

**CHAPTER 4. SOCIO-ECONOMIC PROSPECTS
AND ENVIRONMENT**



Chapter 4 Socio-economic Prospects and Environment

Problems to natural environmental conservation have been discussed in section 4 of Chapter 2. Those problems are identified as critical factors for wildlife habitation and is assumed that they will become more critical in line with future socio-economic changes. This chapter presents future socio-economic changes. Future critical issues for the environmental conservation and management plan are subsequently identified.

1. Future Socio-economic Changes

1.1. Economic Growth

Kenya's economy is expected to grow at about 5.5% P.a from 1993 - 2010 rate. According to Table 4.1, Kenya's GDP is projected at a level of 10,776.2 million pounds in 2010, which is factor 2.5 times her the present GDP. This economic growth is expected to be lead by the expansion of manufacturing and service sectors, rather than the agricultural sector. Especially the service sector will occupy 44 % of total GDP and be the top economic sector in Kenya's economy instead of the agricultural sector.

Table 4.1 Projection of GDP Growth

	1993	2000	2005	2010	A.R-% P.A (1993-2010)
GDP (M.K£)	4,337.6	6,202.2	8,252.9	10,766.2	5.5
GDP/Capita (K£)	174.8	208.8	247.8	291.8	3.0
Agriculture (%)	26.4	26.1	24.5	22.4	-
Manufacturing (%)	13.8	13.8	14.2	15.2	-
Service (%)	38.1	40.2	42.1	44.0	-
Government (%)	16.1	14.7	14.4	14.1	-

Note: At 1982 Constant Price
Detailed information on future GDP is available in chapter 2 of Volume 1
Source: JICA Study Team

1.2. Population

1.2.1. Population Growth

Kenya has experienced rapid population growth in the past. Even if the growth rate will slow down, population growth will still continue. According to Table 4.2, Kenya's population is estimated to reach a level of approximately 37 million people by the year 2010. That means that during the next 16 years until 2010, the population will increase by about 11.4 million people. Such increase would imply a 2.5 % annual population growth rate during this period, which is slightly lower than the past population growth rate.

Table 4.2 Projection of Population Growth (000 and %)

	1989	2000	2005	2010
Population	22,067	29,706	33,305	36,898
Urban Population	3,791	6,941	8,933	11,235
Urbanisation Ratio (%)	17.18	23.37	26.82	30.45

Note: Detailed information on population is available in chapter 2 of Volume 1.
Source: JICA Study Team

1.2.2. Population Distribution

The population growth rate will differ by Districts. The population in the highland Districts, which presently have a higher population density, will increase the population with a stable growth rate. The Districts around the highland districts will record a higher population growth rate. Particularly, Narok, Kajiado, Laikipia, and Isiolo Districts will record the highest population growth. However, most of the Districts in the Turkana, North and Eastern provinces will continuously have lower population growth, as presented in Figure 4.1.

1.3. Urbanisation

1.3.1. Urban Population

The urban population was 3.8 million people in 1989, which accounted for 17 % of the national population. The urban population in 1994 was estimated at approximately 5 million or 20 % of the national population. This is forecasted to reach appropriately 11 million people or 30.4 % of the total population in 2010. The population is expected to be more concentrated in urban areas with a higher population growth rate, than in the rural area, as shown in the previous table 4.2.

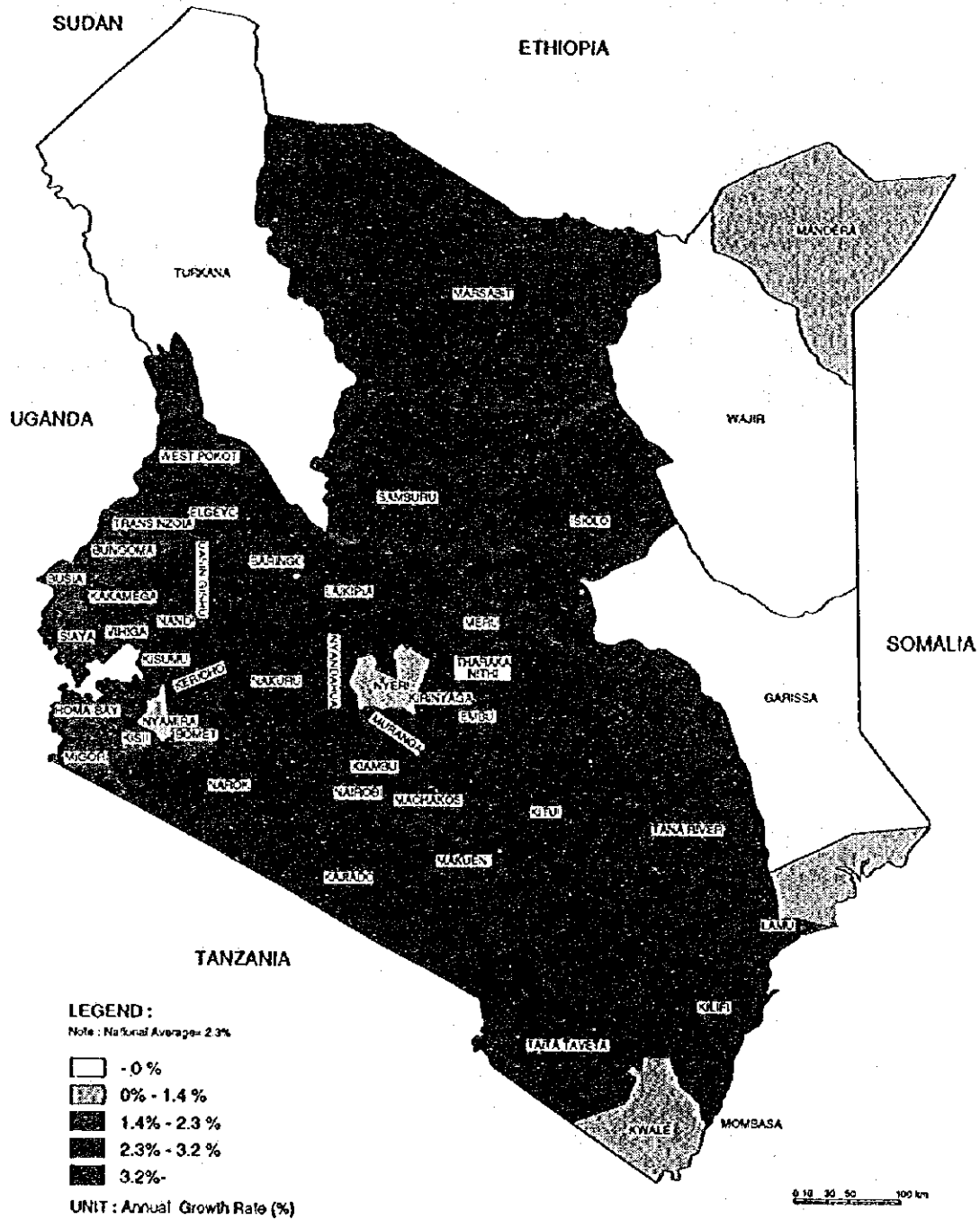
1.3.2. Urban Hierarchy

Several urban development policies have been formulated to accommodate the increased number of the urban population, such as :

- Service centre policy,
- Growth centre policy, and
- Integrated transport and communication policy.

The basic idea of above policies is to develop cities with a hierarchy of urban services and to integrate them to form a corridor with a suitable transport and communication network. Nairobi, Mombasa, Kisumu, Eldoret, Nakuru, Nyeri and Kakamega are designated as the service centres in their regions. Based on the City Ordering Analysis made in "A Road Network Development Master Plan Study" by JICA, the urban hierarchy and urban service zones are illustrated in Figure 4.2.

Figure 4.1 Future Population Distribution



Source: National Road Development Master Plan, 1995, JICA

1.4. Tourism Development

Tourism development will be carried out in accordance with the target number of tourists as described in Chapter 2 of Volume 1. According to Table 4.3, the Coastal, Central, Maasailand and Western Tourism Regions will receive the most increasing number of visitors. In order to meet these demands, tourism facilities and supporting infrastructure will be developed.

Table 4.3 Projection of Future Foreign Visitors

	(Million Visitors)			
	1993	2000	2005	2010
Foreign Tourist	0.78	1.1	1.6	2.1

Source: JICA Study Team

Since wild animals are supposed to be still a most important tourism resource in Kenya, the number of visitors to the national parks and reserves is also going to increase rapidly. It results in worsening present problems of animal harassment without any measurements.

1.5. Change of Peoples' Life Style

1.5.1. Energy Consumption

Petroleum, electricity and wood are the major sources of energy in Kenya. Wood fuel or other biomass fuel constitutes about 70 % of total domestic energy consumed. It is mainly used for cooking, heating and lighting in the rural and urban households. Energy consumption will increase, due to economic and population growth. Even if the structure of energy sources will be modernised, wood consumption for wood fuel will continue. This may affect the achievement of forest conservation. Wood felling for fuel has been increasing and be the main use of wood after 1988 (Table 4.4 refers).

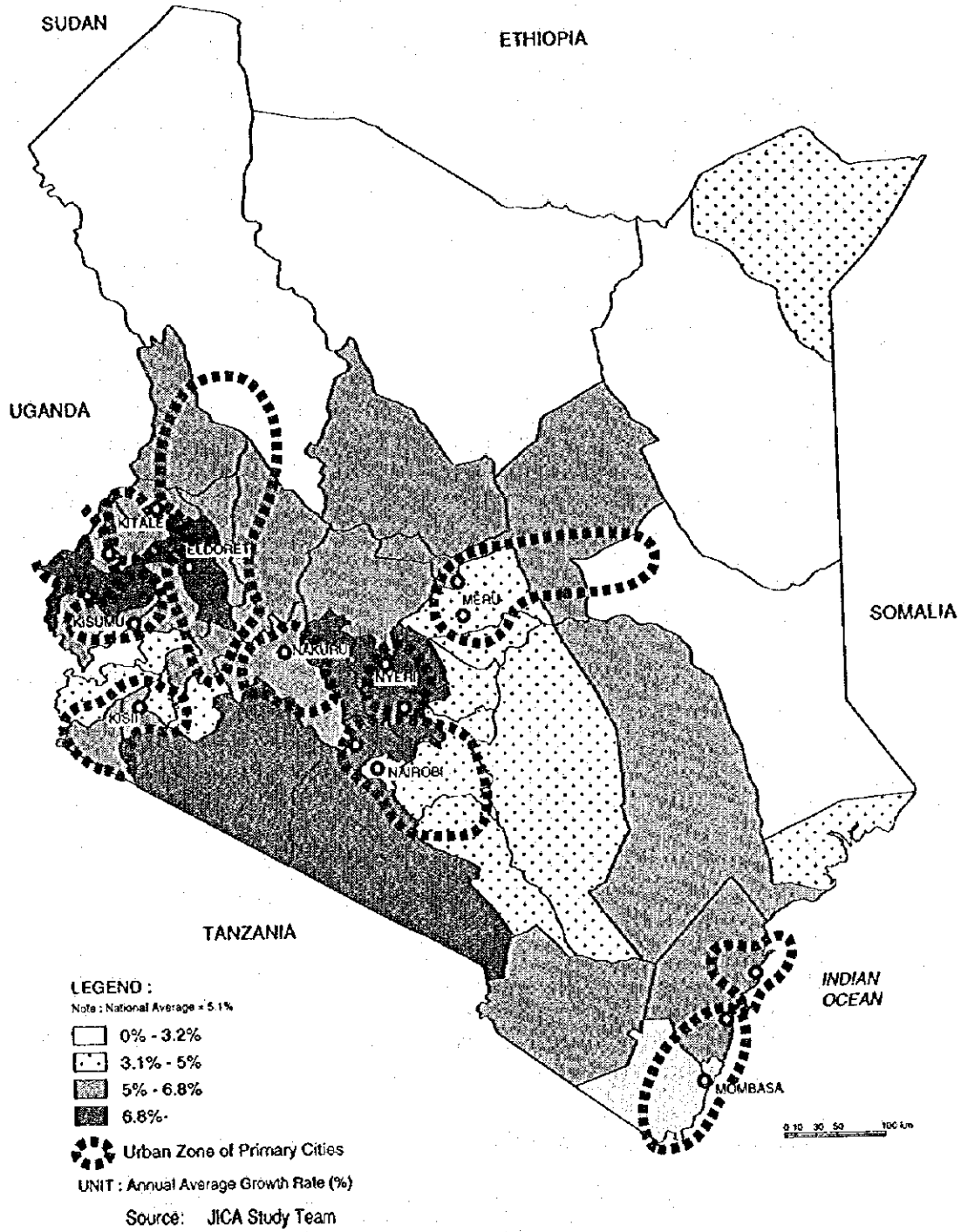
If the demand for wood fuel continuously increases, it will accelerate deforestation. The Kenyan government has, therefore, set up a wood energy policy in order to keep sustained yields of forest, from an environmental conservation point of view.

