national target. The proposed area is to be selected in Ukwala and Yala divisions along the boundary with Kakamega district. In addition, 1,000 ha of cotton are also expanded mainly in Bondo division.

Livestock development in the district is facing feed shortage. For 179,000 heads of local cattle and 47,000 heads of sheep and goats equivalent to 136,000 LU's, only 120,000 LU's equivalent of feed are available. To stabilize feed supply as much as possible, 7,000 ha of fodder crops will be expanded. The feed availability is expected to increase from 120,000 LU's to 168,000 LU's equivalent to cover 74% of the total feed requirement in 2005.

South Nyanza

The Master Plan proposes the expansion of food crops in the area surrounding the intensively cultivated Rongo and Migori areas. In addition, the flat patches of lowlands located on the Lake shore i.e. Homa Bay, Mbita and Karungu will be newly cultivated. The total expansion is 62,000 ha consisting of 47,000 ha of maize, 8,000 ha of beans and 7,000 ha of sorghum under Marginal Sugarcane Zone (LM2).

PIU of Nyanza Province is expected to implement the small scale rice irrigation projects in Oluch-Kimila valleys abstracting the river water from Awach Kibuon and Awach Tende. In total, 4,000 ha of irrigated rice will be newly established.

Cash crops will also be expanded. In the south of Migori, i.e. Nyanome, 5,000 ha of sugarcane will be introduced along C13 road. In addition, 3,000 ha of cotton will be expanded in the central part of district along C18 road under Cotton Zone (LM3).

Although 432,000 heads of local cattle and 105,000 heads of sheep and goats are extensively raised, population of grade cattle is limited at 1,000 heads. Under the Master Plan, dairy cattle raising is emphasized. Through multiplication of grade cattle from 1,000 heads to 5,000 heads and improvement of milking yield of local cattle by introduction of crossbred with grade cattle, milk production will be increased from 10,000 tons to 146,000 tons. The main dairy zone will be situated in Rongo and Migori. For stabilizing feed supply, 12,000 ha of fodder crops will be developed.

Bungoma

The Master Plan proposes the expansion of 17,000 ha for food crops which consists of 12,000 ha for maize, 3,000 ha for beans and 2,000 ha for rice. Main expansion of maize and beans will be performed in the south-west of Chwele along the existing maize fields. Rainfed rice will be expanded for 2,000 ha in the southern part of Sirisia division, i.e. Malikisi.

Expansion for cash crops will be promoted primarily with Arabica coffee and sugarcane. In consideration of catchment conservation especially in the upper catchment area of Nzoia River as well as land suitability, Arabica coffee would be expanded in about 4,000 ha on the footslopes of Mt. Elgon. Sugarcane will be expanded for 10,000 ha in the area surrounding the existing fields for Nzoia Sugar Factory.

Dairy farming is prevailing in the district for producing 10,000 tons of milk, and some 3,000 ha of managed pasture and 13,000 ha of fodder crops are maintained. In view of the high potential productivity of feed, no expansion of pasture is planned under the Master Plan. Through intensification of pasture maintenance, its carrying capacity can be improved from 3.7 LU's/ha to 4.8 LU's/ha. Fodder production will also be enhanced from 3.7 LU's/ha to 5.8 LU's/ha. This would enable to increase the total feed availability from 43,000 LU's to 89,000 LU's equivalent in the existing managed pasture and fodder fields. Supported also by the LBDA dairy cattle multiplication center at Sangalo, milk production will be increased from 10,000 tons at present to 71,000 tons by 2005.

Busia

The Master Plan proposes the further food production and the introduction of Robusta coffee in the district with a total extent of 33,000 ha. About 20,000 ha of food crops will be expanded in Malaba and Matayo under Marginal Sugarcane Zone (LM2). The central part of the district, which is highly suitable for agriculture under Sugarcane Zone (LM1), will be developed with Robusta coffee. The proposed expansion amounts to 10,000 ha. Moreover, cotton will be further expanded along the district boundary with Bungoma, i.e. Malaba-Malakisi zone. The total expansion is 1,000 ha under Cotton Zone (LM3). Rainfed rice will also be developed for 2,000 ha of low-lying flat land, i.e. river valley bottom, under LM3.

Kakamega

Under the Master Plan, 59,000 ha of agricultural land development are proposed in the district. Maize of 14,000 ha and beans of 8,000 ha will be expanded surrounding the

existing maize and beans field in Malaba under Marginal Sugarcane Zone (LM2) and in Lugari under Sunflower Maize Zone (UM4). By attaining the target yield of 4.0 tons/ha, maize production in the district is expected to increase from 197,000 tons at present to 317,000 tons by 2005.

Sugarcane area of 11,000 ha will be expanded along the eastern fringe of the existing sugarcane fields. Arabica coffee and tea will also be expanded for 2,000 ha and 7,000 ha respectively near the existing fields surrounding the Kakamega Forest. The new plantation of Robusta coffee will be introduced in the eastern district with a total area of 11,000 ha. This is a part of the new Robusta zone of 32,000 ha to be established in Kakamega, Busia and Siaya. Fruits and vegetables will also be expanded with 3,000 ha under the Horticultural Extension Project.

Kakamega is a large dairy zone in Western Province. With 25,000 heads of grade cattle and 207,000 heads of local cattle, 22,000 tons of milk and 3,000 tons of beef are produced accounting for 65% and 50% of the total production respectively in Western Province. Through intensification of feed production in the existing managed pasture (2,000 ha) and fodder fields (23,000 ha), livestock production will be further promoted in the district. Although no expansion of feed producing fields is planned under the Master Plan, the district has a capacity to increase the milk production from 22,000 tons to 91,000 tons.

Elgeyo Marakwet

The Master Plan proposes, first of all, the establishment of the well-planned forest conservation programme and second the further increase in food and milk production. In total, 2,000 ha of maize fields and 2,000 ha of fodder crops will be expanded, mainly in Central division, i.e. Iten to Tambach.

Kericho

The land development for the district should carefully consider the conservation of upper catchment area of Sondu River. For this, no expansion of managed pasture and fodder crops area is planned, and cash crop expansion is planned only for tea and coffee. These cash crops involve the least soil erosion and other environmental problems. Replacing a portion of indigenous forest with tea does not adversely affect either rainfall or the environment, provided that ground cover is complete as described in SPI. Planting of Arabica coffee under shade of trees, a kind of agro-forestry, is one of the best means for protecting soil.

The Master Plan proposes the expansion of maize, sorghum and beans production. It is planned with 25,000 ha of expansion to increase these food crops from 176,000 tons to 564,000 tons by 2005. About 5,000 ha of wheat will be introduced in the south of Bomet under Wheat-Barley Zone (LH3).

On the basis of the long experience of tea industry, new plantation of tea will be established around the existing tea plantation. About 7,000 ha of Kablango, Litein and Kapkatet will be developed for this. This expansion corresponds to 16% of the target set by the national tea expansion programme for 2000.

Arabica coffee will be newly introduced in Roret and its north under Tea-Coffee Zone (UM1). The total expansion is to be 4,000 ha. Expansion of horticultural crops will be encouraged in the district. Several kinds of horticultural crops should be newly planted, considering the marketability of each. Passion fruit is one of the promising crops.

The district is the most developed zone of dairy farming in the Region. The total milk production of the district is 156,000 tons accounting for 31% of the regional production. It is expected that the carrying capacity of the managed pasture will be increased from 2.7 LU's/ha to 3.5 LU's/ha and the productivity of fodder crop from 2.7 LU's/ha to 6.6 LU's/ha. With this improvement of the existing feed sources, the grade cattle will be multiplied from 217,000 heads to 290,000 heads to increase milk production to 337,000 tons. No expansion of managed pasture and fodder crops area is planned as mentioned above.

Nakuru

The Master Plan gives the highest priority to the conservation of natural forests for watershed management. However, to take advantage of the good potential under Pyrethrum-Wheat Zone (UH2), a maximum of 10,000 ha is planned for maize expansion.

Dairy cattle raising is prevailing in the district. It is estimated that approximately 15,000 heads of grade cattle and 28,000 heads of local cattle distribute in the LBDA portion. Some 11,000 tons of milk and 2,000 tons of meat are produced.

Through the promotion of zero-grazing, intensive dairy farming will be encouraged. Grade cattle will be multiplied from 15,000 heads to 49,000 heads to attain the milk production to 56,000 tons by 2005. For this purpose, 5,000 ha of fodder crops will also be expanded.

Nandi

The Master Plan proposes, first of all, the further promotion of milk production in the district. Through expansion of 7,000 ha for fodder crops, 37,000 heads of grade cattle are reproduced. For such expansion, Tea-Dairy Zone (LM1) around Kapsabet will be devoted. Raising 170,000 heads of grade cattle and 45,000 head of improved local cattle i.e. crossbred with grade cattle, milk production will be increased from 75,000 tons at present to 245,000 tons by 2005.

The Master Plan also proposes to increase food and cash crop production. For maize and beans, 15,000 ha and 2,000 ha respectively of the district land will be newly reclaimed. The main expansion area is planned to locate along the eastern side of Tinderet Forest extending from Kaiboi to Kapsabet, and the northern portion of Nandi Hills. This area falls in Wheat/Maize-Pyrethrum Zone (LH2). In addition, 10,000 ha of wheat are planned to be expanded on the flat terrain in the north-eastern portion of the district, i.e. Masop division.

In Tea-Coffee Zone (UM1) and Tea-Dairy Zone (LH1) around Southern Tinderet Forest, 3,000 ha will be selected for tea plantation. Arabica coffee will be expanded in the south of Southern Tinderet Forest with a total area of 9,000 ha under Tea-coffee Zone (UM1). The

expansion for these cash crops will be the best means for the conservation of upper catchment area of Yala River, while contributing to economic growth.

About 5,000 ha of horticultural crops will be expanded within maize expansion area. The increased production of fruits and vegetables seems very promising, as Nandi district is located between Kisumu and Eldoret, two major markets.

Narok

The Master Plan proposes the further food and milk production in the district. Taking account of possible adverse effects to wildlife in Masai Mara, however, the intensive agricultural development is not considered in the Mara river basin. Only to the limited scale, tea plantation will be introduced to the perimeters of Western Mau Forest. Therefore, Kilgoris division will be central for the future agricultural development in the district.

Along the district boundaries with Kisii and South Nyanza, 12,000 ha will be newly reclaimed for maize, sorghum and beans. Although Arabica coffee and tea can be developed in this area, the expansion will be limited for the next 20 years.

Since a carrying capacity of natural grassland is low at 0.3 LU/ha, only 136,000 LU's equivalent of feed are available for the total feed requirement of 207,000 LU's. For making up with the pasture shortage, fodder crop production will be encouraged. Semi-zero grazing will be promoted by developing 32,000 ha of fodder crops for 185,000 LU's equivalent.

Trans Nzoia

The Master Plan proposes the further production of maize, wheat and milk. For maize, 10,000 ha will be expanded in and around Kitale town. Wheat production prevailing on the footslopes of Mt. Elgon will be further expanded with a total area of 10,000 ha around the existing fields in Kwanza division. Arabica coffee will also be expanded in this division with a total area of 1,000 ha under Main Coffee Zone (UM2). Agro-forestry of citrus trees will be developed to a certain extent.

The district raises 74,000 heads of grade cattle and 36,000 heads of local cattle to produce 53,000 tons of milk and 3,000 tons of beef accounting for about 10% of the total production in the Region. To stabilize the feed supply to grade cattle, 10,000 ha of fodder crop field will be developed. This would enable to increase population of grade cattle from 74,000 to 120,000. As a result, milk production will increase to 129,000 tons by 2005.

Uasin Gishu

The Master Plan proposes to promote maize, wheat and milk production in the district. About 16,000 ha of maize will be expanded in and around Kipkabus under Pyrethrum-Wheat Zone (UH2) and in the southwest of Turbo under Sunflower-Maize Zone (UM4). Wheat will be expanded from the north to the south of the district with a total area of 19,000 ha. The annual production of wheat will attain 342,000 tons. This amount

corresponds to 86% of the target national production in 2000, while the national wheat demand is projected by SP 1 to reach one million tons.

Feeding 133,000 heads of grade cattle and 89,000 heads of local cattle, the district produces 95,000 tons of milk and 5,000 tons of beef accounting for 19% and 9% of the total amounts respectively in the Region. The present production is supported by 12,000 ha of managed pasture and 4,000 ha of fodders.

Milk production will be encouraged through both intensification and expansion of fodder crop production. In order to perform multiplication of grade cattle from 133,000 heads to 170,000 heads by 2005, the additional 13,000 ha of fodders are to be expanded in the whole district. Under such a condition, milk production will be increased from 95,000 tons to 195,000 tons.

West Pokot

The Master Plan proposes the multiplication of grade cattle from 5,000 heads to 16,000 heads in order to increase the milk production from 4,000 tons to 19,000 tons. Planned for this purpose are the improvement of carrying capacity of existing managed pasture and expansion of fodder crops with 3,000 ha.

It is estimated that 8,000 ha of the agricultural land are used for crop production, i.e. maize and wheat. The expansion of 3,000 ha for these food crops is proposed by the Master Plan.

4.2 Development Schemes and Projects

A variety of measures are conceivable as means for attaining the development targets as set for the Region by the socio-economic framework (Section 3.3). These measures can be classified broadly into 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. Implementation of the development projects by the public sector would also induce private sector activities.

These measures consist of those which are already taken or included in existing plans and programmes and those which are newly proposed by this Master Plan. It is assumed that the former will continue to take effect even without this Master Plan, including the inducement of private sector activities. If no additional development activities are taken, however, the Region's development will be nothing greater than indicated by the trend projection (subsection 3.3.1).

The additional measures to be taken by the public sector in order to attain the envisioned targets are stipulated by this Master Plan. They consist of a set of eight area development schemes with projects and an integrated rural development project presented in this section and institutional measures to complement the project implementation summarized in subsection 4.3.3.

4.2.1 Area development schemes

The potential development areas identified in subsection 4.1.1 are viewed in the light of general land capability analyzed in subsection 4.1.2, as well as existing conditions and development potentials described in Chapter 2 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, where major development efforts should be devoted in the coming two decades (see Figure 4.4).

A development scheme conceived for each of these areas is presented below, including the background and basic concept, purposes and projects. Projects included in each development scheme consist of main projects which are called Master Plan projects and other related priority projects (see Figure 4.5). Some of the main projects are called project complexes, which are sets of mutually inter-related component projects. Informal sector activities which are likely to be induced as a result of implementing each project complex are also suggested.

(1) Integrated Lake shore development

Background and basic concept

This development scheme is meant to develop the area around the Winam Gulf as an indivisible unit. The area includes Kisumu municipality, the largest urban center in the Region. Nyando and Sondu are two major rivers draining through this area into Winam Gulf, bringing in nutrients as well as large amounts of water and sediments. The concern has been raised over pollution of Lake water especially in Winam Gulf (Section 7.2, Sector Report).

For this area, recycle-oriented development is conceived, where the water body of the Gulf would function as a buffer to minimize possible adverse effects of development. Fishery and tourism, being recycle-based activities, should be promoted. Agricultural development in the area would have to depend in part on irrigation as the area is a "rain-shadow", but proper farming practice together with irrigation and drainage should have positive effects on the Lake water quality. Effluents from industries to be newly established should be treated to a sufficiently high level in view of turn-over rate and assimilative capacity of the Gulf with recycling of water if necessary, and commercial and other service activities should be more encouraged.

Purposes

To increase and sustain fishery production in the area by promoting Lake fishery with appropriate technologies and by establishing fish farms;

To protect and enhance Lake water quality and Lake shore environment, while utilizing productive capacity of the area; and

To promote tourism in a longer run.

Projects

This development scheme consists of the following main projects.

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

The fishery complex project will establish fishery centers along the Lake shore, where marketing and research/training facilities, ice plants and cold stores will be provided to support Lake fishery and aquaculture. Fishing ports may be upgraded, if necessary, and processing plants for fish meal and fillets will also be established at selected centers. The research/training facilities may be combined with the operation of fish ponds, some of which may also serve for fingerlings production. Artificial feed plants will be established not only for these demonstration ponds but also for encouraging various forms of fish culture by individuals (Chapter 3, Report on Preparatory Study). Existing fishermen's cooperatives will be made instrumental for provision of these services (see subsection 4.3.3). Traditional methods of fish processing in informal sector by sun-drying and smoking would be improved, if proper marketing channels are established through implementation of this project, supported also by other informal sector activities such as packaging and labeling. Fishing gears industry and boat workshops will be induced in both formal and informal sectors.

Smaller fishery towns/villages will be inter-connected with the centers by improved networks of access roads. Access to Asembo (C28) and to Mbita (C19) will be bituminized and other roads of class D or E will be improved.

The Lake shore irrigation project consists of relatively small irrigation schemes along the Lake shores for effectively utilizing productive capacity of the area, which is currently constrained by the lack of reliable water supply. This project is described in more detail in the Report on Preparatory Study (Chapter 1).

The Lake transport improvement project is meant to serve both fishery and tourism activities. It includes the replacement of tugboats, upgrading of major ports, introduction of a sight-seeing boat and improvement of wagon ferry. Lake Victoria cruise is envisioned as a key to integrating tourism activities along the Lake shore in a longer run (Section 6.3, Sector Report).

A range of service activities will be induced in both formal and informal sectors as the tourism in the area develops. In utilizing cultural value of the Region as added attractions for tourists, cultural centres may be established, incorporating folklores, traditional dance troupes, and handicrafts by joining the efforts of formal and informal sectors.

In Phase 1, three fishery centers should be established, including the one already planned at Mbita, South Nyanza. Candidate sites in Siaya district are Usenge and Asembo. Access roads around these centers should be improved. Replacement of tugboats should also be

done in this phase. Those irrigation schemes of the Lake shore irrigation project identified as more promising, e.g. Oluch and Kimira schemes should be implemented in Phase 1.

Other projects related to this scheme are water-based recreation facilities, bird sanctuary in marshy areas, tourism accommodation, and preliminary exploration of rare earth and niobium minerals in Homa Bay area. Also the current efforts of monitoring Lake water quality should be intensified in this phase so that development options in the subsequent phases conceived by this scheme will properly reflect this aspect.

(2) East-west corridor development

Background and basic concept

Certain accumulation of economic activities already exists in the area with Eldoret municipality, Bungoma town and a few other secondary towns. The area has in its hinterlands productive agricultural lands. Maize, wheat and timbers are produced in the hinterland of Eldoret. Portions of Busia, Kakamega and Nandi districts close to the corridor produce a variety of food and cash crops, including maize, beans, coffee, cotton, sugarcane and horticultural products. Further accumulation of economic activities along this corridor would have far-reaching effects on the development of the interior too, if infrastructure and other services are concomitantly improved.

Purposes

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

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

Projects

This scheme is composed of the following main 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

The coffee complex project includes the expansion of Robusta coffee mainly in Siaya, Busia and Kakamega to establish an instant coffee factory as well as expansion/rehabilitation of Arabica coffee in Bungoma for high utilization of existing processing capacity. Provision of seedlings is the main instrument for these activities. A research program on Robusta coffee should also be promoted by Coffee Board. Associated industries such as packing materials, printing and can making will be induced along the corridor in both formal and informal sectors. Utilization of coffee husks for making charcoal is another informal sector activity to be induced.

The horticulture complex project is planned first for the expansion/rehabilitation of passion fruits production and the introduction/intensification of other horticultural crops, and second for fruits and vegetables processing and canning. Candidate crops include citrus fruits, French beans, tomatoes and other vegetables. Production of seeds and seedlings and a market information center for various horticultural crops will be main instruments for encouraging farmers to produce more horticultural crops of different kinds. Informal sector activities will be involved in packing, printing and labelling related to processed goods and also dehydrated vegetables produced by informal sector.

Trunk road improvement and corridor expansion projects aim at broadening the area of high economic performance along the national trunk road A104 in line with the national policy of rural-urban balance. Inter-linkages between secondary towns and between the corridor and its hinterlands will be improved.

Eldoret water supply project is planned to be implemented in stages. First, the current severe water shortage has to be alleviated by urgent measures. Second, the water supply for this major municipality has to be much expanded by major development of water sources so that it will continue to lead the economic development of the area. (details in Section 7.5, Sector Report).

In Phase 1, the Robusta coffee production will be increased to about 5,000 tons per year to prepare for the establishment of an instant coffee factory at the beginning of Phase 2. For this, about one million seedlings have to be provided a year starting from 1989. A fruits and vegetables processing and canning plant should be established in this phase at some 2,000 cans per day capacity based on existing raw materials, e.g. passion fruits and French beans. It should be located somewhere between Webuye and Turbo. Overlay of A104 and bituminization of C33 (Bungoma - Chwele) and C42 (Chwele - Kimilili) should be implemented in Phase 1, as well as stage 1 of Eldoret water supply.

Other projects related to this scheme include storage facilities for maize and wheat to be much expanded in the hinterland of this area, Webuye Falls and Teremi mini-hydro and water supply for Bungoma and other secondary towns.

(3) Kisumu-Eldoret dual core development

Background and basic concept

From a viewpoint of inter-regional balance, a certain degree of accumulation of population with economic activities in larger urban areas within the Region would be necessary in order to attract people moving out of the rural areas to stay there. However, Kisumu municipality alone would not be capable of having sufficient population accumulation, given the present size of the city and in view of environmental constraints suggested under the scheme (1) above. Eldoret municipality, located just about 100 km north-east of Kisumu, has advantages in that it is situated on the trunk road, served also by the main railway line, and in the catchment of Nzoia River draining into the main water body of Lake Victoria, although it faces a severe water shortage at present.

More advanced manufacturing activities would have to find their locations either in Kisumu or Eldoret together with associated service activities. Kisumu should be equipped with more commercial and other service activities. The latter would include some higher order functions such as the function of a conference/ communication center complementary to Nairobi and that of an education/ technology development.

Purposes

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

To contribute to minimizing the drift of people out of the Region by providing the area with a variety of functions to attract people.

Projects

This scheme consists of the following infrastructure and utility 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

No project in production or service sectors is planned as a main project, considering existing accumulation of economic activities and strategic locations, which would induce further establishments of various production and service activities, provided that the provision of infrastructure and utilities is improved.

Kisumu airport improvement project consists of the overlay of runway, apron expansion and a new passenger terminal in stage 1, as already planned by Ministry of Transport and Communication, and further upgrading to make it an international class airport in stage 2. Kisumu-Eldoret highway upgrading project includes the overlay of A1 (Kisumu-Kakamega) and the provision of a climbing lane on A1 (Kiboswa-Chavakali). Kisumu municipality water supply and sewerage project will be implemented in stages. Nandi Forest multipurpose dam is planned to divert a part of Yala River water toward the Kano Plain for hydropower generation, water supply and irrigation. (Section 7.5, Sector Report for latter projects)

As this scheme aims at encouraging further accumulation of various economic activities in these two municipalities, proper measures have to be taken in due time to protect the environment. They include the establishment of a monitoring system for industrial effluents and ambient water quality, and introduction of discharge standards and regulations related to industrial location and urban land use. Other important projects related to this scheme are woodfuel plantations to supply charcoal to urban areas, Eldoret water supply listed under the scheme (2), Kisumu urban development, Kisumu by-pass (A1) and Eldoret by-pass (A104).

(4) Northern growth center development

Background and basic concept

The weak north-south development axis in the Region is due to relatively sparse population in the north and the south, and the paucity of interactions with the outer territory in the north and the international linkages with Tanzania in the south. As a step toward strengthening these inter-regional and international linkages and stimulating north-south communication, major growth centers can be created in the northern and southern areas of the Region.

Kitale municipality would naturally serve as a core of this growth center, inter-connected with Kapenguria in West Pokot and a few other secondary towns along the district boundaries of Trans Nzoia with Uasin Gishu, Kakamega and Bungoma. This area is highly productive with a wide range of agriculture, livestock and forestry activities.

Purposes

To promote the development of the northern area by

- 1) intensifying livestock production,
- 2) encouraging agro-forestry, and
- 3) improving road links between productive hinterlands and distribution centers for products and also along the northern borders for tourism-related activities; and

To contribute in a longer run to the strengthening of north-south communication in the Region and interactions with the outer territory.

Projects

This development scheme is composed of the following main projects.

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

The first two projects are in fact programmes - i.e. sets of projects and other measures.

The livestock improvement project is planned to further increase the milk and beef production in the area. However, in view of existing facilities and well-established livestock farms in the area, the emphasis is placed on supporting services. Main components are rehabilitation of dips, increased staffing of farmers' training centers, intensive ticks and disease control programmes, a livestock breeding stock testing station, a public auction market with weighing scales, stud bull service for remote rural areas and a research/extension center for inoculation, quality control and other supporting activities. Improvement of access roads will also be necessary particularly to facilitate milk collection. To make use of excess milk currently wasted due to insufficient transport facilities, small dairy plants may be established. Some of them in rural areas will be induced in informal sector to produce cheese by conventional methods.

The agro-forestry and soil conservation project is a package of measures for watershed management compatible with production activities. Arabica coffee and citrus fruits should be expanded by increasing the supply of seedlings. Soil conservation measures include afforestation at individual farm level and extension service for better farming practices.

In addition to the improvement of rural access roads, key secondary roads should be upgraded to perfect a transportation network in the northern area under the road links improvement project. They include C44 (Endebass - Turbo) and C48 (Kitale - Kapeherop).

Other projects related to this scheme are improvement of accommodations for Mt. Elgon and Saiwa Swamp National Parks, expansion/intensification of maize and wheat and more grain storage facilities. Small-scale processing of milk into cheese and coffee are among the informal sector activities to be induced in rural areas.

(5) Southern growth center development

Background and basic concept

This development scheme is based on the same concept as described in the scheme (4). Migori town, although relatively small at present, would serve as a core of this growth center, but inter-linkages with other towns in the north such as Rongo, Ogembo, Kisil and Keroka, would also be important.

The area around Migori includes more fertile lands compared with other parts of South Nyanza and project areas for rain-fed rice. Also a few livestock centers are either being operated or planned. It also holds a strategic position between Masai Mara national reserve and potential tourism resources in and around Lake Victoria. In view of relatively small population in the area, settlement schemes may be a prerequisite.

Purposes

To promote the development of southern interior area by

- 1) much intensifying livestock production,
- 2) establishing a few strategic cash and food crops, and
- 3) improving access roads; and

To contribute in a longer run to the strengthening of north-south communication in the Region and international linkage with Tanzania by establishing a growth center.

Projects

This development scheme consists of the following main projects.