Table 4.4 Wood Production

	Thousand cu. m.					
	1982	1984	1986	1988	1990	1982/1990
Timber	366	501	575	764	712	1.95
Fuel	143	151	46	781	832	5.82

Source: Statistical Abstract, 1991

Figure 4.2 Urban Hierarchy

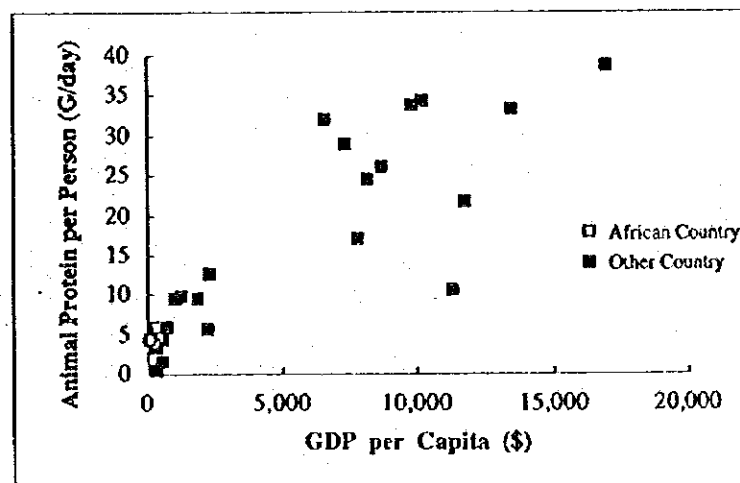


1.5.2. Source of Calorie

In line with economic growth and the diffusion of western countries' culture, peoples' life style has been changing. Changes of life style start in the urban area and spread to rural areas. A most significant change of peoples' life style from the environmental impact point of view is the change of food consumption.

Generally speaking, the proportion of protein, especially animal protein, in total consumed calories is going to increase in accordance with improving income level. Figure 4.3 shows the relationship between the proportion of animal protein in total calories and GDP per capita in different countries. It clearly indicates that higher GDP countries show higher consumption of animal protein. This implies that demand of livestock production will increase in Kenya in accordance with economic growth.

Figure 4.3 Relationship between Animal Protein and GDP per Capita



Source: Food Balance Sheets, 1991, FAO

2. Implications of Future Socio-economic Changes for the Environment

2.1. Overview

The above socio-economic changes will affect the natural environment. In line with the indicated relationship between socio-economic activities and environmental problems in the previous Figures 2.15 and 2.16, the following socio-economic changes will broadly and fundamentally affect the natural environment and cause several environmental problems through changes of land use patterns and accumulation of environmental loads:

- Increase in demand for agricultural land and products,
- Increase of livestock consumption,
- Expansion of urban settlements, and
- Increase of tourists.

2.2. Predicted Influences on the Environment

2.2.2. Increase in Demand for Agricultural Land and Products

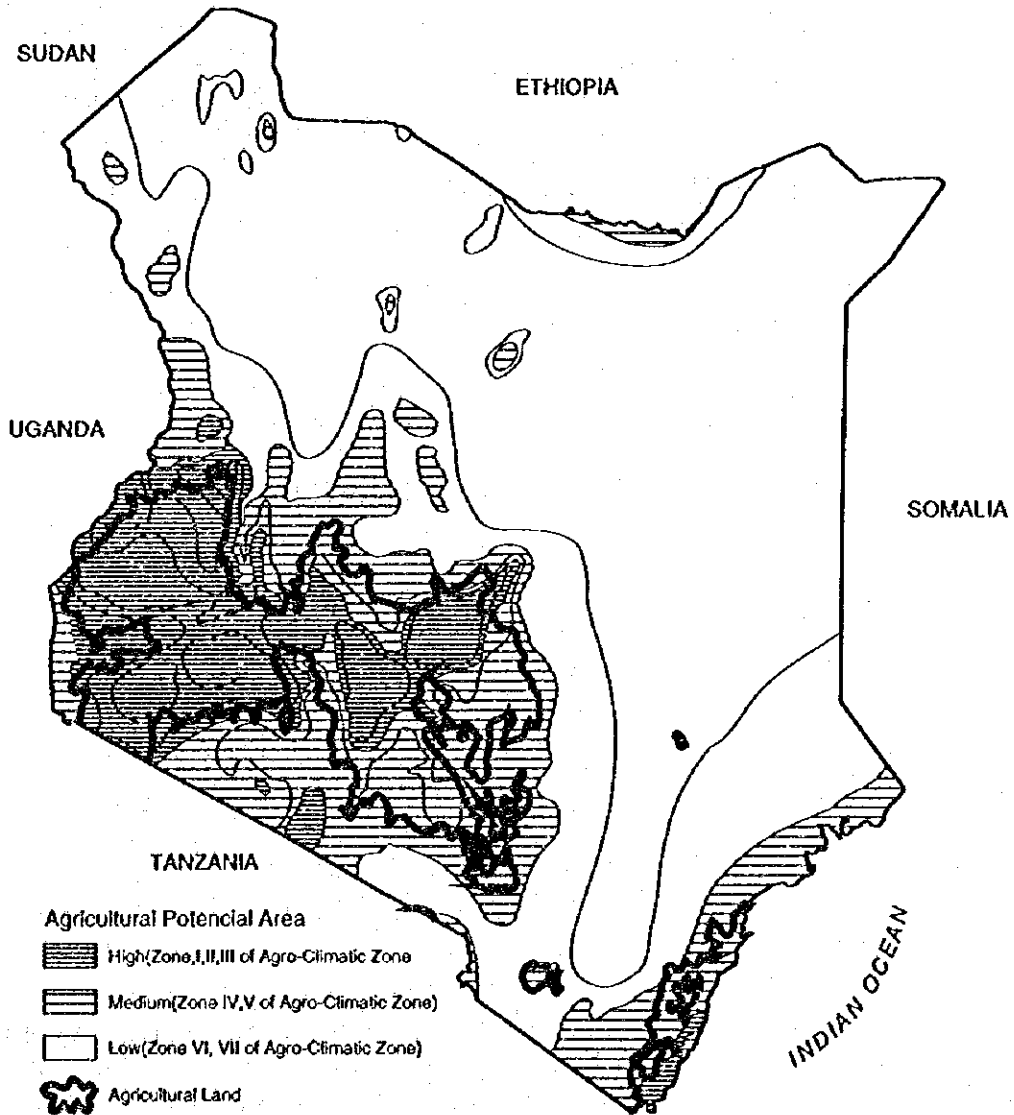
Agricultural products will be required in accordance with Kenya's population growth. Since Kenya's Government pursue the objective of food security as a principle agricultural policy, agricultural development must be implemented to increase the agricultural production and products.

On the other hand, wage employment in the agricultural sector will increase from approximately 280,000 workers in 1993 to approximately 600,000 workers in 2010 (according to the employment projection by the Ministry of National Development and the Vice President's Office). Together with the population growth, the increase of agricultural workers implies the necessity of more agricultural employment opportunities.

From the above point of views, agricultural development must progress so as to improve land productivity and expand farm land. Since high agricultural potential lands have been utilised for cash crops such as coffee and tea, agricultural development for increasing foodstuff production will have to depend basically on expansion of the farm land in the near future. High agricultural potential land is almost fully utilised at present, so new agricultural land will be developed in the direction of the remaining medium agricultural land, which is located around the highland area (Figure 4.4 refers).

From the environmental point of view, expansion of farm land may make wildlife dispersal areas and migration routes narrow through fencing and changing land use.

Figure 4.4 Agricultural Potential and Utilisation



Source: JICA Study Team

2.2.3. Increase in Livestock Consumption

According to Table 4.5, the number of slaughtered livestock has increased steadily in the past. This tendency will continue in the future in accordance with economic growth as described in the preceding section. This may influence the environment, in particular that of arid and semi-arid land (ASAL), because most of livestock except dairy cattle are kept in the ASAL, as shown in Table 4.6. Approximately 68 % of Kenya's livestock are in the ASAL. This may worsen land use conflicts between wildlife and livestock, especially in the ASAL.

Table 4.5 Number of Livestock Slaughtered
(Thousand head)

	1989	1991	1993
Cattle and Calves	752	969	980
Sheep and Goats	998	1,345	1,280
Pigs	73	83	88

Source: Economic Survey, 1994

Table 4.6 Livestock Population and Area (1987)
(Thousand)

	ASAL	Non-ASAL	Total
Beef Cattle	5,761 (64%)	3,310	9,071
Dairy Cattle	715 (24%)	2,287	3,002
Sheep	4,144 (64%)	2,300	6,444
Goats	7,283 (85%)	1,245	8,528
Camels	956 (100%)	-	956
Donkey	249 (100%)	-	249
Total	19,108	28,250	47,358

Source: Development Policy for The Arid and Semi-Arid Lands, 1992

2.2.4. Expansion of Urban Settlements

Urban settlements will expand so as to receive the increased number of population as described in the preceding section. This may cause changes in the present land use pattern at surrounding areas of the existing cities, and add more environmental loads.

2.2.5. Increase of Number of Tourists

Tourists' traffic is highly concentrated in certain parks and reserves. Such concentration may continue with an increased number of tourists in future, resulting in worsening present negative environmental impacts.

**CHAPTER 5 ENVIRONMENTAL
CONSERVATION POLICIES**

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Chapter 5 Environmental Conservation Policies

1. Policies

In order to meet basic human needs and to improve the living conditions for all Kenyans, a self-supporting economy and environmental conservation are indispensable. Special emphasis should be placed on environmental conservation regarding tourism development, as the tourism industry is the top single foreign currency earner in Kenya and as it depends largely on the natural environment. Furthermore, from an international point of view, Kenya's natural environment should be conserved as part of the precious world heritage.

Kenya has an unique and diverse ecosystem deriving from its location, topography and climatic conditions. However, the natural ecosystem does not have high environmental capacities, because of the vast areas occupied by arid/semi-arid land. For the last three decades since Kenya's independence in 1963, the population has trebled and economic growth has been progressing. Following this change with insufficient environmental conservation effort, the environmental degradation has become a serious problem.

Furthermore, the population is expected to reach 37 million people by the year 2010, which is a 1.5 times increase over the present population size of 25 million. Accordingly, the risk from environmental degradation will become more severe due to increase of various human activities : represented by pollution, land deterioration and decrease of wildlife population and biodiversity. The environmental deterioration will have further negative impacts on the survival and welfare of the people.

In this context, it is necessary to apply more appropriate measures for environmental conservation and management and to control human activities well along the functions of the natural ecosystem. Basically, as mentioned above, the future prospects of the environment are highly dependent on the successful control of population growth. Kenya has to establish a more effective population control policy. On the other hand, sustainable utilisation of natural resources with appropriate land use is also a crucial factor for sustainable development of the country. That is to say, there is need to balance between environmental conservation and economic development. In this sense, basic policies for environmental conservation and management in Kenya are identified as follows : -

- Recognise the fact that environmental conservation is a fundamental and crucial factor for sustainable development of the country,
- Keep a balance in the ecosystem, that is between the human activities and the natural ecosystem, and
- Involve people, especially those who are closely related to the natural ecosystem, in environmental conservation efforts.

2. Goals and Strategies

According to the above mentioned policies, the following goals and strategies of the environmental conservation and management plan are set up. They are formulated so as to basically meet the aims of "The 7th National Development Plan (1994-96)" and the "National Environmental Action Plan (NEAP)".

2.1. Goals

Four main goals are established to guide environmental conservation and management. They are :

- Preserve the main characteristics of Kenya's natural ecosystem with its high biodiversity and migration of large mammals and slow down environmental deterioration,
- Minimise negative impacts on the natural environment by development activities within its carrying capacity,
- Develop the most appropriate land use and sustainable use of the natural resources, and
- Generate people's understanding of and support for environmental conservation.

2.2. Strategies

In order to achieve the above goals, integrated approaches are required, which have sound policies, legislative framework, institutional arrangements and co-ordination mechanisms. In this sense, the following strategies form a basis to formulate detailed plans: -

- Reinforcement of the pollution control measures by improving the Environmental Impact Assessment (EIA) programme and the related administrative and legislative frameworks,
- Co-ordination of future land use competition by formulating a national and regional land use plans respectively,

- Enhancement of environmental education and information service for both, Kenyans and international visitors,
- Enhancement of research activities for environmental conservation and management,
- Enforcement of the Environmental Impact Assessment (EIA) and environmental monitoring for all development plans/projects,
- Development of human resources by promoting effective training for both, governmental and non-governmental organisations,
- Provision of economic incentives to people for environmental conservation, such as by revenue sharing from tourism, taxation and polluter fines,
- Encouragement of local peoples' participation in the procedures of environmental conservation programmes, from planning, implementation, monitoring to evaluation,
- Review and reform of legislation and regulations for environmental conservation and observation of the related international conventions, and
- Co-operation among governmental organisations and with international organisations, foreign governments and non-governmental organisations.

3. Plans and their Objectives

Taking these strategies into account, the following four plans are made:

- Natural Environment Conservation Plan,
- Land Use Plan,
- Environmental Impact Control Programme, and
- Environmental Considerations for Tourism Development.

The Natural Environment Conservation Plan is made to protect and sustainably utilise the natural environment and resources, with emphasis on wildlife and their habitats. Reflecting this plan, the Land Use Plan is drawn up to co-ordinate different land uses and to facilitate coexistence of people and wildlife. The Environmental Impact Control Programme is, on the other hand, provided in order to minimise environmental negative impacts from any development plan or project. In addition to these overall plans, the Environmental Considerations for Tourism Development is made to focus on environmental conservation specifically for tourism development.

3.1. Natural Environment Conservation Plan

This plan is composed of the following three main programmes :

- Non-organic environmental conservation and management programme,
- Wildlife conservation and management programme, and
- Zoning programme for natural environment conservation.