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

The pig industry complex project is planned to establish breeding centers for distributing pigs to contract farmers with the concomitant provision of extension services. Meat processing and blood and bone meals factories will also be included in this complex to process pigs to be purchased from the farmers. Tannery, hides and skins, and leather goods industries will be subsequently introduced. These processing industries will constitute an integrated slaughtering and processing center for effective utilization of all the raw materials, which in turn will contribute to minimizing adverse environmental effects due to discharge of organic materials. Feed production may also be combined to serve both livestock and fishery production (Chapter 3, Report on Preparatory Study). Production of animal feeds and manure may be induced at individual farm level as informal sector activities.

For more effective implementation of this project, a scheme for integrated contract farming systems should be introduced for small-scale farmers (Section 2.3, Sector Report). Within this scheme, farmers would raise combinations of small animals including hogs or also fish with home-grown or locally available feeds. Extension and other services would be provided to them through farmers' cooperative societies, covering the following.

- Extension services for farming practices most suited to each scale of operations,
- Supply of rearing stock, e.g. feeder pig and chicks,
- Arrangement of credits,
- Supply of construction materials for stalls, fish ponds etc.,
- Veterinary services and other technical activities,
- Purchase of animals ready for marketing at uniform and standard prices, and
- Research on locally available feed resources such as cowpeas, soybeans, rice bran, cassava, sweet potatoes, bananas and others.

The cotton and oil crops complex includes as primary production activities the production of cotton by rehabilitation/ expansion of cotton area and oil crops and their processing activities. In addition to ginning and spinning, cotton products industry will be established to produce sanitary cotton and possibly other products too. Oil crop processing will include oil milling, refining and canning/bottling. Existing oil crops such as maize and groundnuts are used as raw materials at the initial stage, but later other crops will be introduced or enhanced, including cotton seeds. Oil mill residues will be used as inputs to the animal and fish feed plant. To support these activities, a cotton research and extension center should be established associated with the Lambwe Valley Cotton project implemented by LBDA. Seeds production for oil crops will be another supporting activity.

In association with these activities, various activities will be induced both in formal and informal sectors such as packing materials for pig industry and cotton products, printing and packing, and feed collection. Institutional arrangements will be required to establish proper marketing channels for new products, and involvement and functional divisions of LBDA, East African Industries Ltd., Cotton Lint and Seed Marketing Board and National Cereal and Produce Board have to be clarified (see subsection 4.3.3).

The southern interior transport network project consists of upgrading of several road sections mainly for improving the communication within the area as well as the access from outer areas to facilitate the distribution of inputs and outputs of agriculture and livestock

production. It will also contribute to tourism development by improving the access to Masai Mara game reserve, and in a longer run by connecting Masai Mara to other tourism objects in and around Lake Victoria such as Ruma National Park and other small game reserves, bird sanctuaries and parks. In this way, the formation of Western Kenya tourism circuit is envisioned (Section 6.3, Sector Report).

On-going rain-fed rice project by LBDA is complementary to projects of this area development scheme. First, it will be supported by the southern interior transport network project, which will facilitate the procurement of production inputs and the marketing of products related to the rain-fed rice project. Second, increased rice production will provide more agricultural waste to be used as a feed source and possibly additional raw material for planned oil mill, too. Rongo area is one of the candidates for a feed compounding plants, strategically located between Kisii where the first pig industry complex is planned and Homa Bay where a fish filleting plant may be located (Chapters 2 and 3, Report on Preparatory Study).

Other projects related to this scheme are the following. Namba Kodero dam and hydropower are planned on the Kuja River with the diversion of additional water from the Migori River by using the existing Gogo Falls dam. Lower Kuja irrigation can also be developed (Section 7.5, Sector Report). In connection with the rain-fed rice and lower Kuja irrigation projects, more grain storage facilities will be required. Agro-forestry is another important activity to protect hilly areas from erosion.

In Phase 1, pig breeding centers and associated facilities will be established with 500 sows initially to be increased to 2,500 by 1993. A cotton research/extension center will be established together with the expansion of the Lambwe Valley cotton area, and ginneries and a spinner. First phase development of oil mill should be at some 3,500 tons per year based mostly on existing crops. Oil mill residues will be incorporated in the animal feed industry project to be implemented in Phase 1 (Chapter 3, Report on Preparatory study). The road sections of C13 (Kilgoris-Lolgorian) and C17 (Lolgorian-Mara Bridge) will be improved.

(6) Western frontier development

Background and basic concept

Two districts in the west, Busia and Siaya, are comparatively less developed in the Region. Development of these areas is important not only for welfare of the people there but also for balanced socio-economic performance of the Region and active interactions with the neighbouring country as well as border security.

In view of less developed status of economy with sugarcane and cotton being only significant cash crops of Siaya and Busia respectively, introduction and establishment of new elements should be actively and deliberately attempted. Recent efforts to reclaim Yala Swamp for agricultural development may be conceived as a forerunner of this scheme.

Purposes

To vitalize the economy of the area along or near the border by establishing new economic activities, viz. pig and cotton industries; and

To improve access to the area for better procurement of production inputs and marketing of products.

Projects

This development scheme is composed of the following main projects.

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

The pig industry complex project in this scheme is essentially the same as the one described under the scheme (5). The cotton complex is planned to establish cotton production in Siaya and Busia as a new cash crop with its processing plants. Cotton products industry should be established in Phase 1, together with ginneries and a spinning mill, at some 200 tons per year of absorbent cotton. Proper arrangements have to be made between LBDA and CL & SMB for distribution of cotton and marketing of cotton products with the Government approval.

The access road improvement project is a set of component projects to improve road sections connecting urban centers in the area to outer areas. The subgrade improvement of the routes C29 (Siaya - Bungoma), C 30 (Busona - Bumala) and C31 (Mumias- Busia) will be implemented in Phase 1 to be followed by tarmaking of them in subsequent phases, in accordance with stage-wise construction scheme for all weather roads (Section 8.3, Sector Report). Graveling of the section C30 (Bumala-Koyonzo) will be implemented at a later stage.

Yala swamp agricultural development currently implemented by LBDA well conforms to this scheme, as it injects new elements into this less developed area. So far, about 2,300 ha (Area I) have been reclaimed and are under cultivation of seeds and seedlings. Area II (9,200 ha) and Area III (6,000 ha) will be reclaimed within the next decade or so. Effects of this project will go beyond this area development scheme. Seedlings of Robusta coffee are essential inputs to the area development scheme (2), seedlings of citrus fruits will serve a few area development schemes and a variety of seeds will be provided to support the expansion of food crop areas as planned.

Other projects related to this scheme include the rain-fed rice projects in parts of Busia, Siaya and Bungoma districts and lower Nzoia irrigation project by PIU. More marketing posts and distribution depots for agricultural inputs would also be necessary as well as storage facilities.

(7) Eastern gateway development

Background and basic concept

The main route entering the Region from other parts of the country passes through the large tea estate area, providing magnificent landscape for those travelling by car. This scheme aims first at enhancing the attractiveness of the Region and second at helping to open the southern interior. Central parts of Kericho district are favoured with good climate, existing tourism facilities and Mau Forest. If these conditions are effectively utilized with complementary development efforts, the area can attract more people for tourism, both domestic and international. Further development of this gateway area may also lead to the establishment of a new primary road, leading from Kericho, through Kisii and all the way to Migori, contributing to the development of the less developed interior in the south.

Purposes

To enhance the attractiveness of the gateway area by promoting tourism; and

To contribute to the opening-up of the southern interior of the Region.

Projects

The main projects of this development scheme are the following.

7.1 Tourism complex project

7.2 Gateway road improvement project

The first step to implement the tourism complex project is to conduct a comprehensive study of tourism in the area in order to identify the portion of Mau Forest to be designated as a national park and also sites for sport fishing and routes for trekking and other opportunities. Rehabilitation/expansion of existing tourism accommodations should be implemented in Phase 1. A few fish ponds should be established also in Phase 1 for demonstration and fingerlings production of trout. Introduction of new tourism facilities for sport fishing, trekking and other activities will follow in subsequent phases, together with the Kericho town beautification project. In a longer run, the Magwagwa reservoir on Sondu River will offer another major possibility for tourism development, including domestic tourism.

The gateway road improvement project is planned not only to serve tourism in the area but also to lead the development toward the southern interior of the Region. In addition to minor rehabilitation of road sections on B1 (Mau Summit-Kericho), sections of C21 (Chemosit-Kisii) should be upgraded. A major part of on-going construction work between Tinga and Chemosit will be completed in Phase 1, and the rest will be done in Phase 2.

Other important projects to be implemented in the area include rehabilitation/expansion of tea areas and a cement plant to be newly established at Koru with the initial capacity of 150,000 tons per year to be increased up to 200,000 tons per year by 2005. This is also an area where various informal sector activities can be induced by utilizing easily available local

resources, including agricultural wastes such as banana fibre for basketing, materials for pottery and roofing tiles and Kisii soapstone.

(8) Integrated Kano Plain development

Background and basic concept

Kano Plain has been known as the most promising area for irrigated agricultural development. Due to its strategic location in the center of the Region, close to Kisumu municipality, a careful approach should be taken to the development of the area. This scheme is planned to find out optimal use of water from multiple sources for irrigation in Kano Plain and surrounding area, while paying serious attention to flood control, protection of Winam Gulf water quality and other environmental aspects as well as existing land tenure system with many smallholders.

Purposes

To increase production of rice and other strategic crops by providing irrigation and drainage facilities;

To protect and enhance environment by controlling floods and sediment transport, conserving swamp areas, properly managing fertilizer use and other measures; and

To improve social capacity of smallholders by proper organization and provision of extension services.

Projects

This development scheme consists of the following main projects.

8.1 Irrigation complex project

8.2 Sondu River multipurpose development project

8.3 Nyando River and Kano Plain flood control project

The irrigation complex project consists of production of rice and other crops under irrigation primarily with water to be diverted from Sondu River, and a package of supporting services. The latter include a research/extension center with rice seed multiplication, rice mill complex and other processing plants, on farm machinery hire service center, grain storage and marketing facilities, and distribution depots for agricultural inputs (Sections 1.3 and 1.4, Sector Report). Aquaculture in irrigation canals and ponds may also be incorporated in the scheme. Smallholders in the area will be organized into a cooperative, and all the supporting services will be channelled through it, including procurement and proper application of agricultural inputs and marketing of products.

The Sondu River multipurpose development project is a driving force for this scheme, providing irrigation water, power for pumping and processing, and opportunities for aquaculture and tourism in and around the reservoirs. As it is a major development project, involving large amounts of investment capital and other resources, stage-wise

implementation has to be taken as specified by its feasibility study. The first stage development of hydropower at Miriu with the diversion of water for irrigation of this scheme should be implemented at the earliest time to make the most of current momentum for project implementation, which in turn will induce the prompt implementation of subsequent development.

The flood control project is a prerequisite for full scale implementation of this scheme. Starting from drainage works in Kano Plain associated with the irrigation development, flood control works will be constructed on Nyando River, to be followed by the establishment of flood forecast and warning system combining village-level efforts and infrastructure for monitoring and communication to be provided by Government agencies.

Another important possibility in the area is the expansion/intensification of sugarcane production with water to be diverted from Nandi Forest dam in the scheme (3). Bagasse can be used for manufacturing wall-boards in informal sector or paper in formal sector together with sugarcane straw and papyrus reed.

In Phase 1, the initial stage of irrigation with Sondu/Miriu diversion should be completed with the establishment of a research/extension center, as well as Sondu/Miriu hydropower plant with some 48 MW. Irrigated area will be expanded to about 8,500 ha by 2000 and up to 15,000 ha by 2005.

4.2.2 Integrated rural development

(1) Background and basic concepts

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.

(2) Purposes

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

To complement the implementation of area development schemes.

(3) Some general guidelines for project formation

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**

Which components are more important depends on existing conditions and resources in each district or area. The following are meant only as some general guidelines for formulating an IRD project. First, a prime consideration should be given to increasing overall productivity of agriculture. Most frequently needed components for this at an initial stage of rural development include the provision of technology, extension, inputs, manpower training and feeder road network.

When the area's agriculture is less developed, emphasis should be placed on food crop production. In later stages of development, the increased intensity in agricultural services should contribute more to the improvement of overall farming systems, integration of crop and livestock production, incorporation of soil conservation and other more intensive and diversified activities. Once intensity of cultivation has increased and manpower and institutions developed, agricultural credit may become the major thrust of IRD.

Also at an early stage, some facilitative measures may be incorporated such as marketing services and group purchases of inputs. The initial emphasis should be on providing intermediate forms of services, including the improvement of roads and storage facilities and market information system. These measures would help to disseminate effects of IRD to a wider range of people including low-income ones.

Points calling for remedial measures at the national level as prerequisites to successful IRD should be clarified such as regulations related to land tenure systems; technology development and dissemination, marketing institutions and pricing policies.

(4) Possible institutional set-up

The procedure for planning and implementing an IRD project will be as follows.

- 1) Survey of the proposed project area,
- 2) Drawing up of a basic plan with a general project strategy,
- 3) Evaluation of the plan and approval with modifications, if necessary,
- 4) Preparation of a detailed plan,
- 5) Forwarding of the detailed plan for approval,
- 6) Implementation, and
- 7) Monitoring and post evaluation.

Initiative for an IRD project has to come from each district in accordance with the "District Focus" strategy with the LBDA support. Involvement of local communities should be ensured from the outset through their participation in DDC. The survey of the proposed project area (step 1) may be entrusted to indigenous consultants or researchers. Drawing up of a basic plan (step 2) in line with overall district strategy should in principle be the responsibility of DDC, but it should be assisted by technical guidance of LBDA. For this to be possible, planning capacity of LBDA itself will have to be much improved. This procedure of plan preparation would also provide opportunities for training district officers.

Evaluation and approval of the basic plan (step 3) represent a critical stage, as the plan has to draw wider attention by bringing visibility and prestige as well as adequate commitment of central authorities. An institution may be newly established for this purpose, but more practically the existing District Executive Committee for each district should be made instrumental with much consolidation of its functions and authority. After the approval, a detailed plan will be prepared again by district officers and planners with technical guidance by LBDA (step 4). Through this entire process of planning, district officers will serve as linkmen between related ministries.

For funding the implementation of IRD projects, more fund should be earmarked for rural development in the LBDA region possibly with donor contribution possibly of multiple sources. Although the appraisal and approval for funding (step 5) should be made by strict and fair criteria, the soundness of the plan to meet district needs should be warranted by the fact that each district is granted the fund at a price (i.e. loan). This will also help to make the IRD self-supporting and continuous by increasing a revolving portion of the fund.

Implementation (step 6) will be facilitated by active local participation, including self-help construction activities, if the public have been involved in the planning. Monitoring and post evaluation (step 7) should be conducted by LBDA, and the plan may be modified, if necessary. For this, certain degree of flexibility in operating the fund would be required.

4.3 Conditions for Development

4.3.1 Resources capacity

The development conceived by various development schemes presented in Section 4.2 would involve a range of resources. Most natural resources, e.g. water and related land resources, are subject to direct development activities, but others are more subtle and basic, being almost the premise of development. More important of those are investment capital, human resources and energy resources. General availability of these resources is examined to clarify the basic conditions, under which development activities are to be laid out.

(1) Investment capital

The amount of public and private investments which may be available for developing the LBDA region are roughly estimated, based on the projected GDP and GRDP and observed relationships between production and investment.

GDP and investments in Kenya

As a national framework for estimating regional allocation of investments, the following are taken.

- 1) Kenya's GDP will grow at the annual average rate of 5.6% to the year 2000 as specified by SPI, which will be sustained to 2005.
- 2) The gross investment in Kenya will be 25% of GDP, in accordance with the trend in recent past (see Table 4.2).
- 3) The total public investment in Kenya will constitute 8% of GDP, leaving 17% to be made up with by the private investment, also following the recent trend (Table 4.2).

Trend projection for the Region

Private and public investments in the Region are projected to 2005 under the trend and the scenario projections, respectively. At present, the share of public development expenditure allocated to the Region is about 25% of the total in Kenya. Assuming this share, the public investment in the Region corresponds to about 8.5% of GRDP of the Region. The private investment in the Region at present is assumed to be 14% of GRDP, slightly lower than the corresponding figure of 17% at the national level, considering the less developed status of the Region. These conditions apply to the trend projection, under which the GRDP of the Region will grow at the annual average rate of 3.6%.

Applying these figures, the cumulative investments in the Region for the next 20 year period are calculated as follows. The public investment would total to K£2,360 million and the private investment K£3,880 million to make the total investment K£6,240 million. Over this period, the GRDP will increase by K£998 million (from K£970 million in 1985 to K£1,968 million in 2005). This implies the incremental capital-output ratio (ICOR), an index for investment efficiency, during this period would be about 6.2.

Scenario projection for the Region

In order to attain much higher growth of the Region's economy under the Master Plan scenario, the investment efficiency must be much improved as well as increases in investments. At the national level, the ICOR value is expected to improve to about 4.5 by attaining 5.6% per annum growth with the same ratio (25%) of gross investment to GDP. The investment efficiency under the Master Plan scenario is assumed as this ICOR value of 4.5. The private investment would have to increase its ratio to GRDP, and 16% is assumed to approach the national average level.

Over the 20 year period, the GRDP is expected to increase under the scenario by K£2,120 million (from K£970 in 1985 to K£3,090 million in 2005). By applying the ICOR value of 4.5, the total cumulative investment would have to be K£9,540 million over the period.

Of the total, the private investment would be about K£ 5,650 million calculated as 16% of the GRDP for each year in the period. Thus the public investment would have to be about K£ 3,890 million to make up the balance.

The analysis above may be summarized in the following table.

	Increase in GRDP (ΔO)	Cumulative investments (ΔI)	ICOR ($\Delta I/\Delta O$)
Trend projection	K£998 million	K£6,240 million	6.2
Scenario projection	K£2,120 million	K£9,540 million	4.5

Regional allocation of investments

Public investment capacity and the allocation of development expenditure to the LBDA region are estimated for the planning period up to 2005. Based on the same assumptions as made above, the total cumulative public development expenditure in Kenya is calculated to be about K£12,000 million over the period 1985-2005. The cumulative amount of public development expenditure that the Region will need to attain the growth target under the Master Plan scenario is about K£3,890 million as calculated above. This corresponds to about 32% of the total public development expenditure available in Kenya in this 20 year period. That is, the allocation of public development expenditure to the Region will have to increase from some 25% in 1985 to slightly over 30% in 2005. The development expenditure of project implementing sectoral ministries is about 70% of the total, i.e. about K£8,400 million. As an estimate, the public development expenditure to be directed to project implementation in the Region is calculated as 32% of the total in Kenya or K£2,700 million over the period 1985-2005. This corresponds to about 10% of the GRDP expected to grow as shown above.

(2) Human resources

Labour demand

In formulating the socio-economic frameworks, employment opportunities to be generated were derived from value-added and employment coefficient (i.e. value-added per employment) for each of three broad sectors. Employment coefficients in 1985 were estimated from the relationships between value-added and employment in the past (see Table 4.3), and those in 2005 were determined by incorporating assumed increase in labour productivity of about 1% per annum in agriculture and manufacturing sectors. No increase in the average labour productivity was assumed for services sector, based on the recognition that this sector will include increasing number of labour-assimilating informal sector activities, although other activities in the sector will improve their labour productivity.

Estimated employment coefficients for 1985 and 2005 respectively are as follows.

Employment	(Unit: K£ per employment)	
	1985	2005
Subsistence and agriculture	270	330
Manufacturing and mining	2,350	2,900
Services	1,300	1,300

Number of employment opportunities available in 1985 and to be generated by 2005 under Scenario 3 are calculated respectively from estimated and projected GRDP (Chapter 11, Sector Report). The following summarize the results.

Employment	(Unit: 10 ³)	
	1985	2005
Subsistence and agriculture	2,260	5,310
Manufacturing and mining	30	110
Services	220	780
Total	2,510	6,200

Labour supply/demand balance

Labour supply can be estimated from the population in age group 15-59 years and the labour participation ratio. The ratio of working-age population to the total population is estimated to be 44.1% in 1985, which will increase to 50.1% by 2005 according to the population projection with age-sex distribution (see Table 3.4). The labour participation ratio is assumed to be 85% in 1985 and 82% in 2005, following SP1. The labour force coefficient,

which is the product of these two ratios, is calculated to be 37.5% in 1985 and 41.1% in 2005.

Calculated labour supply and its balance with the labour demand are summarized as follows.

(Unit: 10³)

	1985	2005
Population	8,116	16,700
Labour force coefficient	37.5%	41.1%
Labour supply	3,040	6,860
Labour demand	2,510	6,200
Unemployment ratio	17.4%	9.6%

Quality requirement

As the economy develops, a wider range of technical skills and expertises of higher quality will be required. Employment opportunities in the modern sector, presumably requiring quality labour, are expected to increase from 294 thousand in 1985 to 975 thousand in 2005. To be added to this is about 10% of employees in informal sector including owners/managers, also requiring high quality expertises. Thus the total demand for high quality labour is estimated to increase from about 500 thousand in 1985 to about 1.5 million in 2005 (Chapter 11, Sector Report).

On the supply side of quality labour, it is assumed that most of them would be provided by secondary school leavers. Assuming the enrollment ratio of 25%, additional high quality labour to be generated in the next 20 year period is calculated to be about 1.1 million, just sufficient to meet the demand. In order to sustain the 25% enrollment ratio, however, facilities of both primary and secondary schools will have to be expanded significantly. Under the Government policy of cutting public expenditure on education, major efforts will have to come from Harambee and other voluntary activities, which LBDA should promote, coordinate and support.

(3) Energy resources

Woodfuel

The energy supply in the Region depends heavily on woodfuel. Currently about 84% of the total regional demand is met by woodfuel, while in Kenya as a whole the dependency ratio is about 77% (Section 9.2, Sector Report). In Kenya as a whole, the household demand for woodfuel constitutes close to 80% of the total demand. Urban household demand for woodfuel is mostly for charcoal, while over 80% of rural household demand is for fuelwood. As the Region develops as planned, more fuelwood will be required to support the rural activities, while urbanization means higher demand for charcoal.

If the conservation measures are taken by the Central Government such as charcoal stove improvement, improved fuelwood use efficiency and improved kiln efficiency, the growth of demand for woodfuel can be considerably suppressed. It is expected that the total regional demand will increase from 9.5 million tons in 1985 to about 16.5 million tons in 2005, following the conservation case of projections by UNDP/World Bank (Energy Sector Management Assistance Programme; Section 9.2, Sector Report).

On the supply side, the current woodfuel demand is met by 3 million tons from the yield and the remaining 6.5 million tons from the stock. 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 plantation, about 9.5 million tons of woodfuel can be supplied by 2005 on a sustainable basis. This implies that the timber depletion rate in 2005 will be about 7 million tons, as compared with the current rate of 6 million tons. This will contribute greatly to delaying the timber depletion and gaining time for developing alternative sources of energy. Without these measures, the timber depletion rate would be as much as 13.5 million tons per year in 2005.

Other forms of energy

As described above, the demand for woodfuel is expected to grow at 2.8% per annum on an average. If the total energy demand grows at 3.7% per annum, following the population growth, the demand for other forms of energy would necessarily have to grow at the rates much higher than these rates. However, the demand for petroleum and coal will not grow at such high rates, considering the geographic location of the Region and the national policy for conserving petroleum products. Therefore, major efforts have to come from much expansion of power supply and utilization of biomass energy.

The electricity demand in the Region is expected to grow at about 7% per annum, much higher than the projections for the national grid. This will be supported by the commissioning of major hydropower plants in the Region, main ones being Sondu/Miriu, Magwagwa (both on Sondu River) and Nandi Forest (on Yala River). Increased utilization of biomass energy may be represented by briquetting of sawdust and other agriculture/forestry residues to serve urban areas. In rural areas, biogas digestors, solar photovoltaic generation and wind mills will substitute fuelwood to a limited extent together with direct use of biomass materials (Section 9.2, Sector Report).

4.3.2 Phasing

Implementation of the Region's development has to be planned by phase in accordance with the Region's roles in changing national socio-economy, as the expansion of resource base in the Region, as described in the previous sub-section, can also be realized over time. In this study, the planning period is broadly divided into the following 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.

In this sub-section, the shift in the Nation's development strategy is first outlined, and then expected performance of Region's development in each phase is examined within the general framework of such strategy.

(1) Shift in Nation's development strategy

The major departures from the previous development strategy introduced by SPI are in the following two aspects.

- 1) Structural adjustment of economy by shift away from direct Government involvement in manufacturing and other sectors, based on more market-oriented incentive systems; and
- 2) Further decentralization of planning and implementing authorities, in accordance with the District Focus for Rural Development.

Along these lines, two major production sectors, viz. agriculture and manufacturing, are expected to perform as follows in the next 15 years. First, agriculture will continue to lead the development of this rural-based economy, but production will be much intensified to stimulate also the growth of non-farm rural activities and employment. Three broad strategies will be pursued to achieve goals for agriculture.

- 1) More productive farm practices, especially wider use of improved varieties, fertilizers and other agro-chemicals, to be supported also by pricing and marketing policies and extension services;
- 2) Research into new varieties; and
- 3) Crop diversification in favour of export crops such as tea, coffee, cotton, oil crops and vegetables.

Manufacturing sector is expected to be re-structured in the next 15 years to become far more productive and attain rapid growth in order to serve five basic aims:

- 1) to expand and diversify Kenya's export base,
- 2) to create jobs,
- 3) to raise productivity,
- 4) to attract and generate indigenous Kenyan entrepreneurs and managers, and
- 5) to support and promote the development of agriculture and of rural areas.

The re-structuring is in the direction of encouraging three kinds of industry; viz. export-oriented manufacturing, efficient import substitution and small-scale employment-intensive ones.

(2) Region's development in phases

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 and credit schemes to encourage farmers to plant those crops.

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.

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 extend into less developed areas around secondary towns. This period should also result in much expansion of the Region's resource base consisting of development capital, energy and human resources.

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.

(3) Phasing of area development schemes

In line with the general phasing of Region's development described above, and taking account of basic conditions for development set by the availability of essential resources as examined in Section 4.2, development activities contained in each area development scheme are laid out in three phases. The results are presented in Table 4.4. Also shown in the tables are institutional measures to be taken in due time in order to complement the implementation of development projects (see subsection 4.3.3).

4.3.3 Institutional aspect

Implementation of development projects will have to be complemented by proper institutional measures so that the development targets set by this study will be most effectively met. Some institutional measures are related to particular development projects or sectors, and others are more general, serving a range of needs for regional development. Specific measures related to each area development scheme have already been presented (see Table 4.4). This section summarizes sector-related and other more general measures.

(1) Sector-related measures

Agriculture

In agriculture, the production increase in the Region as planned will be supported basically by continuing efforts along the line set by NEP which have just been initiated. In addition, the following points may be emphasized (details in Section 1.3, Sector Report).