The non-organic environmental conservation and management programme is a basic and important requirement for sustainable development of the country as well as improvement of the people's life. The suggested actions include forest conservation, suitable land use, water resource management and pollution control. The wildlife conservation and management programme occupies a central part of the Natural Environment Conservation Plan, due to its biological/ecological importance and economic value, especially for the tourism industry. The suggested actions cover the following fields: national network of wildlife areas, wildlife-based tourism, local people and wildlife coexistence, environmental education, scientific services, legislation and international conventions and finally management capability and finance. Taking the contents of these programmes into consideration, the zoning programme for natural environment conservation is made to divide the whole land into three conservation priority zones (high, medium and low) with major suggested actions for each zone.

3.2. Land Use Plan

This plan includes the following :

- Land use plan for co-ordination of urban, agricultural, pastoral and natural conservation areas,
- Mitigating system for land use conflicts between local people and wildlife, and
- Zoning system for national parks and reserves.

Land use is a critical part for environmental conservation and management in terms of sustainable utilisation of land resources and coexistence of local people and wildlife.

After analysing the present and future land use, land use policies are made with classification of the land into urban, agricultural, pastoral and natural conservation areas; among which land use co-ordination is required. Systems to mitigate land use conflicts between local people and wildlife are recommended as follows : establishment of buffer zones, empowerment of the Community Wildlife Programme by KWS and promotion of a fencing programme. In addition to this, zoning systems for the national parks and reserves are proposed for more effective management.

3.3. Environmental Impact Control Programme

This plan includes the following:

- Environmental Impact Assessment (EIA) system, and
- Pollution control programme.

The EIA system should be developed to control development activities and reduce their impact on the environment. In this plan, mainly procedure and implementation measures are considered. The pollution control programme, particularly for tourism development projects, is made in terms of administration, legislation, formulation and measures to be taken.

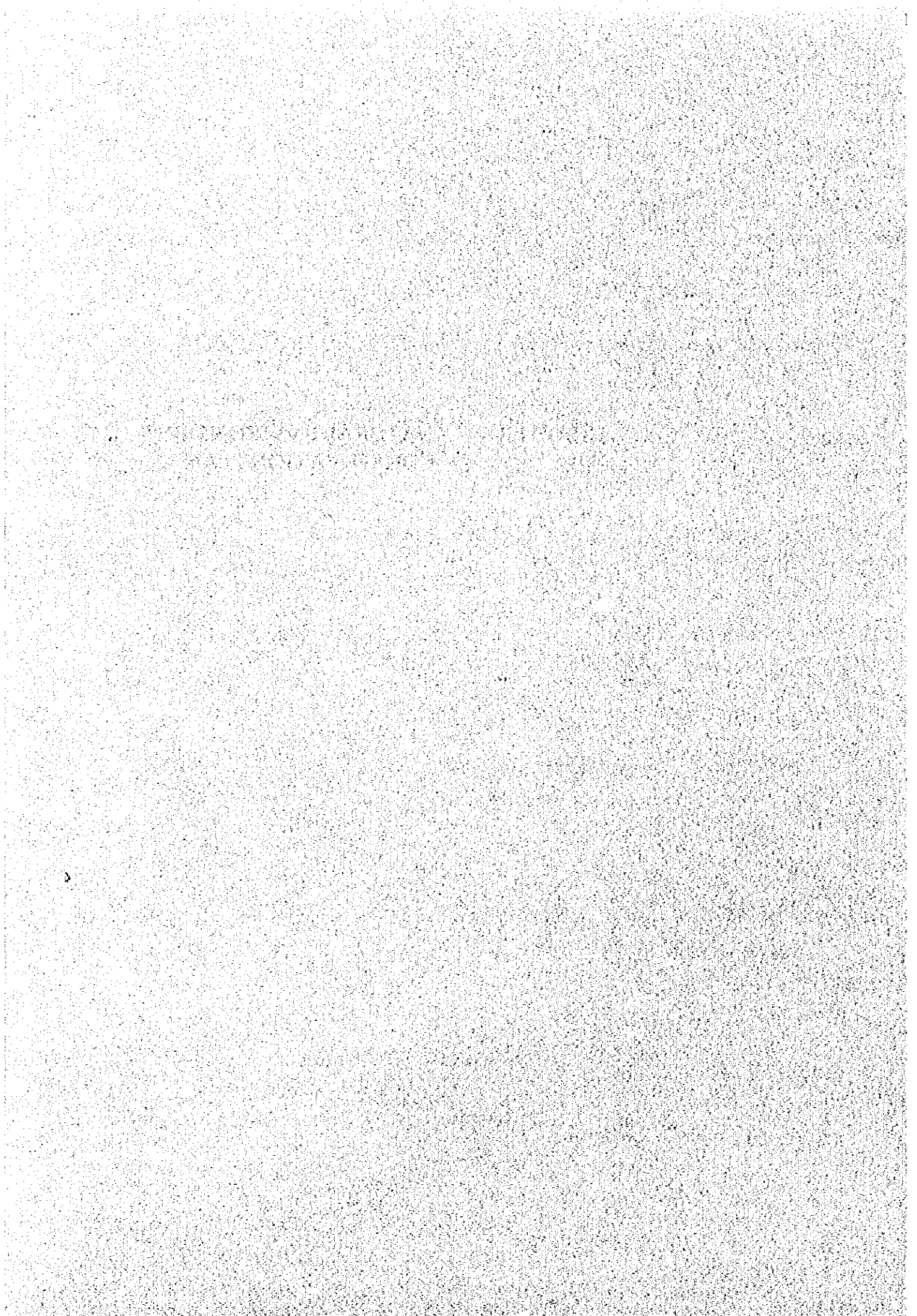
3.4. Environmental Considerations for Tourism Development

This plan is composed of the following two parts:

- General recognition on tourism development and environmental conservation, and
- Environmental considerations for tourism development and problems.

Firstly, general relationships between tourism development and environmental conservation are identified in order to understand how tourism development impacts on the environment and its conservation. Then, environmental problems by tourism development are extracted with an analysis of their respective causes. Following general environmental considerations, as for specific areas such as National Parks/Reserves, counter-measures are considered for common problems, represented by over-use by tourism, and specific problems, such as off-road driving, balloon safari and animal harassment.

**CHAPTER 6 NATURAL ENVIRONMENT
CONSERVATION PLAN**



Chapter 6 Natural Environment Conservation Plan

1. Non-organic Environmental Conservation and Management Programme

Since elements of the non-organic environment are closely interrelated to each other, their conservation and management must be considered as a set of issues. This is especially true for the interrelation between soil and water. There are four main suggested actions for the problems in the non-organic environment, which were indicated in the previous Figure 2.15. They are summarised as follows :

- Forest conservation for water exhaustion and land deterioration,
- Suitable land use avoiding land deterioration,
- Water resource management for water exhaustion , and
- Pollution control for environmental pollution (air, soil and water).

Each measure for these suggested actions are described in this section, taking account legislation, management and technical issues.

1.1. Forest Conservation

Forest areas have an important function to stabilise a natural ecosystem : namely fixation of carbon, prevention of soil erosion, protection of water catchment and conservation of biodiversity and wildlife habitats. On the other hand, forest and its products have been recognised by people as natural resources, sometimes with cultural value : such as fuel-wood, housing materials, foods, medicines and sacred grounds. However, deforestation has been seriously going on caused by increasing human pressure. Since success or failure of forest conservation may to sway the future survival of people, urgent actions for forest conservation are really needed. The actions are to:

- Intensify and expand afforestation through the present programmes of the Forest Department and NGOs : exotic trees for fire-wood use and indigenous trees for conservation of water catchment and biodiversity,
- Control logging measures from clear felling to selective logging,
- Develop sustainable use of various forest resources, such as by harvesting forest products other than timber (e.g. fruits, nuts, honeys, vines) and encouraging eco-tourism,
- Develop substitutes for fuel-wood/charcoal for domestic use,

- Reinforce FR management and regulations, such as for tree felling, field patrol and fire control with expansion and maintenance of a network of fire-breaks,
- Draw up management plans for all FRs with the establishment of a national forest inventory, and
- Gazette new FRs and promote important FRs for wildlife/biodiversity conservation into NPs.

1.2. Suitable Land Use (Protection from Desertification)

Land deterioration, such as desertification, is mainly caused by unsuitable land use with over-use or miss-management. Desertification, following soil erosion, can easily take place in Kenya, because most of the land belongs to a fragile ecosystem. However, desertification has progressed seriously over the recent decades and has become a main threat to people lives, because of the increase in human activities. Since more than half of the Kenyans live in arid/semiarid land, although its population density is rather low, desertification can have a considerable impact on the country, too.

Basically it is better that people living in arid/semi-arid land keep their traditional life style as nomadic pastoralists, which is ecologically suitable in this area. There is a need to reconsider settlement schemes with promotion of agriculture in this area. Some other ecologically sustainable measures should be taken for improvement of their lives. The measures are to:

- Intensify and expand the present programmes for protection against desertification,
- Enhance afforestation and agro-forestry, especially on hill tops and marginal areas of desertification,
- Protect forests along riverbanks from tree felling,
- Pursue suitable land use based on the agricultural potential and improve the agricultural systems and methods,
- Re-examine traditional pastoralism systems and their land use in arid/semi-arid land,
- Restrain expansion of intensive agriculture and human settlements to arid/semi-arid land,
- Reduce livestock populations, especially goats, which are the worst affecting animals for over-grazing, and redistribution of their grazing areas, and

- Extend wildlife-based development, such as eco-tourism and game culling and ranching, which can be compatible with traditional pastoralism.

1.3. Water Resource Management (Wetland Conservation)

Water resources are influenced by environmental deterioration and they are one of the limiting factors for development and human activities, particularly in arid/semi-arid land. Water resources are critical for survival of many wild animal species too, as providing drinking water and aquatic habitat, especially during a drought year. In order to maintain water quality and quantity, it is indispensable to carry out forest conservation and the prevention of soil erosion as mentioned above, not only in wetland areas, but also in water catchment areas.

Conservation of the coastal wetland can contribute to protecting the coastal shore from beach erosion and the sustainable use of marine resources. Particularly mangrove forests are considered to be a key element to mitigate the affects from the inland. Suggested water resources/wetland conservation measures are to:

- Protect water catchment areas through forest conservation,
- Prevent soil erosion and siltation along riverbanks and near water sources,
- Restrict reclamation, irrigation and water resource development works in ecologically important wetland and/or important water sources for wild animals,
- Intensify pollution control by emission source control with treatment, reduction and its monitoring system,
- Reinforce MNP/MNR/Mangrove FR management and regulations, and
- Assess water quality and quantity with the establishment of a national wetland inventory : full potential of water resources, especially in the Lake Victoria basin and the coastal fresh water resource.

1.4. Pollution Control

Environmental pollution (air, soil and water) has become a serious problem in urban and industrial areas, such as Nairobi and Mombasa, due to rapid increase of the population without proper pollution control. Pollution often appears as a problem in protected areas, such as NP/NRs caused by tourism development. In line with the further population increase, it is clear that areas influenced by pollution will expand to other medium or small cities and that pollution will gradually but certainly affect people's health as well as the natural environment, unless effective measures are immediately taken.

The principal concept for pollution control is control of the emission sources and effective legislation and enforcement/monitoring systems should be established. It is also necessary to provide appropriate incentives and penalties for widespread adoption of these measures. To this end, the followings are necessary actions to be taken into consideration are to:

- Formulate a basic and integrated law for pollution control under the Ministry of Environment and Natural Resources, including pollution standards, pollutant emission standards and environmental quality standards,
- Establish pollution control enforcement systems and pollution monitoring systems,
- Establish installations for sewage treatment, such as urban/municipal sewerage, household-based sewerage (e.g. septic tanks, small-scale domestic treatment) and end treatment stations,
- Establish installations for solid waste treatment, such as incineration, excrement treatment, rubbish treatment and large-size rubbish treatment installations,
- Charge the water supply systems with introduction of recycling of used water after treatment,
- Conduct land improvement schemes, such as dredging (e.g. rivers, ports, harbours, coastal areas), soil covering (e.g. ports, harbours), oil/dirt fencing (e.g. ports, harbours) and protective measures for water quality from agricultural land use, and,
- Establish laboratories to study environmental pollution, and monitor water quality changes for timely action.

The details of the pollution control programme are described in Chapter 8 of this volume.

2. Wildlife Conservation and Management Programme

2.1. General Directions

The policies, strategies and measures described in KWS's "A Policy Framework and Development Programme 1991-96" are well considered and its contents is highly evaluated. The wildlife conservation and management programme should therefore conform with this policy framework of KWS.

It is clear that the PAWS project, which was started following the policy framework, is effective and has improved the condition of wildlife conservation and management in Kenya, especially in several high priority areas. However, there is not so much progress as expected so far, since donor agencies delayed to release funds committed to the project: weakening or slowing down Kenya's wildlife conservation and management, as has happened in the late 1970's to the 1980's.

Before considering the direction of wildlife conservation and management, it must be recognised that the future of wildlife is by no means guaranteed. There are two major directions to be considered : one is concentration of all the efforts into the protected areas, and the other is expansion of the efforts into other wildlife areas. For the first direction, it may guarantee that some wildlife population and habitat will be protected at a minimum level. As for the second direction, it is expected that the whole ecosystem, including wildlife dispersal areas, will be conserved at a maximum level.

Therefore, as for making the wildlife conservation and management programme, both direction must be considered, or a holistic approach is recommended. The first direction however, should be given high priority for implementation because of its urgent needs and fund constraints.

Until recent years, wildlife utilisation in Kenya was restricted to wildlife tourism and even presently, hunting and dealing in wildlife products is legally prohibited. Although they characterise Kenya's policy for wildlife conservation, it seems that the present severe circumstances on people and wildlife in Kenya may not allow to keep this direction without any change in the future. Introduction of non-commercial consumptive use of wildlife will become an important measure for rural development, mitigation of wildlife conflicts, wildlife management and revenue increase for KWS, which will help its fund basis. Thus, It is required to develop a multiple wildlife utilisation system, which conforms to Kenya's ecosystem, society, culture and economy. Also, a prudent attitude should be taken for its

introduction, since this kind of wildlife utilisation may have a considerably negative impact on tourism development.

The suggested actions for the long-term survival of wildlife are shown in the previous Figure 2.16. They are divided into major actions and supporting actions as follows :

Major Actions

- Develop a national network of wildlife area,
- Enhance wildlife-based tourism, and
- Support coexistence of local people and wildlife.

Supporting Actions

- Encourage environmental education,
- Provide scientific services,
- Review and enforce legislation and international conventions, and
- Reinforce management capability and finance.

Each measure for these suggested actions are described in this section.

2.2. Major Actions

2.2.1. National Network of Wildlife Areas

The KWS established a protected area system, which is a main part of the national network of wildlife areas, particularly for conservation of biodiversity/ecosystems, conservation, education/research and development of recreation/tourism. Under this system, all of the NPs and one-fourth of NRs are administrated by KWS. However, the rest of NRs are administrated by County Councils in Districts, where NRs are located. To improve on the management and conservation of NP, KWS should enter into management agreements of with relevant Country Council for NR under their jurisdiction. Meanwhile, it is indispensable that wildlife conservation be carried out both, inside and outside of the protected areas, since many of them are not ecologically self-sufficient, but depend upon their surrounding areas. Generally, wild animals are abundant in terms of population density in the protected areas such as NP,NRs, but they are also distributed in the vast dispersal areas, which are mainly in arid/semi-arid land (refer to Figure 2.17). According to KWS officials, it is estimated that about 75% of the Kenya's wild animals live outside the protected areas. The dispersal areas are very important for self-control of wildlife population densities and for their seasonal migration habits.

Five major actions proposed are: -

- Conservation priority,
- Protected area system,
- Management of protected areas,
- Wildlife management outside protected areas, and
- Conservation of biodiversity (genes, species and ecosystems).

(1) Conservation Priority

- First, protected areas, especially NP/NRs under the control of KWS, as a core area of the network,
- Second, wildlife conflict/dispersal areas, especially in adjacent areas to the protected areas, as a buffer zone,
- Third, other wildlife areas, such as agricultural land and nomadic pastoral land.

(2) Protected Area System

- Include all of NRs in this system by making agreements with County Councils and transfer the management rights to KWS in some cases,
- Gazette proposed protected areas or expand boundaries of existing NP/NR areas, especially for 32 sites (including FRs) currently processed or proposed by KWS in co-operation with the Forest Department, County Councils and so on.

(3) Management of Protected Areas

- Implement the Five Year Management Plans for Protected Areas, especially low development priority NP/NRs as soon as possible,
- Finalise quickly the memoranda of understanding, such as for wetland conservation and MNP/MNR management, between KWS and the Department of Fisheries, Kenya Marine and Fisheries Research Institute and so on,
- Establish development/management priorities for each area according to present conditions, potential, ecological value and relationship with areas outside the protected areas,
- Strengthen management of the protected areas, especially MNP/MNRs and NP/NRs located in remote areas, by allocating enough budget and human resources through appropriate planning and research, and

- Establish special zones inside the protected areas to preserve the most valuable ecosystems and endangered species.

(4) Wildlife Management outside Protected Areas

- Involve local communities in wildlife conservation efforts while minimizing wildlife related costs to them,
- Establish development/management priorities for these areas based on conservation/economic values, land use competition, land tenure systems and locations,
- Keep dispersal/migration areas of wild animals as a buffer zone for people and wild animals by enhancing wildlife-based development and preserve the highly important areas as a corridor for their migration, and,
- Co-operate with other governmental sectors in order to deal with land use and tenure issues, especially for improvement of the present land sub-division system .

(5) Conservation of Biodiversity (Genes, Species and Ecosystems)

- Give priority to endangered and key species, like elephant and black rhinoceros, as well as other threatened species,
- Enhance population recovery and control of these threatened species by specific conservation programmes, which include anti-poaching, illegal trade monitoring, well-considered trans-location, captive-breeding and fencing measures,
- Strengthen in-situ conservation of ecosystems with 19 types of the bio-communities (refer to Table 3.2), especially forest and wetland, and ex-situ conservation like gene banks, botanical gardens, zoos and aquariums,
- Enhance international co-operation agreements with the neighbouring countries, particularly Tanzania and Uganda, for conservation of migratory animals and ecosystems extending to those countries, and,
- Establish national inventories of Kenya's flora and fauna with identification of threatened species.

2.2.2. Wildlife-based Tourism

Wildlife-based tourism is a principal economic activity in wildlife-based development. This provides an economic justification for wildlife conservation and sufficient revenue for NP/NR management. Besides the old safari type tourism, eco-tourism, which gives benefits to both, environmental conservation and local people's life, should be further encouraged.

The protected areas can be divided into three groups in terms of their present tourism conditions, as shown in Table 6.1. The carrying capacity of visitors is different in each NP/NR, due to its environmental features and can be changed by conditions of tourism activities, infrastructure/facilities and management/regulations. Basically, in NP/NRs where environmental impacts have already appeared, the visitor numbers should be regulated, unless appropriate actions are taken. In the case of other NP/NRs, the visitor numbers should be allowed to expand, but counter-measures for solving the problems must be reconsidered, if any impact due to increase of visitors is observed. Proposed control measures are to:

- Enhance ecologically sound wildlife-based tourism, by improvement of infrastructure/facilities with implementation of the EIA and protection of key animals for tourism ,
- Develop a model case of eco-tourism, particularly in the under-developed NP/NRs,
- Reduce tourism-related impact on the environment by means of visitor service/education, improvement of road networks and regulations of tourism facilities/activities.

Table 6.1 Classification of Protected Areas by Present Tourism Condition

Present Conditions	Popular NP/NR	Developing NP/NR	Under-developed NP/NR
Tourism	High to medium potential, Major destination (>50,000 ca. visitors/year)	High to medium potential, Minor destination (10,000-50,000 ca. visitors/year)	Medium to low potential, Little-use (<10,000 ca. visitors/year)
Management	Almost sufficiently to insufficiently implemented, Restoration from environmental damage by tourism	Almost insufficiently implemented, Prevention of environmental damage by tourism	Insufficiently implemented, Development of a model case for eco-tourism
NP/NR Examples	Amboseli NP, Nairobi NP, Lake Nakuru NP, Aberdares NP, Tsavo East/West NPs, Masai Mara NR, Mombasa MNP, Malindi MNP	Mt. Kenya NP, Hell's Gate NP, Meru NP, Lake Bogoria NP, Shimba Hills NR, Samburu NR, Kisite MNP	Sibiloi NP, Mt. Elgon NP, Kora NP, Ruma NP, Tana River Primate NR, Marsabit NR, Kakamega NR, Kiunga MNP

Source: JICA Study Team

- Redistribute tourism destinations by differentiation of pricing on the entry fees, development of infrastructure/facilities, promotion with advertisement and strict limitation on the number of tourist accommodations and entering vehicles,
- Monitor visitor numbers and environmental impact in every NP/NRs, in order to estimate the carrying capacity of visitors and also to be able to provide proper actions against possible environmental problems,
- Maintain tourist security by field patrol, especially for NP/NRs located near the border and in remote areas,
- Develop visitor service through improvement and establishment of facilities : Information Centres in all protected areas, Visitor Centre in Nairobi, and Environmental Education Centres with Animal Orphanage/Aquarium in Mombasa, Nairobi NP, Kisumu Impala LS, and
- Enhance close co-operation with the Ministry of Tourism and Wildlife and tourism industry, as represented by Kenya Association of Tour Operators and Kenya Association of Hotel Keepers and Caterers, INGO, local communities and other stakeholders in all matters related to tourism.

2.2.3. Local People and Wildlife Coexistence

To obtain an understanding and support for wildlife conservation by local people is indispensable for the success of wildlife conservation. Generally, however, local people regard wild animals as nuisances, because there are many conflicts between local people and wild animals, such as crop/livestock damage and human injury or death. These conflicts occur on a border between human areas and wildlife areas and thus, is remarkable around the protected areas particularly in the central highland and the coastal lowland (Figure 2.17). Therefore, the positive role of wildlife for local people should be recognised by themselves through economic benefits from the wildlife-based development and environmental education as well as reduction of damage by wild animals. As the result, local people will be able to tolerate wildlife existence and restrain their land from altering for other purposes.

The Community Wildlife Programme by KWS should be enhanced through the District focus for rural development by the District Development Committees, and the proposed TPZS. There are two principal directions for coexistence between local people and wildlife in terms of land use around the protected areas. One is wildlife-based development, including eco-tourism, in wildlife dispersal areas, where livestock keeping is a dominant land use. The other is reduction of

damage by wild animals through fencing and problem animal control programmes in intensive agricultural land, where protected areas are isolated.

Wildlife-based development can be carried out profitably alongside some human activity, such as livestock keeping. Wildlife related tourism has higher economic returns than returns from alternative land users, since in the first instance, most NP/NR are located in arid and semi arid lands where profitable alternative land users are severely limited. Also, annual biomass per area, of wild animals (ungulates) be much larger than that of livestock only or livestock with wild animals (e.g. Talbot, 1963). However, its viability depends on the ecological zones, land use capabilities, socio-cultural features and so on.

As for environmental education, people should be given opportunities to learn about the importance of wildlife for Kenya's natural ecosystem as well as the national/local economy and the international value of their wildlife. It is expected that, in the long term, people appreciate the value of wildlife, hence enhance their responsibility to wildlife conservation. Proposed measure to increase participation of local communities in wildlife conservation are to:

- Enhance wildlife extension in order to involve local people and land owners in wildlife-based development and conservation with establishment of Community Conservation Units in local areas,
- Develop a multiple wildlife use system to be suitable for Kenya's ecosystem, society, culture and economy, particularly for local communities,
- Expand consumptive use of wildlife, such as game cropping/ranching/farming, with examination of re-introduction of sport hunting,
- Encourage eco-tourism by establishment of community-based sanctuaries,
- Develop sustainable fisheries' management with the introduction of environmentally sound fishing methods and reinforcement of fishing regulations,
- Improve systems of the Wildlife Fund for Development and the benefit sharing programme by receiving audit from the third sector to secure transparency of the fund management and allocation, and involve all tourism-related organisations, both government and private sectors (investors, hoteliers, tour operators, etc.) in the fund arrangement,

- Reduce damage of crops and property by wild animals by expanding the fencing and problem animal control programmes,
- Expand environmental education through the Community Education Programme and improve Field Study Centres in Tsavo East/Lake Nakuru/Meru NPs, and
- Undertake research in order to determine where wildlife-based development, both consumptive and non-consumptive use of wildlife, is compatible with or alternative to other land uses (livestock pasturing, forestry, fisheries, etc.) in various parts of the country.

2.3. Supporting Actions

2.3.1. Environmental Education

In order to conserve the natural environment for future generations, environmental education is a basic as well as a key factor. This conforms not only to the wildlife conservation, but also to environmental conservation from a long-term viewpoint. Kenyans should be given opportunities to learn about such facts as: people form a part of the ecosystem; natural resources will generate economic benefits. If people utilise them in a sustainable manner, Kenya's natural environment is internationally praised as a great and precious world heritage. Thereafter the people will have a better understanding of their responsibility for environmental conservation.

Environmental education is divided into three main types, namely community education, youth education and visitor education.

Community education, especially for local communities, is necessary to enhance their coexisting with wildlife. Youth education at the national level should be given first priority, since the young generation, who will take the nation's future upon themselves, is an appropriate target to extend environmental education. The Community Education Programme should be expanded for both, the community and youth education. Since it is important that people think this matter of their own accord and many NGOs can contribute to this field, education at the grass-root level will be encouraged as well as formal education in schools/colleges.

Visitor education is carried out as part of the visitor service. It is important that visitors to NP/NRs have a chance to appreciate more the wildlife and natural ecosystem of Kenya. Visitor education can contribute to mitigation of tourism impacts on the natural environment, promote international understanding of Kenya's wildlife

conservation, and increase revenue/donation from visitors. Actions required to promote environmental education are to:

- Enhance the youth education by participation of youth in local conservation activities and invitation of youth to Education/ Field Study Centres in NPs,
- Include environmental conservation matters schools' curriculum as formal education by collaborating with the Kenya Institute for Education,
- Support education at grass-root levels led by NGOs and activities of Wildlife Clubs of Kenya, and
- Improve and establish facilities for education: Field Study Centres for community/youth education, Visitor Centre and Information Centres for visitor education, and Environmental Education Centres with Animal Orphanage/ Aquarium for all types of the education.

2.3.2. Scientific Services

It is a general principle that, before taking any wildlife conservation and management measures and depending on each measure and objective, scientific research should be carried out in terms of biology, ecology, sociology, economics and so on. Ecological monitoring is required to evaluate the present conditions of the environment and to estimate the future impact on the environment by development activities and management measures. Veterinary service is required to implement several measures, particularly prevention and treatment of animal disease and assistance to animal translocation. Proposed measures to this end are to:

- Give first priority to research, ecological monitoring and veterinary service, which are essential for planning and management of the protected areas and the conservation of the wildlife,
- Strengthen the research capabilities by improving of staff training and research equipment/facilities, establishment of research stations in key NP/NRs for ecological concerns (e.g. Mt. Kenya/Amboseli/ Sibiloi NPs, Kakamega/Tana River Primate NRs, Malindi MNP) and use of Field Study Centres for the research purpose,
- Encourage national research programmes on wildlife and ecosystem by collaborating with other national/international research institutions, such as National Museum of Kenya, Department of Remote Sensing and Resource Survey, Kenya Marine and Fisheries Research Institute and IUCN.