1) Marketing systems

Strengthening of marketing systems will be needed for some agricultural products, especially for grains, cotton, oil crops and horticultural crops. Not only the streamlining of the national marketing boards such as National Cereals and Produce Board (NCPB) and Cotton Lint and Seed Marketing Board (CLSMB), marketing functions of cooperatives and private dealers should also be strengthened.

2) Financing systems

Agricultural credits have been provided through a number of formal and informal channels, but they do not effectively reach smallholders primarily due to high interest rates and conditions for eligibility. This should be rectified. A new credit scheme should be established for contract farmers to reduce their initial investment into 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.

3) Information services

Provision of proper information to a range of farmers is a prerequisite for more effective farming practices, which includes campaigns for high utilization of better varieties and existing facilities such as research and extension centers processing plants and farm machinery hire services. Also vital are meteorological information to allow timely land preparation and seeding and information on opportunities for new crops and markets. LBDA will be in the most appropriate position for establishing and operating such an information system.

4) Research and extension

Demonstration activities of LBDA in technological improvement for Region specific products should be further promoted, such as on-going nucleus farm operation in the Lambwe Valley Cotton Expansion Project and the rain-fed rice project. Coordination in expanding the production of groundnuts, another Region specific crop, would be another important role of LBDA, and the first step toward planning and coordination in processing the products into various commodities. More research emphasis should be placed on small holder farming practices including inter-cropping, and a Robusta coffee research station should be established in Busia or Siaya. Also seed and seedlings multiplication functions should be much intensified, including both LBDA activities in Yala swamp and efforts of other agencies, for crops to be much expanded such as rice, Robusta coffee and citrus fruits as well as maize.

Livestock

Institutional arrangements for the promotion of livestock industry should aim first at training technicians for both livestock farming including disease control and processing of livestock products, and second at establishing marketing and pricing systems for a whole range of livestock products. For the former, existing institutions such as LBDA multiplication centers and youth polytechnics should be made instrumental. For instance, pasture management, livestock feeding, artificial insemination, livestock products processing and tannery courses may be offered. Furthermore, the establishment of an effective mechanism would be desirable to disseminate extension information and services for livestock raisers, utilizing research results. For the latter, a new institutional arrangement may be necessary on LBDA initiative, especially for those industries to be newly introduced or much intensified, such as pig industry, hides and skins, and tanneries.

Fishery

For further promotion of fishery in the Region, the IDA project once planned in South Nyanza should provide the basic idea. This project is aiming at providing technical assistance to fishermen through cooperative societies, covering the development of fishing gears and methods, fish handling, storage and processing, distribution/marketing, and research/training. However, more emphasis should be placed on marketing and pricing

with quality control as well as technology development and training for fish farming rather than the development of fishing gears and methods.

Reorganization and consolidation of fishermen's cooperatives will be essential for the following purposes.

- 1) To secure and maintain proper marketing channels;
- 2) To negotiate with traders from outside the Region and to offer stable and reasonable prices to fishermen for both fresh and processed fish;
- 3) To provide and manage improved facilities such as cold stores, workshops and processing plants; and
- 4) To provide credit facilities for fishermen and/or to make arrangements for such.

Thus the technical assistance described above should be properly channeled through the cooperatives.

Manufacturing

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 public-private partnership are conceivable as discussed in Section 4.6 of Chapter 4, Sector Report.

Participation of indigenous entrepreneurs would be an essential condition for the successful industrial development by public-private partnership schemes. As the first step for recruiting indigenous entrepreneurs by the public sector, a list of potential entrepreneurs in the Region should be prepared. For each prospective industrial development project, all the relevant candidates are called upon for possible participation. Particular roles of the successful candidates should be clarified as well as contract terms and the project feasibility. The responsible public agency should provide at its own cost training to candidates, if found necessary.

Relevant public agencies to be involved in the public-private partnership will be different depending on the types of specific projects, but LBDA and KIE will play a vital role. In addition to participating in the public-private partnership, the two institutions have to fulfil the following functions:

- 1) To provide loans and capital to existing and potential enterprises;
- 2) To monitor and evaluate activities of enterprises loaned by public financial institutions;
- 3) To provide extension services for technical and managerial skills;
- 4) To establish and operate marketing information systems; and
- 5) To formulate a rolling plan on industrial development in the Region.

The industrial division of LBDA may be consolidated by delegation of some functions of KIE for effectively fulfilling these functions.

In addition to such direct involvement of the public sector, various facilitative measures can be taken by different public organizations. For finance and technical education/training, existing institutions would be generally adequate, provided that their operation in extending services is improved. Extension of soft loans to small scale manufacturing enterprises and informal sector enterprises would be most essential. With this respect, ICDC small loans programme should be directed more to these enterprises. Youth polytechnics and secondary technical schools would be particularly useful in promoting application-oriented technology.

Other sectors

Necessary measures for tourism development in the Region include (i) encouragement for establishing local tour operators and travel agencies, and (ii) coordination of activities by Ministry of Tourism and Wildlife, Kenya Airways and LBDA.

Although early exploitation of any mineral resources is not recommended at this time, it should be emphasized that private interests have to be brought in for exploration of gold and other minerals. To give incentives to prospective private investors, the measures such as the following should be taken in due time.

- 1) Compilation of detailed data held by Mines and Geological Department into a data bank for prospectors; and
- 2) Provision of technical advice and other services such as the use of assay laboratory.

(2) Measures for integrated rural development

Each District Development Committee should take initiative in 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. Procedures for project preparation and implementation would be the same as in the case of any other district initiated projects. However, LBDA would be expected to provide the following.

- 1) Guidelines for preparing IRD projects and technical advice in the preparation;
- 2) Appraisal of IRD projects submitted by DDC, advice on modification and approval;
- 3) Advice for proper arrangement for funding; and
- 4) Monitoring of implementation.

The monitoring should be done by a special unit in LBDA to be established.

(3) Planning and financing systems

Under the current system of development planning called "District Focus for Rural Development", much of planning and implementing responsibilities has been shifted to the district level. The basic idea of this strategy is that each district should take initiative in identifying, formulating and implementing development projects to meet specific needs of the district. Organizational measures for realizing this idea are in short reduced to the

strengthening of planning and implementing functions of the Central Government at the district level so that those district projects are properly planned and actually implemented.

Along this line, the District Planning Unit and the District Executive Committee need to be further strengthened. Implementation of IRD projects aided by increased planning capacity of LBDA, as mentioned above, may provide a means to this end. Also the planning staff of LBDA should be increased to serve all the districts by their participation in DDC's, as well as the assignment of a small number of additional district planners.

Most district projects are funded by the Central Government through different ministries, except those implemented by self-help activities (Harambee) or with the contribution from voluntary groups. In addition, local government authorities can borrow from the Central Government's lending agencies such as the Local Government Loans Authority and the National Housing Corporation, and receive grants from the Government in lieu of rents and rates on non-residential plots, although the Government abolished most other grants to local authorities a few years ago.

In a longer run, there may be a need to modify the balance between the development funds to be channeled to districts through different Government ministries and the local authorities' funds, in line with the District Focus strategy. As a prerequisite for such modifications, responsibility of different categories of local governments should be clarified, viz. municipal, town, urban and county councils.

4.3.4 Social aspect

(1) People's participation

Success of any development project depends on the active participation of local people, who are the ultimate implementing agencies. Following are particularly important as conditions for people's participation.

- 1) Local people tend to pay more serious attention to projects constructed with their funds and hands, with respect to maintenance of facilities and payment of user charges.
- 2) Initial momentum for project promotion would depend much on how local people identify it in practical terms or how they see their own benefits.
- 3) Relocation and compensation always pose serious social problems. Inadequate compensation has often caused the destruction of family institutions and ties, psychological maladjustments and ultimately widespread rural poverty. Guarantee of proper land title, rather than the issue of temporary occupation licences as done for a few projects in the Region, is to be considered a prerequisite.

The points discussed in (1) and (2) above apply particularly to IRD projects. For smaller component projects of any IRD project to meet bottom-up needs of a district, the motivation of people who would be affected by the project implementation would be indispensable and actually more important than the integration from above. Relating to the point (2),

construction of parts of facilities under an IRD project by the Harambee efforts would not only reduce the dependence of the project on the Central Government fund but also enhance the credibility of the district's request for funding the project.

(2) Land division and use

When a development project is implemented as a direct public undertaking, the involvement of rural population, especially smallholders, should be considered according to the following priority. First, smallholders already living in the project area have to be guaranteed of their land titles as a matter of top priority. When additional land is made available by development, the equal priority should be given to those who have not really settled in the area due to occasional floods, but have been engaged in flood recession agriculture. Next priority should be given to the rural landless/unemployed first in the area and then successively in the district and in the province.

The core portion of such a project should be supported by the local rather than immigrants. Also consultation should be made with existing agricultural cooperatives before the final decision on the selection of particular crops. These cares should help to lead the project to success by effectively utilizing social capability of rural population.

These points may apply to the Kano Plain irrigation project and other agricultural expansion projects as well as on-going Yala Swamp agricultural development project.

(3) Resettlement

When the implementation of development projects by public entities will involve the resettlement of original inhabitants, a set of principles should be applied to minimize possible social problems. The first principle is that they should be resettled within the vicinity of each project area as long as possible.

This, however, will increase the pressure on land. In order to reduce the pressure on land by resettlement, some of those originally engaged in agriculture should be advised to participate in agro-processing industries to be newly established or related activities, provided that social attitudes of the people fit with such a scheme.

Traditionally agriculture-oriented people would have to be relocated to such agricultural areas that have comparable productivity. In this case, it is advisable to ensure, if possible, that the relocated people would retain their original identity and continue to have some connection to the original area. This may be made possible by letting them enter into shareholder schemes with agro-processing industries or other related activities in the original area or district, by investing a portion of compensation payment.

This issue may have relevance to large-scale water resources development project. An example is the Magwagwa multipurpose dam, the second phase of the Sondu River multipurpose development project. This dam scheme would inundate a substantial portion of productive land in Kisii, where the population pressure on land is already acute. Some of the agricultural people to be relocated must be encouraged to enter agro-processing business

or otherwise relocated to neighbouring areas of good productivity, e.g. areas around Migori.

4.4 Direct Effects of Proposed Projects

4.4.1 Evaluation criteria

(1) Selection of evaluation criteria

In evaluating any development plan, it is necessary to maintain such a broad perspective that will allow balanced development among different sectors and aspects. A variety of criteria are conceivable for evaluation related to social, cultural, environmental and other aspects as well as economic criteria. These criteria may be broadly divided into the following four categories: viz. national economy, regional development, social well-being and environmental quality.

Specific evaluation criteria are listed below under each category with which the criteria are more directly associated.

National Economy

- Investment cost
- Requirement for development budget allocation
- Foreign exchange requirement
- Foreign exchange earnings/savings
- Regional benefit

Regional development

- Employment generation
- Direct benefit (income generation) and a major portion of secondary benefit

Social well-being

- Informal sector activities to be induced
- Contribution to basic human needs such as sanitation, health care and education

Environmental quality

- Contribution to the enhancement/conservation of environmental quality such as watershed management and protection of water quality
- Adverse environmental impact
- Protective measures required

Some criteria, especially those in the first two categories above are more amenable to quantitative measurement, but others are not. There are alternative indices to represent each of more easily measurable criteria. In this study, the following three indices are used as representing primary evaluation criteria.

<u>Evaluation index</u>	<u>Criterion to be represented</u>
1) Public fund to be required	Investment cost
2) Employment opportunities to be directly generated	Employment generation
3) Number of direct beneficiaries	Benefits

In addition, the following are used as qualitative and secondary evaluation criteria.

- 4) Informal sector activities to be induced
- 5) Environmental effect

(2) Explanation of each criterion

Public fund

Public fund requirement is estimated for each development project on the following basis.

- 1) Investment costs of major infrastructure such as dams, roads and irrigation facilities are to be covered entirely by public funds.
- 2) For smaller facilities likely to be constructed partly with self-help activities or other private participation, a fraction of costs to be covered by public funds is individually assumed.
- 3) For private sector activities, only those costs involved in supporting services such as research, extension and provision of credit facilities to be provided by public organizations are taken as the public fund requirement.

Employment

For projects in production sectors, the number of persons to be engaged in production activities of each project is roughly estimated. The same apply to power generation and utility services such as water supply; employment during construction is not counted.

Beneficiaries

For projects in production sectors, the beneficiaries are those engaged in production activities and their families. For power projects, the number of beneficiaries is estimated based on the number of households to be newly electrified, assuming future electricity demand by sector. For transportation projects, the expected traffic demand at the time of project implementation is used as a basis. The expected traffic demand consists of daily, occasional, seasonal and once-for-all uses of the facilities, but the forecast of daily traffic demand is taken to be representing continuous use of facilities and thus average number of beneficiaries. Secondary beneficiaries who would use the project outputs are not counted for any project.

Qualitative criteria

For the qualitative criteria, the evaluation is done in the following three ranks.

Rank	Inducement of informal sector activities	Environmental effect
	High	Positive
Medium		Neutral or mixed
Low		Negative

4.4.2 Evaluation of direct effects

The recommended development plan presented in this chapter consists of the IRD project conceived as a set of small component projects to meet bottom-up needs of each district (i.e. district projects), and regional or inter-district projects formulated within the eight area development schemes. These are called the Master Plan projects. There also exist other priority projects, some of which have been partly implemented, but they are not earmarked as the Master Plan projects.

Each of the eight area development schemes has been evaluated by the five criteria selected in the previous subsection. Evaluation by the two qualitative criteria, viz. inducement of informal sector activities and environmental effects, is shown in Tables 4.5 and 4.6, respectively. Evaluation results are summarized in Table 4.7.