2.3.3. Legislation and International Conventions

The Wildlife Conservation and Management Act (1976) was amended occasionally, including in 1989, but has some deficiencies and unsuitable provision to the present situation. On the other hand, Kenya is a party to or member of many international conventions, which are not always implemented appropriately. The Wildlife Conservation and Management Act (1976, revised 1989), should be further revised to:

- Review and reform legislation and regulations in terms of land use, wildlife use right, compensation system for damage of property by wild animals and MNP/MNR management and so on,
- Facilitate implementation of international conservation obligations and register new international designated conservation areas, such as Biosphere Reserves, World Heritage Sites and Ramsar Sites, for example Tana Delta, Lake Bogoria, Lake Naivasha are currently processed or proposed to the Ramsar Sites by KWS.

2.3.4. Management Capability and Finance

The management capability and financial condition has improved very much after KWS started its operation and the preparation of its policy framework 1991-1996. However, due to the recent political pressure and some financial constraints KWS projects have not advanced as much as expected. In order to continue the present projects and succeed in wildlife conservation in Kenya, KWS has to increase its management capability and to maintain its financial base from park entry fees and the donor support. In the future after completion of the projects, it is expected that KWS will work on a self-supporting basis, that is from internally generated income. Actions required to strengthen KWS are to:

- Secure parastatal status and the financial autonomy of KWS,
- Restore and secure new confidence in Kenya's wildlife conservation direction in order to secure and increase funds by donor countries and agencies,
- Provide capital investment for basic infrastructure and facilities, such as roads, airstrips, transport, plant, equipment, offices, accommodation and water supply facilities, particularly for low development priority NP/NRs,
- Develop human resources through intensive staff training and rehabilitation of Wildlife and Fisheries Training Institute in Naivasha and Training School in Manyani, and

- Improve revenue generation basis of KWS by expanding and diversifying the revenue sources and improving the revenue collection system for park entry fees and lodge leases.

3. Zoning Programme for Natural Environment Conservation

3.1. General

In order to implement the natural environment conservation plan effectively, land use is one of the most important factors, since many of environmental problems arise from land use competition or mismanagement. It is necessary to establish a zoning programme for sustainable and environmentally sound land use.

The whole country is divided into three conservation priority zones, giving priority to environmental conservation : high, medium and low conservation priority zones. These zones are further divided into a total of six sub-priority areas, considering the conservation value of the natural environment; ecological zones, ecological importance, wildlife/livestock/human distributions, agricultural potential and present land use are taken into account.

Basically, areas where the natural environment has not been extensively altered by human activity, higher priority should be put on environmental conservation, while those, where the natural environment has been altered or disturbed by human activities, lower priority should be given to environmental conservation. Major suggested actions for these three zones with the six areas and their distribution are shown in Table 6.2 and Figure 6.1, respectively. An approximate percentage of land area occupied by each sub-priority area of the whole country is calculated by reading the distribution map. These occupancy rates are approximately 18% for the high, 75% for the medium and 7% for the low conservation priority zones.

3.2. Conservation Priority Zones

3.2.1. High Conservation Priority Zone

The high conservation priority zone is applied to ecologically important and sensitive areas. They can be classified into two sub-priority areas: protected area and other ecologically important area. Wildlife is still abundant with high floral/faunal diversity and endemism and the natural ecosystems are relatively well balanced. This zone should be defined as large as possible in terms of area, since the areas included in this zone are generally isolated in location and tend to be threatened by expanding human activities. Required major actions comprise of conservation of both, non-organic environment

The protected area, as a term of one sub-priority area, includes all the present, processed and proposed NP/NR/NS/LSs. This area is scattered all over the country with the occupancy rate of about 10%, and only a few of them are found in arid land. This area represents Kenya's bio-communities and is the central part of wildlife/biodiversity conservation as a core area. This area should be used only for tourism in NPs or sustainable utilisation of natural resources by local communities, such as fuel-wood collection, livestock grazing and traditional fishing in NRs. Another important objective of this area is to generate the financial resources from tourism revenues for wildlife conservation and management. Additionally inside NP/NRs, the special important or sensitive sites for ecological/biological concerns should be determined by further research in order to intensify preservation of the most valuable ecosystems and protection of the endangered species. No human activities are allowed in these sites, except for scientific research and environmental monitoring for conservation purposes.

On the other hand, the ecologically important areas include other gazetted or registered conservation areas, such as Forest Reserves and Biosphere Reserves, and unprotected ecologically important areas, such as high species diversity/endemism areas, ecologically sensitive areas and other natural forest/wetland. The unprotected areas should be legally conserved by promoting them to a kind of the conservation area, including community-based sanctuaries. At the same time, sustainable utilisation of natural resources, including consumptive use of wildlife, can be allowed in this area.

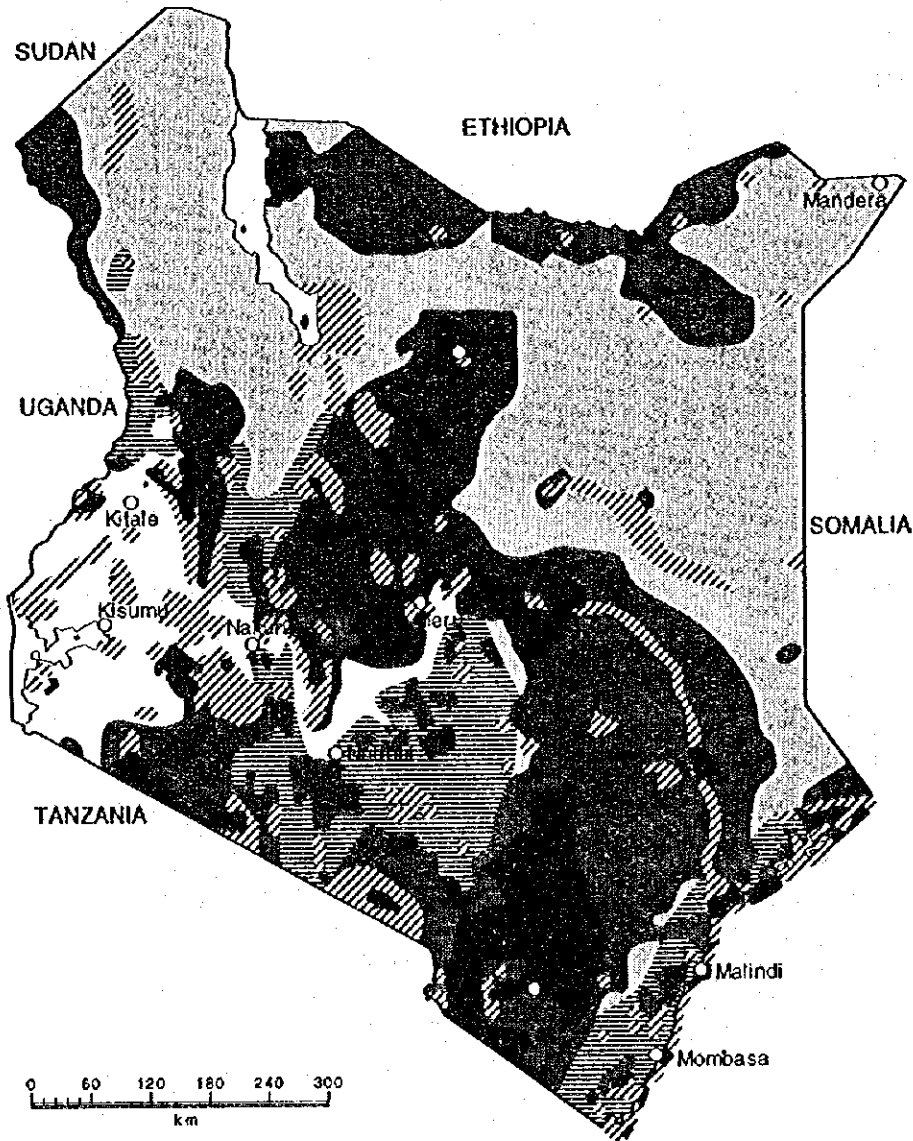
Table 6.2

Priority for Environmental Conservation and Management

Conservation Priority Zones	Sub- priority Areas*	Designations	Ecological Zones	Major Suggested Actions	Occupation *** in Area (%)
High	1 Protected Area	Present National Parks/Reserves/Sanctuary & Local Sanctuary, Processed/proposed National Parks/Reserves**	I - IV	Pollution control #, Forest/wetland conservation, National network of wildlife areas, Wildlife-based tourism	10%
	2 Ecologically Important Area	Forest Reserves/Nature Reserves, Biosphere Reserves, Private Wildlife Sanctuaries, High species diversity/endemism area, Ecologically sensitive area, Other natural forest/wetland including coastal ocean	I - IV	Forest/wetland conservation, National network of wildlife areas ##, Local people/wildlife coexistence, Wildlife-based tourism ##	8%
Medium	3 Wildlife Conflict/Dispersal Area	Major wildlife conflict area, Major wildlife dispersal area, Elephant distribution area	I - IV	Suitable land use/management, National network of wildlife areas ##, Local people/wildlife coexistence, Wildlife-based tourism ##	33%
	4 Medium Productivity Area	Medium agricultural potential area, Medium livestock density area	II & IV	Suitable land use/management, Local people/wildlife coexistence ##	9%
	5 Low Productivity Area	Low agricultural potential area, Low livestock density area	II & III	Suitable land use/management, Local people/wildlife coexistence ##	33%
Low	6 High Productivity/ Human Activity Area	High agricultural potential area, High livestock density area, Urban/Industrial area	I	Pollution control, Suitable land use/management	7%

Note: * An area in the higher rank is given priority to occupy the land over areas in the lower ranks.
 ** Currently processed or proposed to the protected areas by KWS.
 *** Approximate percentage of land area occupied by each sub-priority area for the whole country.
 # This action is needed for some specific areas such as popular NP/NP.
 ## Priority for these actions are not so high as those in other areas.
 Source: JICA Study Team

Figure 6.1 Distribution of Conservation Priority Zones



Legend :

- [High]  Protected Area
-  Ecologically Important Area
- [Medium]  Wildlife Conflict / Dispersal Area
-  Medium Productivity Area
-  Low Productivity Area
- [Low]  High Productivity / Human Activity Area

Source : JICA Study Team

3.2.2. Medium Conservation Priority Zone

The medium conservation priority zone is mainly applied to arid/semi-arid land, in which wildlife is widely distributed and human activities are carried out only to a certain extent. This zone can be classified by conditions of wildlife distribution, wildlife conflict and agricultural potential into three sub-priority areas : wildlife conflict/dispersal area, medium productivity area and low productivity area. The principal objective for this zone is to realise the coexistence of local people and wildlife by solving their conflicts through suitable land use/management and the wildlife-based development, particularly tourism.

The wildlife conflict/dispersal area occupies about 33% of the country. This area and the high conservation priority zone mentioned above can be evaluated as important areas for wildlife conservation as well as proposed areas for tourism development. Both areas together occupy about half of the country (51%).