Referring to Table 4.7, the recommended development plan is evaluated by the five criteria as follows. First, the total investment costs of all the area development schemes are calculated to be Kshs.16,930 million (K£850 million). This corresponds to about 30% of the public development expenditure expected to be allocated to the Region for the next two decades as estimated in subsection 4.3.1.

Other priority projects specific to the Region are listed in Table 4.8 together with rough estimates of investment costs. These projects would require additional K£1,030 million in total. 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.

Second, 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. Third, 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.

Fourth and fifth, the recommended development plan will induce a variety of informal sector activities as listed in Table 4.5, and overall effects on the environment would not be negative.

Overall, the 27 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. These projects will be a driving force for the development of the Region as stipulated by the Master Plan framework.

Table 4.1 Agricultural Land Development Plan

(Unit: 1000 ha)

District	Maize	Sorghum	Beans	Wheat	Rice	Arabica Coffee	Robusta Coffee	Tea	Sugar-cane	Cotton	Fruit & Veg.	Fooder Crop	Total
Nyanze													
Kisi	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													
Kencho	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.

Table 4.2 Investments and GDP, 1982 - 85

	(Unit: K£x10 ⁶)			
	1982	1983	1984	1985*
GDP at factor cost	2,945	3,317	3,655	4,126
Gross investment (% of GDP)	765 (26.0%)	810 (24.4%)	916 (25.1%)	883 (21.4%)
Public investment** (% of GDP)	223 (7.6%)	251 (7.6%)	314 (8.6%)	410 (9.9%)

* Provisional

** Given by fiscal year

Table 4.3 Estimation of Employment Coefficients

(1) Agriculture, including forestry, fishery and subsistence sectors

	Kenya in 1985	Sources
(a) Employment 10 ³	5,619	Figure in SPI for 1984 increased by 3.4%
(b) Value-added K£10 ⁶	1,496	Economic Survey 1986
(c) Employment coefficient K£	270	Calculated as (b)/(a)

(2) Manufacturing and mining

	(a) Employment	(b) Value-added* K£10 ³	(c) Employment Coefficient (b)/(a) K£
Nyanza and Western Rift Valley**	12,799 8,700	25,555 25,200	1,997 2,897
LBDA	21,499	50,755	2,361@2,350

(3) Services

	LBDA in 1985	Source
(a) Employment 10 ³	220	Calculated as balance between total and Agri.+ Manufacturing
(b) Value-added K£x10 ⁶	285	Table
(c) Employment Coefficient K£	1,295@1,300	Calculated as (b)/(a)

* Original data converted to 1985 price

** About 40% of the total in LBDA region

Source: Census of Industrial production, 1977

Table 4.4 Area Development Schemes (1/8) - Integrated Lake shore development

1. Integrated Lake shore development					
	1.1 Fishery complex	1.2 Fishery town access improvement	1.3 Lake shore irrigation	1.4 Lake transport improvement	Institutional measures and other projects
Phase 1 -1993	<ul style="list-style-type: none"> -Establishment of three fishery centers with marketing and research/training facilities, ice plants and cold stores and upgraded fishing ports -Establishment of satellite fishing stations by upgrading existing facilities -Operation of existing fish ponds for demonstration and fingerlings production -Establishment of a few fish processing plants for fish meal and fillers, and also artificial feed plants 	<ul style="list-style-type: none"> -Upgrading of C28 (Asembo-C27 junction), C26(Oyugi-Kendu Bay), and C19(Katito-Kendu Bay), stage 1:subgrade improvement of D and E classes along the Lake shore -Bitumining of C19 (Kendu Bay-Homa Bay) 	<ul style="list-style-type: none"> -Comprehensive feasibility study -Tender design and tendering -Implementation of Oluch and Kimira schemes 	<ul style="list-style-type: none"> -Replacement of tugboats -Construction of lighter berth at Homa Bay 	<ul style="list-style-type: none"> -Reorganization and consolidation of fisherman's cooperatives for all the measures necessary for fishery development -Recruitment of research/training staff by the cooperative society or LBDA -Intensification of monitoring of Lake water quality
Phase 2 1993-2000	<ul style="list-style-type: none"> -Expansion of all the activities above -Upgrading of a few satellite stations into fishery centers -Establishment of larger fish farms 	<ul style="list-style-type: none"> -Upgrading of C28 (as above), C26 (as above) and C19 (Katito-Kendu Bay), stage 2:bitumining -Gravelling of C19 (Homa Bay - Mbita) 	<ul style="list-style-type: none"> -Implementation of other schemes -Improvement of post harvest facilities 	<ul style="list-style-type: none"> -Upgrading of major ports -Introduction of sight-seeing boat 	<ul style="list-style-type: none"> -Introduction of measures to control Lake water quality -Introduction of measures to encourage local tourism
Phase 3 2000-	<ul style="list-style-type: none"> -Establishment of a network of fishery centers and satellite stations inter-connected with large fish farms 			<ul style="list-style-type: none"> -Improvement of wagon ferry -Provision of rail rampway and rail car loading facilities at Homa Bay 	<ul style="list-style-type: none"> -Improved provision of tourism facilities such as water-based recreation facilities, bird sanctuary and hotel accommodations

Table 4.4 Area Development Schemes (2/8) - East-west corridor development

2. East - west corridor development		2.2 Horticulture complex	2.3 Trunk road improvement 2.4 Corridor expansion 2.5 Eldoret water supply	Institutional measures and other projects
2.1 Coffee complex				
Phase 1	-Expansion of Robusta coffee (2700ha by 1993) in Siaya, Busia and Kakamega by increasing seedlings supply (1 million seedlings/year) Expansion/rehabilitation of Arabica coffee in Bungoma	-Establishment of fruits and vegetables processing and canning plant (2000 cans/day) based on existing raw materials, e.g. passion fruits and French beans, somewhere between Turbo and Webuye -Expansion/rehabilitation of passion fruits production	-Upgrading of C33 (Bungoma-Chwale), stage 1: subgrade improvement -Eldoret water supply, phase 1 for urgent measures	-Modification of quota system for coffee export -Institutional arrangements for marketing new products (Robusta coffee and canned food) -Market information center for encouraging farmers to produce more horticultural crops of different kinds
-1993	-Rehabilitation of existing coffee processing plants for fuller utilization of capacity			
Phase 2	-Establishment of instant coffee factory (5,000 tons/year on bean basis) at Bungoma -Further expansion of Robusta coffee (15,500 ha by 2000)	-Expansion of fruits and vegetable processing and canning plant (4,000 cans/day) -Introduction/intensification of other horticultural crops, e.g. citrus fruits, French beans, tomatoes etc.	-Upgrading of C41 (Bungoma - Kakamega), stage 1: subgrade improvement phase 2 with major development of water resources -Upgrading of C33 (as above), stage 2: bituminizing -Up grading of C42 (Kumili-Maliksi), stage 1: subgrade improvement	-Institutional arrangements for marketing instant coffee -Expansion of grain storage capacity
1993				
-2000				
Phase 3	-Expansion of instant coffee factory (22,000 tons/year) -Establishment of associated industries such as packing materials, printing and can making	-Further expansion of fruits and vegetable processing and canning plant (15,000 cans/day) with diversification of products	-Dualing of A104 (Eldoret - Leseru) -Upgrading of C41 (as above) and C42 (as above), stage 2: bituminizing	
2000				

Table 4.4 Area Development Schemes (3/8) - Kisumu - Eldoret dual core development

3. Kisumu - Eldoret dual core development			
		Other projects	Institutional measures
Phase 1 -1993	<p>3.1 Kisumu airport</p> <p>3.2 Kisumu - Eldoret highway</p> <p>3.3 Kisumu water and sewerage</p> <p>3.4 Nandi Forest dam</p> <p>-Kisumu airport improvement -overlay of runway, apron expansion, new passenger terminal</p> <p>-Kisumu - Eldoret highway upgrading - overlay of A1 (Kisumu-Kakamega)</p> <p>-Kisumu municipal water supply and sewerage - phase 1</p>	<p>-Establishment of a few woodfuel plantations</p> <p>-Eldoret water supply (listed in development scheme 2)</p>	<p>-Establishment of monitoring system for industrial effluents and ambient water quality</p>
Phase 2 1993 -2000	<p>-Kisumu - Eldoret highway upgrading - climbing lane on A1 (Kiboswa -Chavakali)</p> <p>-Kisumu municipal water supply and sewerage - phase 2</p> <p>-Nandi Forest diversion and hydropower</p>	<p>-Kisumu urban development</p> <p>-Kisumu bypass - A1</p> <p>-Eldoret bypass A104</p> <p>-Grain storage facilities</p>	<p>-Introduction of discharge standards and regulations related to industrial location</p> <p>-Establishment of urban regulations</p>
Phase 3 2000 -	<p>-Kisumu airport improvement - upgrading to international class</p> <p>-Kisumu municipal water supply and sewerage - phase 3</p>		

Table 4.4 Area Development Scheme (4/8) - Northern growth center development

4. Northern growth center development				
	4.1 Livestock improvement	4.2 Agro-forestry and soil conservation	4.3 Road links improvement	Institutional measures and others
Phase 1 -1993	-Higher utilization of existing facilities for AI, dips and training centers by rehabilitation and increased staff and vehicles -Initiation of intensive ticks and disease control programs	-Expansion of Arabica coffee and citrus fruits by increasing provision of seedlings -Initiation of integrated soil conservation program	-Improvement of access roads to facilitate milk collection etc.	-Measures to encourage installation of cooling facilities at individual farmers level -Establishment of marketing institutions for citrus fruits
Phase 2 1993 -2000	-Establishment of livestock breeding stock testing station and public auction market -Introduction of stud bull service in remote rural areas -Establishment of research/extension center for inoculation etc.	-Continuation of the above	-Gravelling of C44 (Endebess -Turbo) and C48 (Kitale - Kapeherop), stage 1: subgrade improvement	-Establishment of livestock products quality standards -Improvement of accommodations for Mt.Elgon and Saiwa Swamp National Parks -Increase of grain storage capacity
Phase 3 2000-			-Gravelling of C44 (as above) and C48 (as above), stage 2: bitumening	

Table 4.4 Area Development Schemes (5/8)-Southern growth center development

5. Southern growth center development				
	5.1 Pig industry complex	5.2 Cotton and oil crops complex	5.3 Southern interior transport network	Institutional measures and other projects
Phase 1	<p>-Establishment of pig breeding center with 500 sows capacity (400 ton pork/year) and provision of extension/training facilities</p> <p>-Establishment of a medium scale livestock feed plant and a packing plant</p> <p>-Expansion of the center and establishment of several more to increase the total capacity up to 5,000 sows (4,200 ton pork/year) by 1993</p>	<p>-Establishment of cotton research/extension center with expansion of cotton area in Lambwe Valley etc.</p> <p>-Establishment of cotton gineries and a spinning mill</p> <p>-First phase development of oil mill, mostly based on existing crops (3,500 tons/year)</p> <p>-Production of animal and fish feed from oil mill residue</p>	<p>-Gravelling C13 (Loigorian - Masai Mara) C17 (Kilgoinis - Loigorian)</p> <p>-Upgrading of B3 (Sotik-Ngorongore), stage 1: subgrade improvement</p>	<p>-Organization of a scheme for integrated contract farming system for small-scale farmers</p> <p>-Institutional arrangements for production and marketing of edible oil (LBDA's involvement, E.A. Industries Ltd.)</p> <p>-Establishment of market information center for horticultural and other upland crops</p>
Phase 2	<p>-Expansion of all the activities above to make the total sow capacity about 10,000 heads (8,600 tons/year) in the southern area</p> <p>-Establishment of pork processing and tannary plants</p>	<p>-Expansion of all the activities above</p> <p>-Second phase development of oil mill, based on newly introduced/enhanced crops</p> <p>-Establishment of cotton products industry (200 tons/year absorbent cotton)</p>	<p>-Upgrading of B3 (as above), stage 2: bitumening</p> <p>-Gravelling C15 (Sotik-Gorgor)</p>	<p>-Institutional arrangements for marketing of cotton and groundnuts (LBDA, CLSMB, NCPE)</p> <p>-Settlement schemes</p> <p>-Expansion of grain storage capacity</p>
Phase 3	<p>-Expansion of sow capacity to 15,000 heads level (13,000 ton pork/year)</p> <p>-Establishment of nucleus breeding center and a research institute for preserving/enhancing stock quality</p>	<p>-Expansion of cotton products industry</p> <p>-Third phase development of oil mill (total capacity 15,000 tons/year)</p> <p>-Establishment of supporting industries, including earning, printing and labeling, packing materials etc.</p>	<p>-Bitumening C13 (as above), C17 (as above)</p> <p>-Gravelling C16 (Keroka -Nyangusu), C18 (Karungu-Rodi Kopany), C20 (Ogembo - Rongo)</p>	