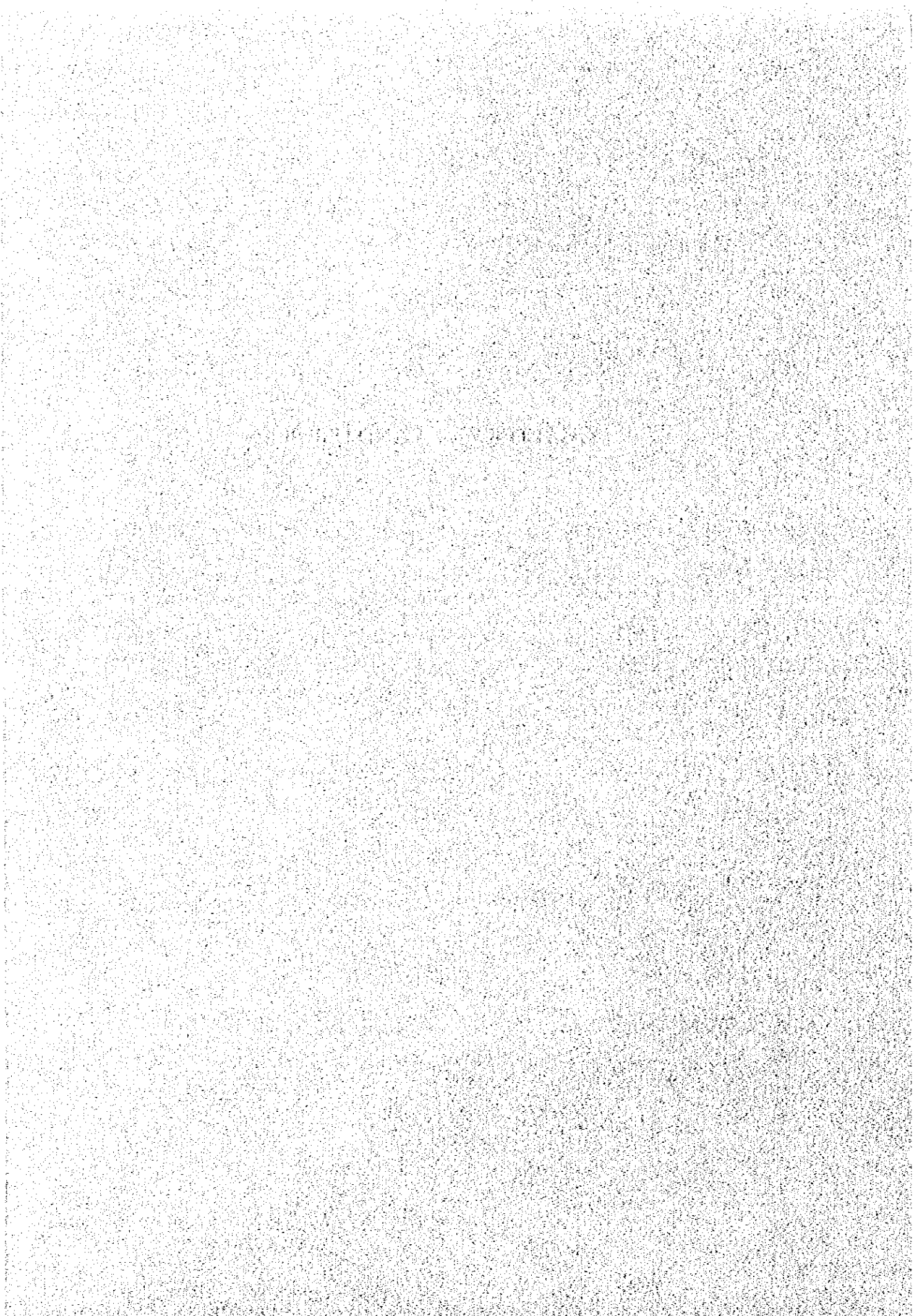
This area includes major wildlife conflict areas, major wildlife dispersal areas and elephant distribution areas. In the major wildlife/man conflict areas on agricultural land, it seems that local people only sustain harm from wild animals and cannot get any benefit from them. Therefore, fencing as a last measure solution have to be introduced to separate the wildlife range from the human range. The same measure may be needed in future in the elephant distribution areas, because elephants are considered the biggest problem to local people. However, in the wildlife dispersal areas and other wildlife conflict areas, wildlife-based tourism such as eco-tourism must be encouraged to conserve their dispersal/migration areas. At least highly important corridors for their migration should be protected from being altered to other land uses.

The medium and low productivity areas, which have medium and low agricultural potential, occupy about 43% of the whole country. These areas should be used for extensive or improved agriculture and traditional nomadic pastoralism with wildlife-based development, especially consumptive use of wildlife, such as game cropping and possibly hunting. In the medium productivity area, more attention should be paid for environmental conservation, because of expansion of intensive agriculture, which is unsuitable for this land. In the low productivity area, besides the protection from desertification, only a few specific urgent actions are needed to be taken, as there is comparatively a small environmental impact caused by human activities, due to the small population size and less abundance of wild animals.

3.2.3. Low Conservation Priority Zone

The low conservation priority zone is applied to the high productivity/human activity area, such as urban/industrial areas and high agricultural potential areas. This zone is concentrated in the central/Western highlands and the Southern part of the coast. It is crucial to sustain the high productivity and the environmental quality in this zone, which contributes to the environmental conservation in the rest of the country, too. Major actions which are needed to be taken are related to non-organic environmental conservation, namely pollution control in Nairobi, Mombasa and other large cities and suitable land use/management in other areas.

CHAPTER 7 LAND USE PLAN



Chapter 7 Land Use Plan

1. Identification of Issues on Land Use

1.1. Summary of Existing Land Use Problems

Generally speaking, land use control is one of the principal measures for environmental conservation and management. In this sense, existing land use problems can be divided into four areas in accordance with geographical features, that is highland area, plain area of arid and semi-arid land, mountainous area and coastal area. These areas show different characteristics of land use, land ownership and development potentials, resulting from different problems (Table 7.1 refers).

Table 7.1 Typical Land Use Problems

	Problems of Existing Land Use	Problems caused by Development	Problems of Land Ownership
Plain Area (arid and semi-arid lands)	Conflicts of existing land use between wildlife and human activities	Overification Enlargement of land use conflicts between sedentary activities and pastoral activities.	Pressure to revert ranch to individual ownership by sub-division. Coordination of land ownership between sedentary and pastoraIs.
Mountainous Area (highlands)	Maximum utilization of agricultural potential lands in order to coordinate the production of cash crops and food crops.	Soil erosion in the ranches where extensive livestock production is applied. Soil erosion causes siltation in the downstream of Tana and Sabaki Rivers, resulted in damaging marine ecosystem	
Coastal Area	Conflicts of existing land use between industry and tourism development.	Coastal erosion due to destroy the original vegetation of mangroves Soil erosion in the cultivated land causes siltation, resulted in damaging marine ecosystem Disturbance of local peoples' access to beach	Large private estates and holdings Unclear land tenure in the coastal strip

Source: JICA Study Team

Three existing land use problems are related to the environmental management as well as to tourism development are:

- Conflicts regarding existing land use between wildlife and others,
- Soil erosion at the edge of high agricultural potential area, and
- Land subdivision in arid and semi-arid land.

1.2. Future Land Use

1.2.1. Land Classification

Based on the above recognition as well as the future socio-economic prospects, land use study must be undertaken so as to facilitate a formation of national and regional land use policy. Meanwhile, it is necessary to set up a temporary and appropriate classification for land use instead of a formal classification. The land classification in this study is set out in accordance with the principle purpose of a land use plan, which is to conventionally manage each land classification. In this sense, the following four types of land classification are proposed :

- Urban Areas,
- Agricultural Areas,
- Pastoral Areas, and
- Natural Conservation Areas.

1.2.2. Demand for Land

(1) Urban Areas

In accordance with the increase of the urban population, urban areas need to be expanded.

(2) Agricultural Areas

Human population growth and the increase of the number of agricultural workers imply an increasing demand for agricultural products. In order to increase the amount of agricultural products, it is necessary to expand agricultural land, as agricultural productivity is not likely to be increased in order to provide the required amounts of agricultural products in the near future. (In the long term, agricultural productivity might improve by promoting intensive agriculture and so as not to expand agricultural land.)

(3) Pastoral Areas

Human number of livestock is presently stable and livestock production measured as head/area seems to have reached its limits at the present. Accordingly, since more meat is required to meet consumption of the increased population and in order to increase the intake of protein, it is necessary to expand ranch and pastoral areas.

(4) Natural Conservation Areas

In line with rising environmental awareness, more attention is to be paid to land use for natural conservation purposes. But due to an

(4) Natural Conservation Areas

In line with rising environmental awareness, more attention is to be paid to land use for natural conservation purposes. But due to an increasing pressure to utilise land for agriculture and livestock production, it will take strong efforts to conserve wildlife dispersal areas.

1.2.3. Future Spatial Development and Land Use Conflicts

(1) Spatial Development Direction

Based on the land requirements for the various human activities discussed in the above section, an outline of the spatial development direction is illustrated in Figure 7.1. The development corridor from Mombasa, Nairobi to Kisumu will be basically strengthened and widened to the north-south direction by expansion of agricultural land and distribution of tourism development. In this context, strong pressure for changing existing land use will be placed on the central part of the Masailand Tourism Region, the northern part of the Eastern Tourism Region and the Northern part of the Central Tourism Regions.

(2) Environmental Zoning

From the environmental point of view, the study team proposes six conservation levels presented in Table 6.2 and Figure 6.1 of Chapter 6. The importance of the protected area, ecologically important area and wildlife conflict/dispersal area will increase in terms of conserving Kenya's biodiversity and bio-communities.

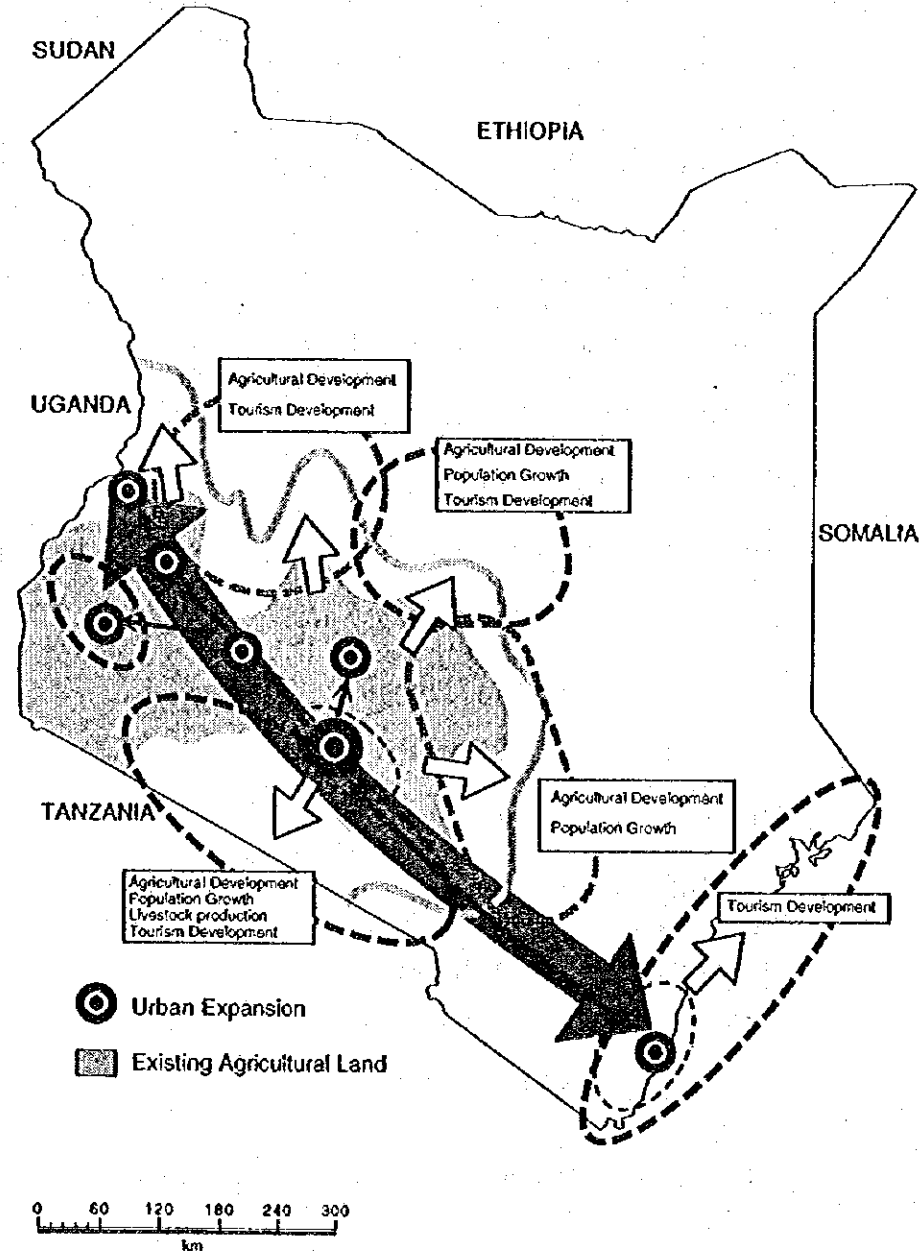
(3) Future Land Use Conflicts

If human activities such as settlements, urbanization, cultivation and livestock production continue as at present, the requirements for expanding land use will generate serious conflicts of land use. According to the previous Figure 7.1, such serious land use conflicts can be grouped into the following 3 types :

- Conflicts between urban and agricultural areas,
- Conflicts between agricultural area, and ranch and pastoral area, and
- Conflicts between livestock and pastoral area, and wildlife dispersal area.

Except for the first type, the conflicts may occur in the wildlife conflict/ dispersal area of the environmental zone or its periphery areas. Further, it could be geographically said that the conflicts are placed on the periphery areas of the highland area, such as the central part of the Masailand Tourism Region, the Northern part of the Eastern Tourism Region, the Northern part of the Central Tourism Region.

Figure 7.1 Spatial Development Direction



Source: JICA Study Team

1.3. Planning Issues regarding Land Use Plan

Land use planning aims achieving optimal utilisation of land, but also co-ordinating different demand for land through zoning to meet the future socio-economic situation. In this sense, land use conflicts, conservation of wildlife dispensal areas through co-ordination of land use conflicts between expansion of agricultural areas including livestock and environmentally important areas, will be the main issues. Accordingly, the following issues should mainly be taken into account for the land use plan from the environmental conservation point of view :

- Co-ordination of agricultural development and natural conservation,
- Co-ordination of wildlife disposal and pastoralism, and
- Utilisation of national parks and reserves.

2. General Land Use Plan

2.1. Overall

Land use is, generally speaking, irreversible. Once land is utilised for a certain purpose, it is difficult to revert to other users. Accordingly, future land use should pay careful attention to sustainable development as well as maximum utilisation. In other words, a land use plan must present both, environmental conservation and economic efficiency. In Kenya, expansion of the agricultural areas including ranches and pastoral areas are likely to negatively affect the wildlife, and efforts should be made to maintain the existing spaces for the wildlife habitats. In this sense, the following principles should be applied :

- Although agriculture areas as well as urban areas will be more in demand in reflection of the population growth and urbanisation process, urban areas and existing agricultural areas should be maintained and more intensively utilised,
- As it is very difficult to reverse the natural conditions of the grassland and bush land once they have deteriorated, the intensity of land utilisation should be kept low, and
- Since the natural endowment, such as flora and fauna are important not only from a common asset point of view, but also as resources to generate economic and social benefits, they should be utilised in a proper way.

2.2. Land Use Policies

2.2.1. Land Use Policies by Area

Following the above principles, the following basic policies for land use by each area of land classification are proposed:

(1) Urban Areas

Expansion of urban areas is acceptable as long as it proceeds in accordance with the urban development master plan. Without fulfilling this requirement, urban expansion should not be permitted. In the existing urban centres, sanitary infrastructure such as water supplies and sewerage systems should be developed and residential, commercial and business areas should be redeveloped. In suburban areas, land development should be co-ordinated with the provision of a basic infrastructure in order to avoid urban sprawl.

(2) Agricultural Areas

The change of land use in the existing agricultural areas, in particular high potential areas, should be prohibited and great efforts should be made to raise agricultural productivity. In those areas, a strong emphasis should be put on agricultural diversification and intensification. These areas are classified as intensive type agricultural sub-areas.

Expansion of agriculture land should lead to marginal areas with medium potential areas in the Central and Eastern Tourism Regions. However, the types of agriculture should be carefully selected in order to maintain the reversibility of the environment. In order to avoid excess cultivation and over-grazing, a mixed farming system where the farmer manages both, extensive agriculture and livestock production, should be promoted. In the Masailand Tourism Region, agriculture land should not be expanded in order to protect livestock and wildlife dispersal areas.

(3) Pastoral Areas

These areas consist mainly of grassland and bushland, and they belong to the arid and semiarid land. As a special characteristic of these areas, it can be pointed out that livestock co-exists with wild animals. Since the environment in these areas is very sensitive with a low reversibility, there would be difficulties for recovery once environmental degradation has occurred. Therefore, introduction of an intensive type of agriculture should not be promoted, while livestock production should be continued as the principal source of income. Small crop production as well as wildlife utilisation should be

promoted more to assure a certain income for local people. In these areas, excess cultivation and over-grazing by livestock should be avoided as well as encouraging soil and water conservation. In relation to the environmental zones, a certain portion of the wildlife conflict/dispersal area, low productivity area and medium productivity area are included.

(4) Natural Conservation Areas

From the environmental point of view, the study team classified the nation into 6 environmental zones in accordance with the level of environmental importance (refer to Table 6.2 and Figure 6.1). These areas consist of protected area, ecologically important area, wildlife conservation/dispersal area, medium productivity area, low productivity area and high productivity/human activity area. Among the six environmental zones, the first two zones and certain portions of the wildlife conservation/dispersal area are proposed to form natural conservation areas in the general land use plan.

The other portions of the wildlife conflict/dispersal area are included in the pastoral areas. Since people live in this area practising pastoralism on group ranches, non-tourism related utilisation of land must be permitted with regulations. A zoning system should be developed to balance natural conservation and land utilisation. The zoning should be made in accordance with environmental values and impacts from land utilisation. In this sense, tourism development is going to be most likely to be promoted in this area.

At present, Kenya has 22 National Parks, 23 National Reserves, 1 National Sanctuary, 1 Local Sanctuary, 4 National Marine Parks and 5 National Marine Reserves. These areas are included in the protected area of the environmental zone. As presented in Figure 2.10 & 11 of Chapter 2, there are still environmentally important sites not yet designated as national park or reserve. Reflecting the increase of population and the expansion of agricultural areas, it is required to make certain efforts to conserve those sites. KWS has identified 32 sites as potential new national parks and reserves including expansion of existing one as shown in Table 7.2. Based on this list, discussion should be promoted between interested parties/stake-holders in order to designate new national parks and reserves.

Table 7.2 Candidates for New National Parks and Reserves

Under Process to be Gazetted	Proposed to be Gazetted		
	Extension	New Sites	
Arabuko Sokoko Forest Bonjoge	Aberdare NP Arawale NR/ Tana River	Cherangani Mountains Coastal Forests (Jombo, Witu etc.) Crater Lake (Naivasha) Gurur	Loita Hills-Nguruman Range Mathews Range
Diani Chale Fourteen Falls Lake Simbi Marsabit NR extension Mau Summit Ras Tenewi	Hell's Gate Longonot NPs Lake Turkana Lake Victoria Mt. Elgon NP Mt. Kenya NP	Kasigau Mountains Lake Baringo Lake Elmenteita Lokis	Ngare Ndare Forest Ngong Hills Nyambeni Forest Ol-doinyo Orok South-western Mau Taita Hills Tana Delta

Source: KWS (1990)

2.2.2. Allowable Activities by Areas

In line with the basic policies of land use by land classification, individual activities are defined for each land use. Either allowable or prohibited human activities on each land are proposed as shown in Table 7.3.

Table 7.3 Summary of Possible Human Activities by Area

	Purpose of Designation	Land Use Policy	Allowable Activities						Prohibition of Land Utilisation		
			I	C	A	R	L	T	Existing land use	Reclamation	Vegetation
Urban Area	Improving to meet urban population growth avoiding disordered urban sprawl	Land development in the suburban area should be co-ordinated with an urban development master plan	○	○	○	○	×	○	No restriction	No restriction	No restriction
Agricultural Area	Conserving agricultural land and environment Appropriately utilising agricultural area to meet food demand	Intensification and diversification of agriculture in the agricultural potential area to reduce expansion of agriculture area	△	△	○	○	△	○	Conservative Improving productivity	Intensively utilised	Conservative
Pastoral Area	Conserving grassland and bush land use for ranch and pastoralism Control land use in accordance with environmental sensitivity	Introducing mixed farming system to increase earning Buffer zone should be prepared to co-existing livestock and wildlife	×	△	△	○	○	○	Minimum change Promoting mixed farming	Minimum change	Minimum change
Natural Conservation Area	Conserving flora and fauna	Zoning system should be promoted to balance conservation and utilisation	×	×	△	△	△	○	Basically prohibited	Basically prohibited	Basically prohibited

Note: I: Industry, C: Commerce and Trade, A: Agriculture, S: Settlement, L: Ranch and pastoralism, T: Tourism

△ Possible, △c Conditionally, △~ Prohibited

Source: JICA Study Team

2.2.3. Basic Direction for Co-ordinating Land Use Conflicts Areas

As described in section 2.2., land use conflicts will intensify without certain control measure, such as a land use plan. Land use competition can not be properly solved by the market economy. Therefore, it must be co-ordinated from the planning point of view. The land, which is expected to have multiple use can be classified into two types:

- Type 1: conflict area between urban area and agriculture area, and
- Type 2: conflict area among agriculture, and pastoral area and natural conservation area.

To minimize possible the land use conflicts on land with uses, with competing alternative, the following basic policies should be applied.

(1) Co-ordination of Land Use between Urban Area and Agricultural Area

Within the type 1 area, basic priority should be given to the agricultural area, in order to maintain high agricultural productivity and to avoid disordered urban growth. Especially the places, where intensive agriculture is carried out or where agricultural development projects are located should stay with the present land use. However, ranches and pastures or extensive agricultural areas with low productivity can change their land use into urban areas, provided that urban infrastructure is carried out under an urban development plan.

(2) Co-ordination of Land Use between Agricultural Area, and Pastoral Area and Natural Conservation Area

Although this type of land use problem has already been pointed out, it is impossible to draw a clear division of zoning. Since wildlife is living under a wider ecosystem than gazetted national parks and reserves, a buffer zone and fence should be set up to allow co-existence among competitive land users or physical division of competitive land users. The present land tenure, such as trust land and ranches should be maintained.

2.3. Future Land Use Image

Based on the existing land use patterns, the land potential, a spatial development framework and the future land use policy as well as environmental zoning shown in the preceding section, an outline of the future land use plan is illustrated in Figure 7.2. This land use plan aims basically at indicating priorities only.

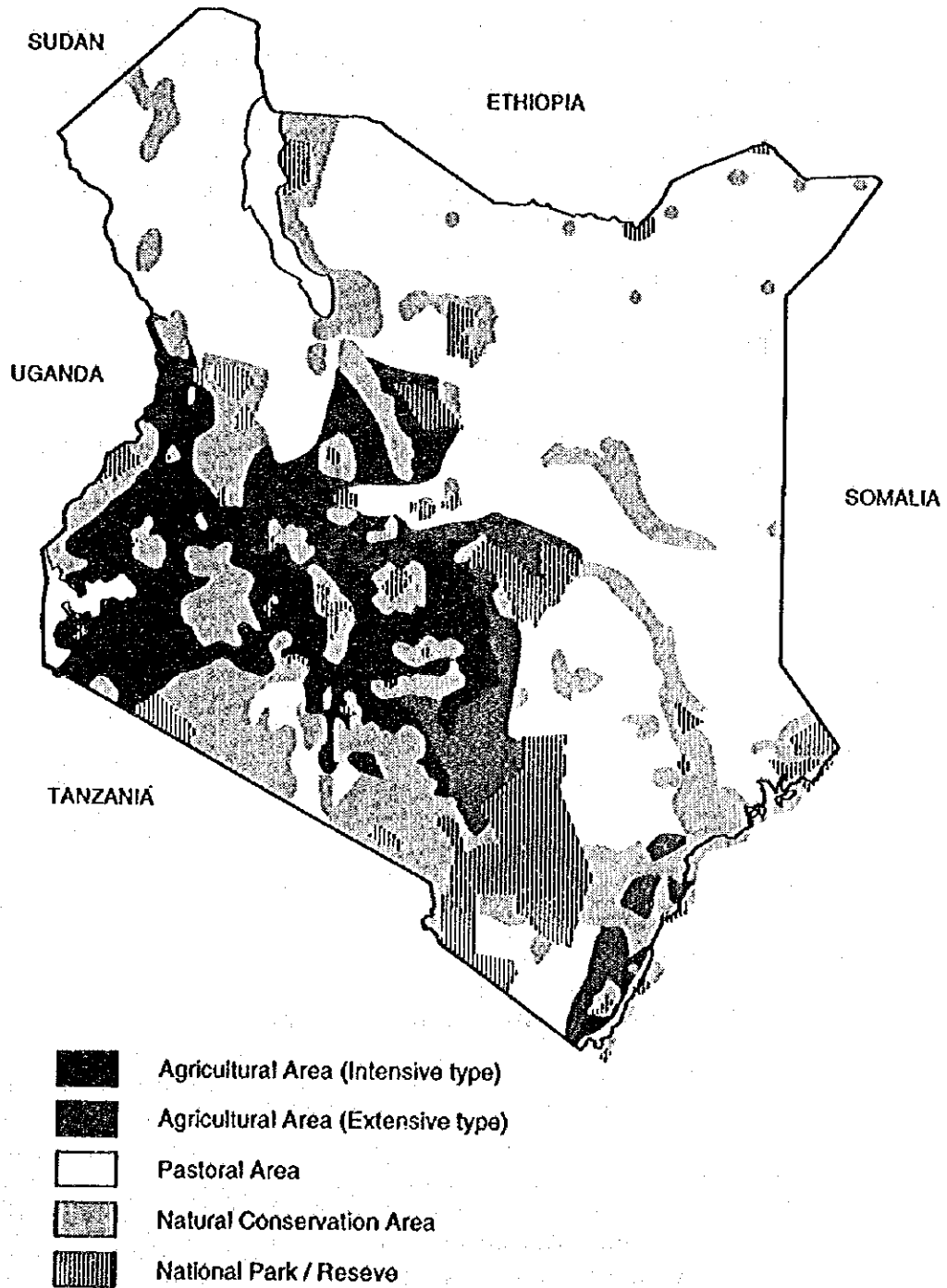
3. Mitigation of Land Use Conflicts between Local People and Wildlife

3.1. Overall

Since the various groups have own benefits of the land, only provision of land use control or restriction to directly solve the land use conflicts will not be sufficient, but supplemental measures for the restoration of tourism benefits for the local community should be provided. In this sense, the following measures are proposed:

- Establishment of Buffer Zone and Fence, and
- Empowerment of KWS's Community Wildlife Programme.

Figure 7.2 Outline of Future Land Use



Source: JICA Study Team

3.2. Establishment of Buffer Zones and Fences

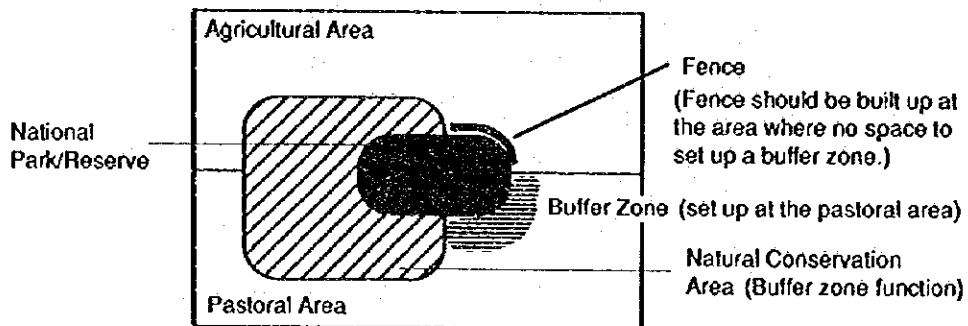
3.2.1. Overall

Buffer zones are set up to support the co-existence of wild animals and livestock at the periphery of each land use, emphasising the utilisation of the natural environment including wildlife. Human activities such as settlements, cultivation, livestock production by local people and tourism use are acceptable. However, intensive agriculture is prohibited to be introduced in this zone. Opportunities to utilise wildlife to improve income should be provided in this zone.