Table 4.4 Area Development Schemes (6/8) - Western frontier development

6. Western frontier development				
	6.1 Pig industry complex	6.2 Cotton complex	6.3 Access road improvement	
			Institutional measures and others	
Phase 1 -1993	-Establishment of pig breeding center with 500 sow capacity (400 ton pork/year) and extension/training facilities toward the end of the phase	-Expansion/intensification of cotton production in Busia and Siaya -Establishment of ginneries and a spinning mill -Establishment of cotton products industry (200 tons/year)	-Bituminization C29 (Siaya - Busonga) C31 (Mumias-Mbwekas) -Overlay of A104 (Bungoma-Uganda border)	-Institutional arrangements for cotton marketing (LBDA, CLSMB)
Phase 2 1993 - 2000	-Expansion of the center and establishment of several more with total capacity of 5,000 sows (4,300 ton pork/year) -Establishment of a medium scale livestock feed plant and packaging plant	-Expansion of cotton production and associated activities -Expansion of cotton products industry (400 tons/year)	-Upgrading of C30 (Busonga-Bumala), stage 1:subgrade improvement	-Expansion of water supply facilities to serve pig industry and cotton processing
Phase 3 2000-	-Expansion of the total sow capacity to 10,000 heads (8,600 ton/pork/year) in the western area -Establishment of pork processing and tannary plants	-Further expansion of cotton products industry with diversified products (800 tons/year)	-Upgrading of C30 (as above) stage 2: bitumenning	

Table 4.4 Area Development Schemes (7/8) - Eastern gateway development

7. Eastern gateway development			
	7.1 Tourism complex	7.2. Gateway road improvement	Institutional measures and other projects
Phase 1 -1993	<ul style="list-style-type: none"> -Comprehensive study of tourism in the area -Rehabilitation of existing tourism accommodations -Establishment of fish ponds for demonstration and fingerlings production of trout 	<ul style="list-style-type: none"> -Upgrading of C21 (Tinga-Chemosit), stage 1:graveling -Completion of road rehabilitation C23 (Kenicho -Sotik) -Rehabilitation of any portion of B1 between Mau Summit and Kericho -Bitumening of C21 (Kisii - Tinga) 	<ul style="list-style-type: none"> -Designation of a part of Mau Forest as a national park -Rehabilitation of tea areas
Phase 2 1993-2000	<ul style="list-style-type: none"> -Introduction of new tourism facilities for sport fishing, trekking etc. -Kenicho town beautification 	<ul style="list-style-type: none"> -Upgrading of C21 (as above) stage 2: bitumening 	<ul style="list-style-type: none"> -Expansion of tea areas -Measures to promote domestic tourism -Koru cement plant
Phase 3 2000-	<ul style="list-style-type: none"> -Development of Magwagva-reservoir area for tourism 		

Table 4.4 Area Development Schemes (8/8) - Integrated Kano Plain development

8. Integrated Kano Plain development			
	8.1 Irrigation complex	8.2 Sondu River multi purpose development	8.3 Flood control
Phase 1 -1993	-Completion of first phase irrigation with Sondu/Miriu diversion -Establishment of research/extension center	-Completion of Sondu/Miriu hydropower plant (48MW)	-Provision of drainage in Kano Plain in association with irrigation development
Phase 2 1993-2000	-Establishment of rice mill and other processing plants -Increase in grain storage and marketing facilities and distribution depots -Establishment of agricultural machinery lease center -Expansion of irrigation area (15,000 ha in Nyakach Plain, portion of Kano Plain) -Aquaculture in irrigation canals and ponds	-Completion of Magwagwa hydropower plant (95MW) -Establishment of aquaculture in Sondu reservoirs	-Expansion of drainage works -Flood control works on Nyando River
Phase 3 2000-	-Further expansion of irrigation area (up to 25,000 ha)	-Development of reservoir areas for recreation and tourism	-Establishment of flood forecast and warning system
			Institutional measures and others
			-Overlay of C34 (A1 junction Muberon)
			-Compensation and relocation schemes associated with Magwagwa -Organization of smallholders into cooperatives for procurement/proper utilization of agricultural inputs and marketing -Measures to preserve swamp areas
			-Dualing of A1 (Kisumu - Ahero).

Table 4.5 Evaluation of Inducement of Informal Sector Activities

Area Development Scheme	Informal Sector Activities to be induced	Evaluation
(1) Integrated Lake shore development	<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 development	<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 development	<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 development	<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 development	<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 development	<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 development	<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 development	<ul style="list-style-type: none"> - Wall-board manufacturing from bagasse - Papyrus mats - Arts and crafts based on papyrus, sugarcane straw etc. 	Low

Table 4.6 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

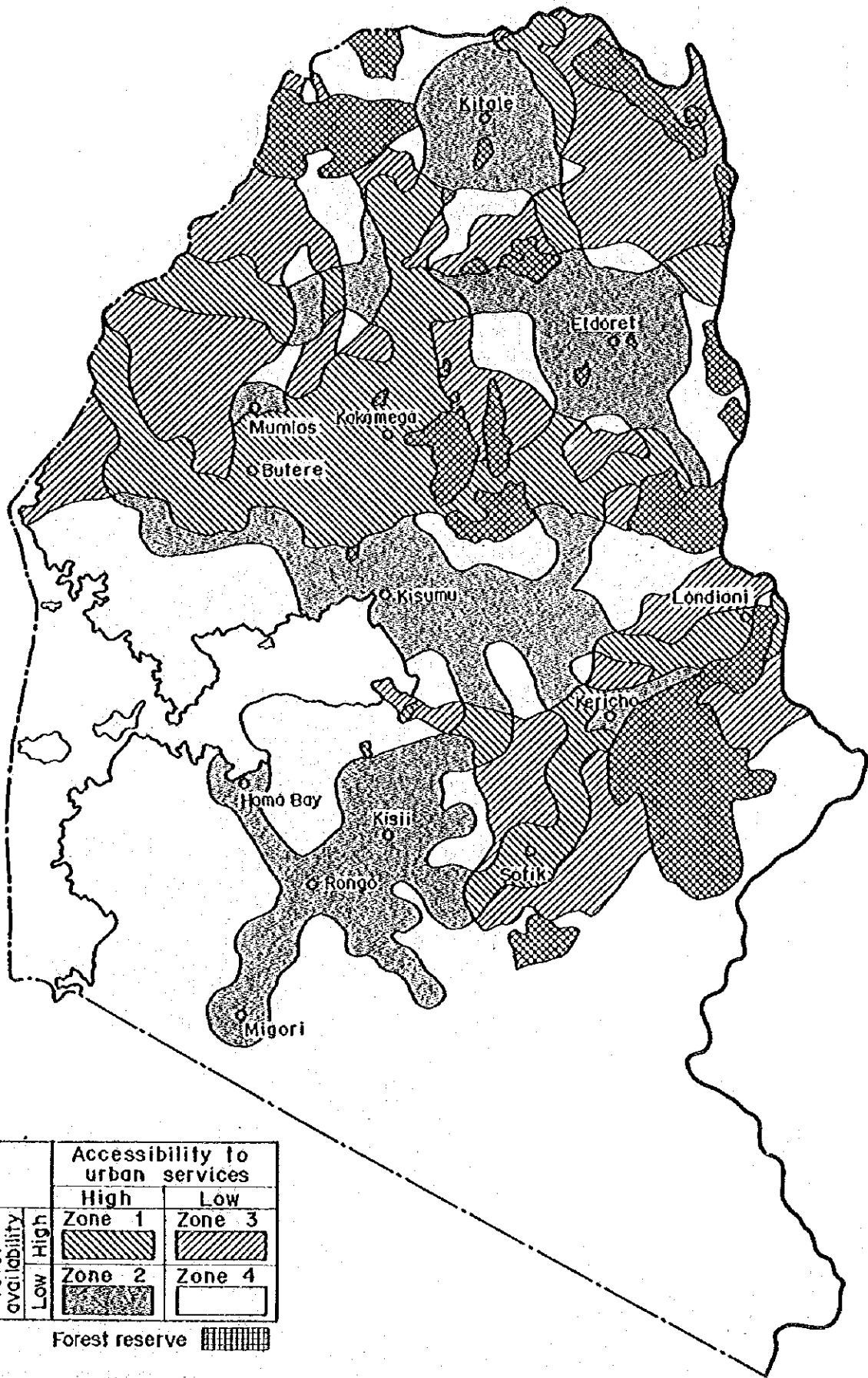
Table 4.7 Evaluation of Area Development Schemes by Five Alternative Criteria

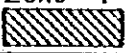
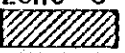

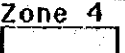
Area Development Scheme	Primary criteria with Quantitative Evaluation			Secondary Criteria with Qualitative Criteria	
	Investment Costs Kshx10 ⁶	Employment Opportunitiesx10 ³	No. of Direct Beneficiariesx10 ³	Inducement of Informal Sector	Environmental Effects
1. Integrated Lake shore development	1,327	0.6	88	High	Positive
2. East-west corridor development	1,755	147.5	711	Medium	Neutral/mixed
3. Kisumu-Eldoret dual core development	2,164	0.3	801	High	Neutral/mixed
4. Northern growth center development	274	2.6	41	Low	Neutral/mixed
5. Southern growth center development	2,135	13.4	88	High	Slightly negative
6. Western frontier development	1,231	8.8	63	Medium	Slightly negative
7. Eastern gateway development	392	0.2	36	Medium	Neutral/mixed
8. Integrated Kano Plain development	7,654	42.0	1,177	Low	Slightly negative
Overall evaluation	16,930	215.4	3,005	Medium	Neutral/mixed

Table 4.8 Other Priority Projects Specific to the Region and Rough Estimates of Investment Costs

Project	Investment Costs x 10 ⁶ Kshs.	Explanations
Roads	200	
Railways	700	Reinforcement
Minor ports	100	
Small airposts/airstrips	200	
Woodfuel plantations	300	Several establishments to produce 0.9 million tons/year of woods in total
New energy	50	Solar demonstration, biogas etc.
Afforestation	400	Kshs.5,000/ha x 80,000 ha
Power transmission & distribution	3,200	Including rural electrification
Dams and hydropower	5,500	Hemsteds Bridge, Namba Kodero, Webuye and Teremi
Oil pipeline	1,500	Extension to Uganda
Transshipment station	200	Container depot, truck terminal, storages etc.
Urban development	300	Kisumu municipality and a few secondary towns
Water supply and sewerage	3,600	Including rural water and sanitation
Grain storages	1,300	Kshs.4,000/ton x 206,000 tons (silos) Kshs. 800/ton x 605,000 tons (warehouses)
Rain-fed rice	450	On-going
Yala Swamp development	800	On-going
Tea rehabilitation/expansion	400	Kshs.16,000/ha x 25,000 ha
Cement plant at Koru	500	150,000 tons/year
Preliminary exploration of minerals	200	Gold, rare earth minerals and niobium
Tourism facilities	150	Mt. Elgon, Saiwa Swamp, Ruma and Lake shore
Others	500	
Total	20,550	

Note: Compilation and estimation by JICA Study Team



		Accessibility to urban services	
		High	Low
Water availability	High	Zone 1 	Zone 3 
	Low	Zone 2 	Zone 4 


Forest reserve 

Figure 4.1 Spatial Development Potentials of LBDA Region

REPUBLIC OF KENYA LAKE BASIN DEVELOPMENT AUTHORITY
 THE STUDY OF INTEGRATED REGIONAL DEVELOPMENT
 MASTER PLAN FOR THE LAKE BASIN DEVELOPMENT AREA
 JAPAN INTERNATIONAL COÖPERATION AGENCY