However, peripheral areas between agricultural areas and wildlife dispersal areas cannot be defined as buffer zones, because of increasing population pressure on available space. Accordingly, this area should be taken into account for fencing programmes.

A zoning image adopting the above zoning system is illustrated in Figure 7.3.

Figure 7.3 Zoning Image of The Buffer Zone and Fencing Zone



Source: JICA Study Team

3.2.2. Formulation of Buffer Zone

(1) Allowable Activities in the Buffer Zone

This zone is identified as a transformation area, that is from agricultural, pastoral land use to wildlife conservation land use. Since traditional human activities such as extensive agriculture, livestock production as well as settlements are found in this zone, maintaining of the present land use with co-existence between wildlife and people is a basic concept. Accordingly, intensive agriculture such as enclosed large farms and large scale manufacturing is prohibited. To improve the economic status of the people living in this zone, a mixed farming system and tourism should be promoted. For this end, local participation in these non-agricultural/pastoral jobs should be supported by the public sector, as well as promoting the community

development programme by KWS (which is carried out as a revenue /benefit sharing programme with the establishment of a wildlife fund wildlife for development in the Community Wildlife Programme). A local reserve, which is proposed in the main volume of this study, is an example to enhance local participation in tourism development.

(2) Designation of the Buffer Zone

A certain portion of the wildlife conflict/dispersal area of the environmental zone is adopted as the buffer zone. The wildlife conflict/ dispersal area of the environmental zone as indicted in Table 6.2 and Figure 6.1 of Chapter 6 can be divided into 2 areas and is included in the natural conservation area and the pastoral area, some portion of which are designated as the buffer zone. However, certain areas, which are peripheral areas of agricultural and wildlife conflict/ dispersal areas, cannot be defined as a buffer zone, because not enough space is available. The proposed buffer zone area is shown in Figure 7.2 of the land use image map.

3.2.3. Promotion of Fencing Programme

(1) Proposed Fencing Areas

Based on the above discussion, the fencing programme should be adapted in the following areas:

- The area, where urbanisation extends to the boundary of the national parks and reserves with a high possibility to cause problems with wildlife, and
- The area, where agricultural development extends to the national parks and reserves with a high possibility to cause problems with wildlife.

The fencing programme harms sometimes the natural environment of the fenced area, due imbalances of the ecosystem. Since wildlife live in a wider ecosystem, complete fencing of protected areas establishes endors of wildlife protected areas, which may result to loss of genetic resource in the long-term. Therefore, careful consideration/assessment is necessary before implementing the fencing programme.

Finally, the necessary budget for the fencing programme should be determined based on a further study.

(2) Financial Sources

The fencing programme has already been identified as an effective measure to solve the problem of wildlife with the local peoples. However, only a few projects have been implemented, such as around Nairobi National Park, Lake Nakuru National Park, Saiwa Swamp National Park and Simba Hills National Reserve. The main obstacle is lack of investment financing. At present, KWS is responsible for implementing it from their own budget and financial support by donor agencies. Therefore, securing financial resources is one of the most crucial points to implement the fencing programme. To increase the budget, the following principle considerations of cost allocation should be reckned:

- Wildlife is a national asset,
- KWS is responsible for managing wildlife as a representative of the Kenyan government,
- Not only KWS, but also the government itself should be responsible for responding to the damages on agricultural products and livestock,
- Maintaining/developing the agricultural environment as well as extension service is in charge of the Ministry of Agriculture, Livestock Development and Marketing (MOALDM), and
- Forest Department (FD) is responsible for managing forests, which supply important habitats and refuges to wildlife and of which borders are often proposed as fencing sites.

Hence, the fencing programme should be implemented by both KWS, MOALDM and FD.

3.3. Empowerment of KWS's Community Wildlife Programme

3.3.1. Overall

(1) Recognition of Problems

From the economic point of view, lack of motivation of local people to conserve wildlife is a problem. Most of local people, who are engaged in agriculture and pastoralism, do not have direct benefits from wildlife conservation, but direct negative impacts are easily received. People, who benefit from safari type tourism are different from those, who suffer from wildlife.

Therefore, benefits from tourism for the local community, such as fostering industries and creating job opportunities, must be created.

Accordingly, the necessary actions to solve the above mentioned problems are:

- Support local development by financial help,
- Support the change of peoples' occupation from pastoralism to modern sectors, if desired,
- Lessen economic damage from wildlife for individuals, and
- Enhance eco-tourism with consideration of wildlife conservation.

(2) Basic Concept

KWS has established the "Community Wildlife Programme". This programme aims at ensuring proper utilisation of wildlife outside the protected areas for the benefit of the communities and in order to tolerate the negative impacts of wildlife. The programme incorporates various components including:

- Revenue Sharing,
- Wildlife Utilisation, and,
- Enterprise Development.

Detailed information on the programme was reviewed in Chapter 6. Since the programme aims at directly serving local people, the bottom up approach is adapted. If the programme is expanded to serve more local people, co-ordination with the development intentions of the local government like district development plans must be taken into account. The programme should, therefore, be improved with a view to integrate it with other local development plans/projects:

- Involvement of local government, and
- Support of training scheme for local peoples.

a. Involvement of Local Government

To emphasise and expand the contribution of wildlife to the local development, close co-ordination between the programme and local development plans and projects must be taken into account. Although the present projects under the revenue sharing programme and wildlife fund for development aims at focusing on supporting the local community, it should extend to support implementing projects in district development plans. To this end, an implementation system with close involvement of the local government should be organised to conduct much more projects under the revenue sharing programme and wildlife fund for development. The project finance should come

not only from KWS, but also from the local government budget. Therefore, close co-ordination between them is necessary.

b. Support of Training Scheme for Local Peoples

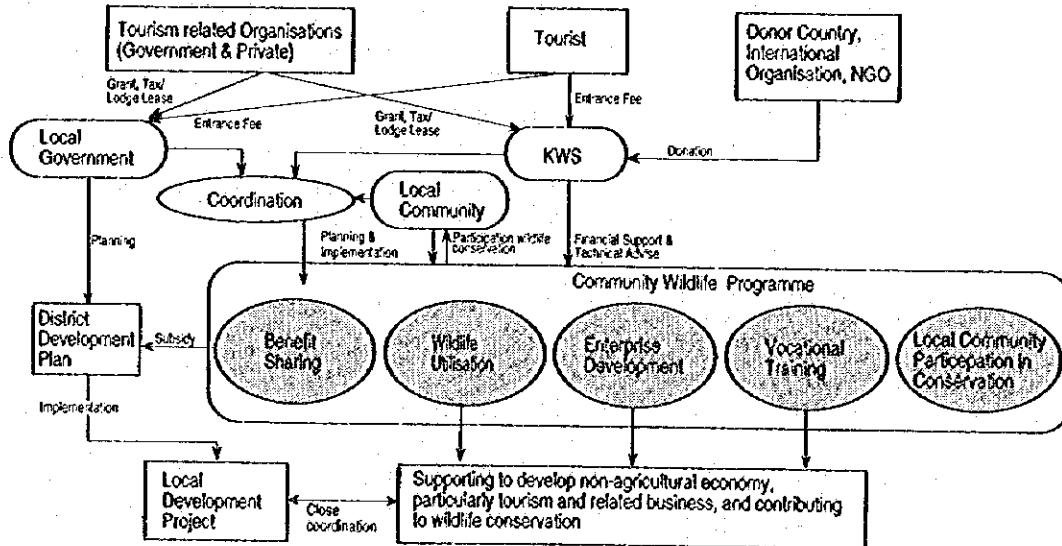
To mitigate wildlife damage in the farms, there is need to provide an alternative ways to earn income and reducing the dependence on agriculture and livestock. In this sense, technical training for producing handicrafts and souvenirs for tourism should be supported. On the other hand, environmental education as well as proper agricultural methods like mixed farming systems should also be supported.

3.3.2. Components of the Programme

(1) Structure of the Programme

The components and structure of the programme are conceptually illustrated in Figure 7.4. The program consists of 4 components, that is revenue sharing, enterprise development, wildlife utilisation and vocational training.

Figure 7.4 Conceptual Function of the Programme



Source: JICA Study Team

(2) Components of the Programme

a. Benefit Sharing

The programme subsidises certain portions of the development projects, organized by the local government. This system aims at selecting and implementing local projects in close co-ordination with the district development plan. Taking into account flexibility and adaptability to individual case, type and contents of supportable projects must be formulated as well as the level of subsidy and their limitation.

b. Wildlife Utilisation

Wildlife utilisation aims at directly obtaining benefits from wildlife through ranching and farming. Under this scheme, farming is practiced on a pilot basis, such as ostrich, crocodile, guinea fowl, butterfly and frog. To fully implement the scheme, a certain portion of the profits from such wildlife utilisation, should be returned to the public in the form of taxation and permission /license fees.

c. Vocational Training Support

Vocational training of local people should be supported by the programme. Under the programme, techniques of tourism related cottage industries, such as handicraft, wood carving, souvenir production, environmental education, agricultural training are considered to be supported in order to create non-agricultural jobs as well as improving the farming system in rural areas.

d. Local Enterprise Development

The existing enterprise development within the programme is sufficient to be continued. Particularly, consultation services for local entrepreneurs should be strengthened.

(3) Sources of Funds

Local development projects are basically carried out not only by KWS, but also by the local government. The budget depends accordingly on both, KWS and the local government. KWS manages the benefit sharing scheme including the wildlife fund for development. The other schemes such as wildlife utilisation, enterprise development and vocational training are supported by KWS.

The financial sources of KWS depend basically on the revenues from national parks, donations from donor countries, grants from the government and fees from wildlife utilisation. About 25 % of the total entrance fees of the national parks was to be set aside as for the benefit sharing programme. This is now considered unfeasible; thus the appropriate target based on the revenue generation capacity and recurrent/investment requirements of each NP/NR should be set up

for implementation. In order to reduce financial pressure on KWS, all tourism-related organizations, both government and private sectors (investors, hoteliers, tour operators, etc.) that benefit from wildlife based tourism should be involved in the fund arrangement.

4. Zoning System of National Parks and Reserves

4.1. Overall

4.1.1. Zoning Policy

National parks and Reserves aim not only at conserving environmentally important sites, but also at providing people with alternative opportunities to harness nature and wildlife. Utilisation should be consistent with the conservation in the national parks and reserves. In this sense, a zoning system should be employed in the national park and reserve, in order to clarify the level of environmental conservation and utilisation in accordance with acceptable activities and land use intensity. KWS is formulating a zoning plan for each national park and has completed such zoning plan for 11 parks and reserves. According to KWS the following 5 zones are set up:

- Closed zone,
- Special zone,
- Wilderness zone,
- Semi-wilderness zone, and
- Utility zone.

To clarify more the characteristics, function and roles of each zone, purpose and management strategy are proposed as follows.

4.1.2. Function of the Zones

(1) Closed Zone

This zone aims at completely preserving primeval conditions of a particularly important and sensitive environment, including endangered flora and fauna. Any kind of development and even entering this zone should be prohibited except for minimum scientific research.

(2) Special Zone

This zone aims at preserving the natural environment. Ordinary human activities will be prohibited except eco-tourism. However, minimum supporting facilities such as trails and animal viewing hides are allowable.

(3) Wilderness Zone

This zone aims basically at conserving the natural environment, however, tourism use is permitted within certain regulations. Trails and minimum temporary structure for tourism are allowable.

(4) Semi-wilderness Zone

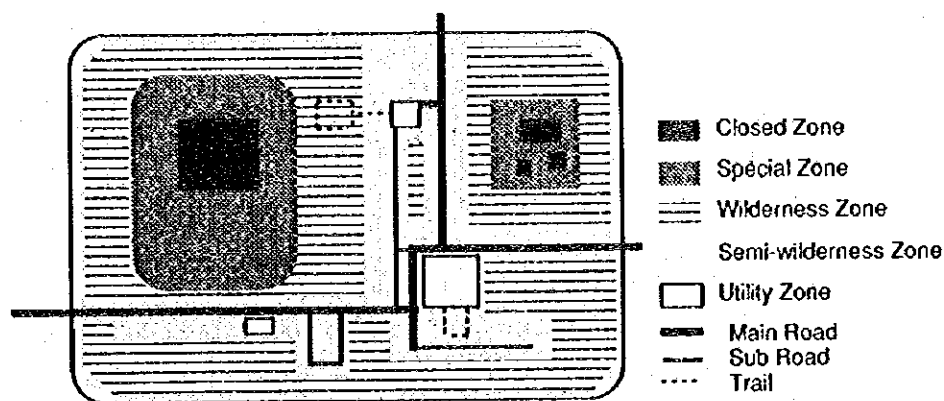
This zone aims at providing relatively undisturbed tracts for tourism use. Small accommodation facilities as well as roads, picnic sites and tourism facilities are allowable.

(5) Utility Zone

This zone provides management and tourism facilities such as accommodations, restaurants and shops with certain development regulations. Instead of the utilisation of the sites, pollution control measures are provided to minimise the negative environmental impact.

A zoning image adopting the above zoning system is illustrated in Figure 7.5.

Figure 7.5 Zoning Image of National Parks/Reserves



Source: JICA Study Team

4.2. Control of Activities in National Parks and Reserves by Zoning

To control development and use of the each zone in accordance with their function, allowable development and activities are considered based on KWS's plan. Type of allowable activities, size of reclamation, size of facilities and regulations of necessary pollution control are considered, as shown in Table 7.4.