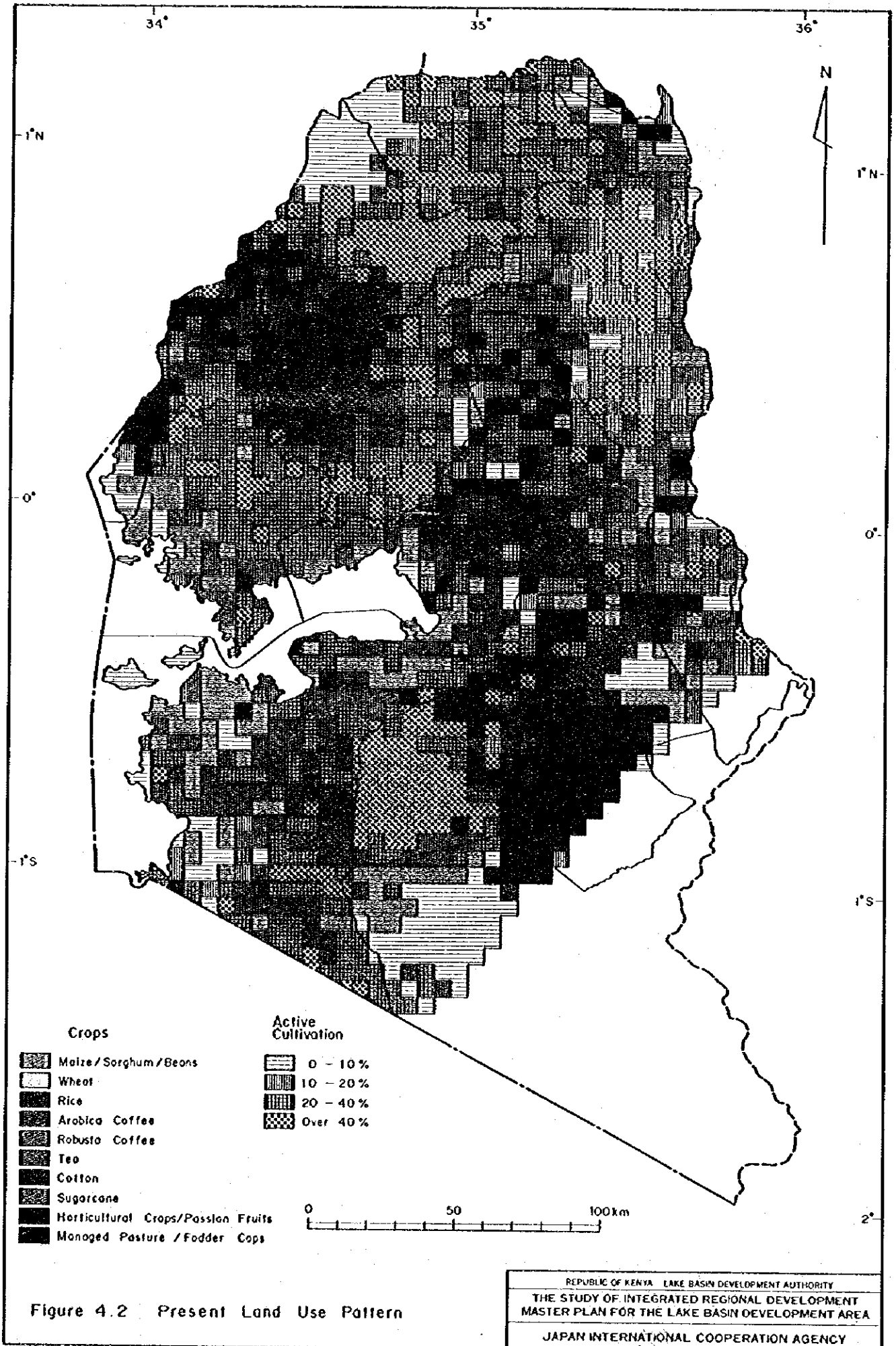


Figure 4.2 Present Land Use Pattern

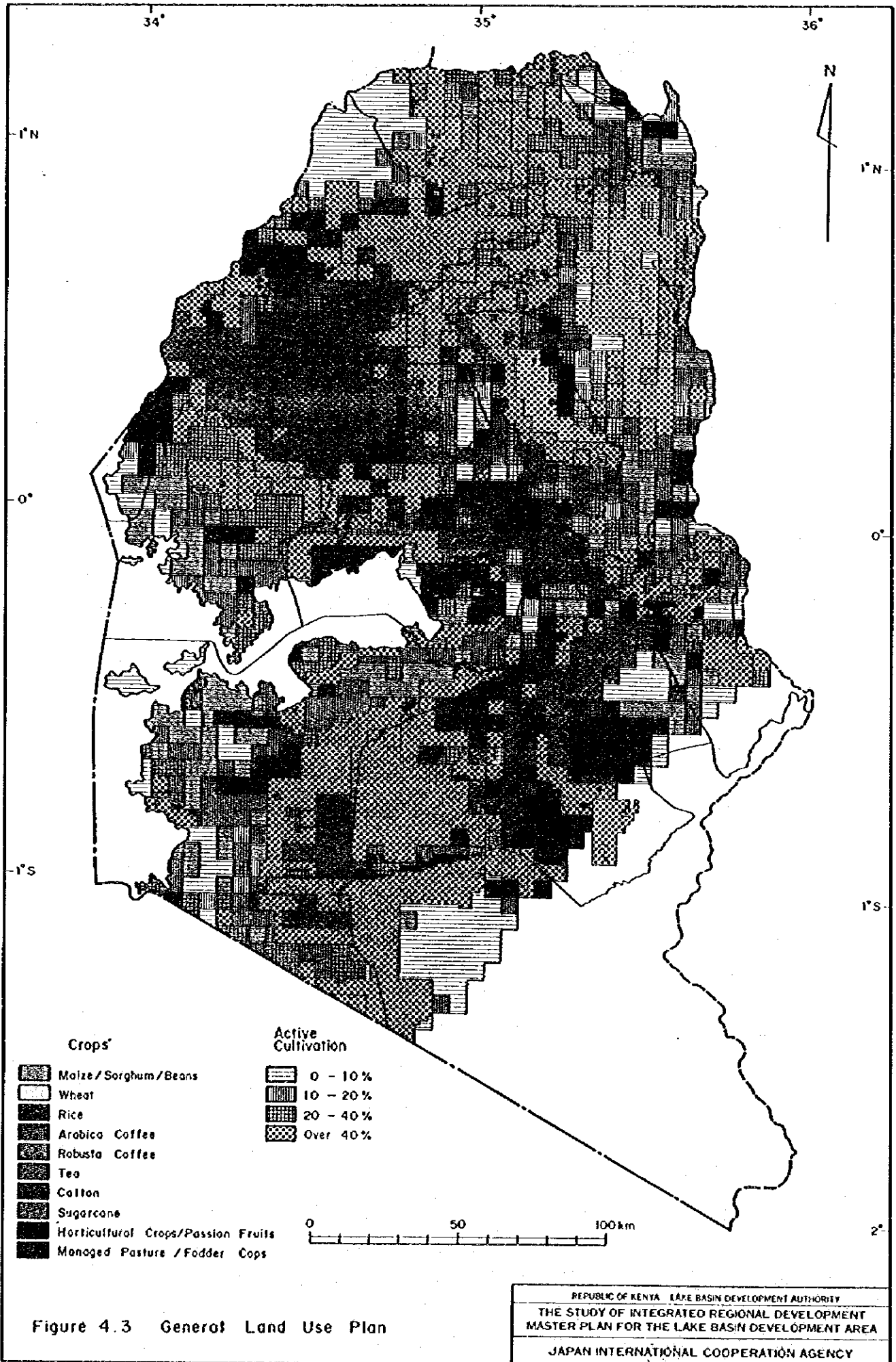
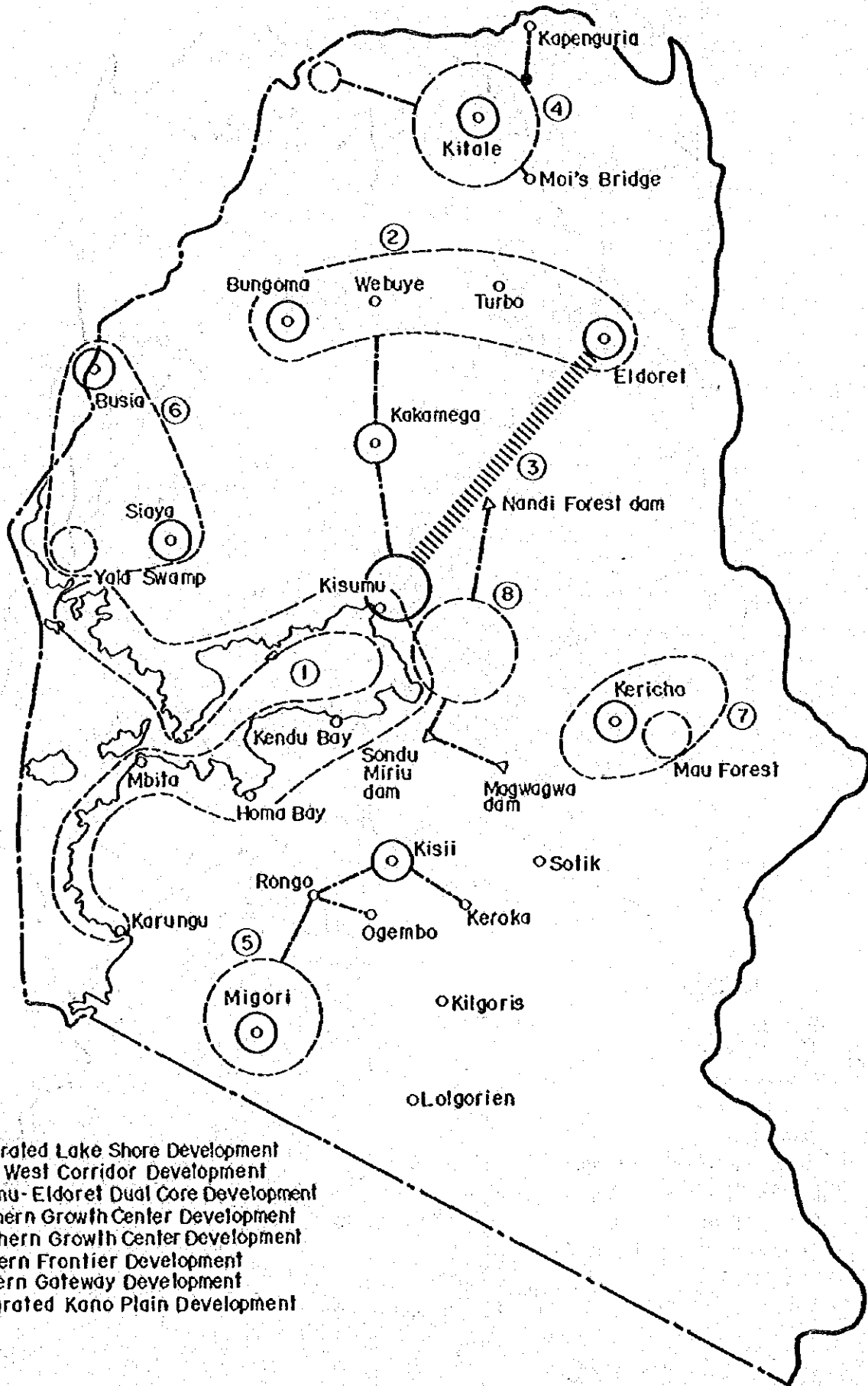


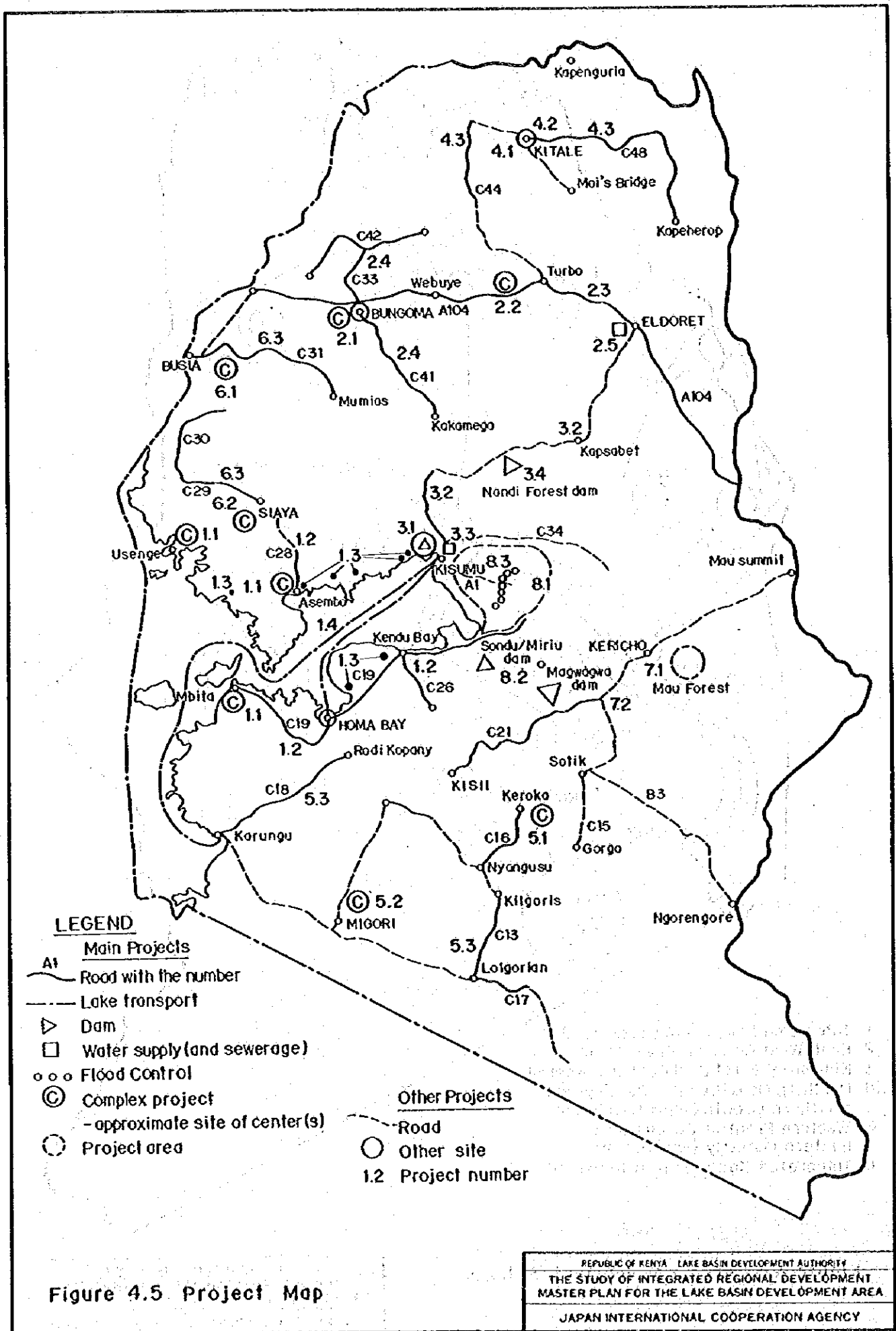
Figure 4.3 General Land Use Plan



- 1 Integrated Lake Shore Development
- 2 East-West Corridor Development
- 3 Kisumu-Eldoret Dual Core Development
- 4 Northern Growth Center Development
- 5 Southern Growth Center Development
- 6 Western Frontier Development
- 7 Eastern Gateway Development
- 8 Integrated Kano Plain Development

Figure 4.4 Area Development Schemes

REPUBLIC OF KENYA LAKE BASIN DEVELOPMENT AUTHORITY
 THE STUDY OF INTEGRATED REGIONAL DEVELOPMENT
 MASTER PLAN FOR THE LAKE BASIN DEVELOPMENT AREA
 JAPAN INTERNATIONAL COOPERATION AGENCY



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