Table 7.4 Concept of Zoning System in National Parks/Reserves

Zone	Allowable Activities		Allowable Development							Entrance of Motor vehicle
	Scientific research	Tourism	Natural trail	Animal viewing hide	Picnic site (no building, no utility)	Road	Guide display	Camping site (no building, no utility)	Accommodation	
Closed Zone	O	×	×	×	×	×	×	×	×	×
Special Zone	O	△	O	O	×	×	×	×	×	×
Wilderness Zone	O	O	O	O	O	△	×	△	×	×
Semi-wilderness Zone	O	O	O	O	O	O	O	O	×	O
Utility Zone	O	O	O	O	O	O	O	O	O	O

Note: Âô possible, Âç Conditionally, Â~ Prohibited

Source: JICA Study Team

5. Legislative Recommendations

With the increasing demand for land, land use conflicts will increase and become an important issue. Land use management is indispensable for natural as well as wildlife conservation. A proper legislative framework should therefore be prepared, in order to guide appropriate future land use as considered for example in section 2 and section 3.

5.1. Issues of the Existing Legal Framework on Land Use

5.1.1. Available Legislation

In accordance with the description in section 3 of Chapter 3 in this Volume, laws and regulations relevant to environmental conservation and management are listed below. From the land use point of view, the following Acts are important:

- The Land Planning Act (Cap. 303),
- The Town Planning Act (Cap. 134),
- The Forest Act (Cap. 385 1942 (1982)), and
- The Agricultural Act (Cap. 318 1967).

In addition, there are several legislations concerning land tenure, such as:

- The Registered Land Act (Cap. 300),
- The Land (Group Representatives) Act (Cap. 287),
- The Trust Lands Act (Cap. 288), and
- The Government Lands Act (Cap. 280).

The legislative framework concerning land use zoning and land tenure is legally managed based on the above Acts. In legal terms, the following designation of areas or zones is available such as :

- Designation as an environmentally important area such as national park, national reserve, forest reserve and so on,
- Designation for protecting agriculture, for example coffee cultivation area, and
- Designation as a special zone for promoting manufacturing, for example export processing zone.

However, general land use planning, which would aim at providing a guideline for future land use covering the whole nation or certain provinces does not yet exist legally.

5.1.2. Issues

Following the above argument, the existing legal framework should be reinforced, in order to guide future land use. The following functions should be taken into account in such a legal framework concerning land use :

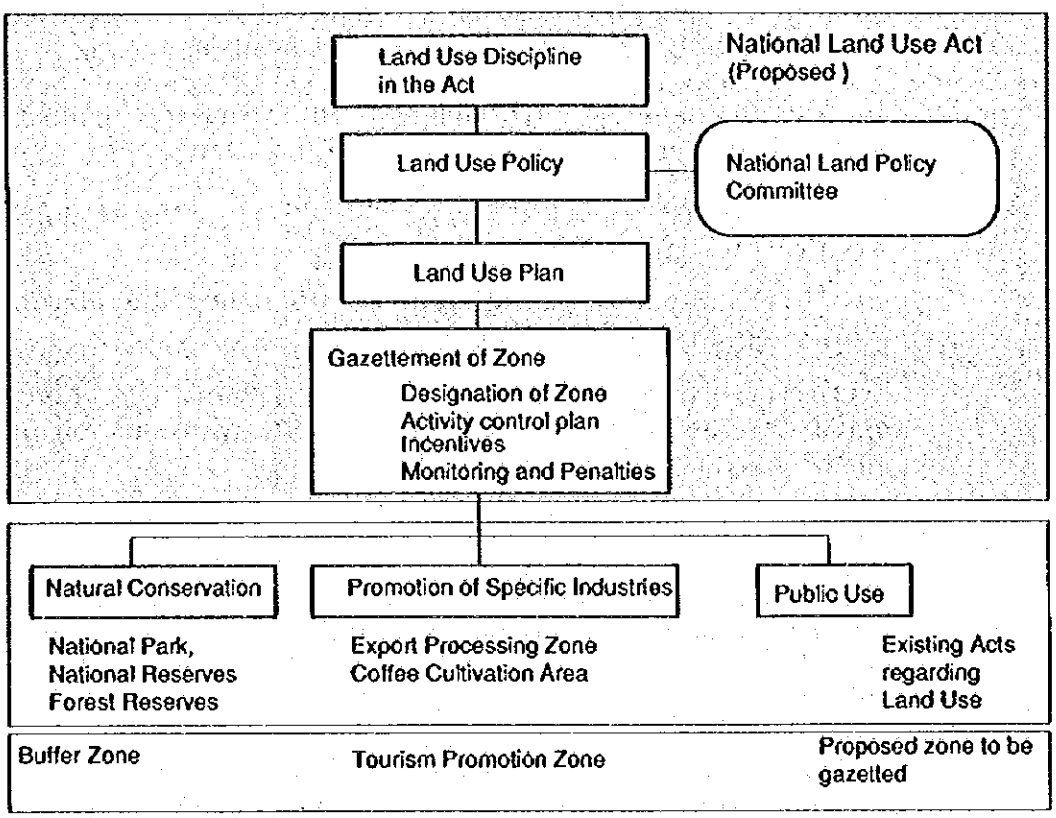
- Formulation of a national/regional land use Act to provide legal framework on the national land use policy and plan,
- Monitoring of land use charges,
- Undertaking of a national/regional land use study prior to formulation of national/regional land use Act respectively,
- Establishment of a gazettement system in accordance with national land use policy and plan under the national land use act.

5.2. Legislative Improvement Policies

5.2.1. Basic Policies

Complications of land use depend, in principle, on both, the strong right of title deed of land and the unsatisfactory status of land use planning. It is therefore proposed that principles of land use should be clearly clarified legally. Based on such legal principle of land use, a national land use policy and national land use plan would be justified as shown in Figure 7.6.

Figure 7.6 Proposed Land Use Planning System



Source: JICA Study Team

5.2.2. National Land Use Act

(1) Basic Concept of the National Land Use Act

A national land use act should aim at providing principles for land use and identify the authority of land use administration for policy making and authorised land use planning.

(2) Functions of the Act

To realise the above concept, the Act should be established so as to stipulate the following functions :

- Provision of a basic concept of land use,
- Provision of land use policy,
- Authorising national land use plan,
- Authorising gazettement of zones, and
- Incentives and Penalties.

a. Provision of Basic Principle of Land Use

Basic principles of land use should be declared in the act, such as :

- Public welfare has higher priority than private right on land use,
- Land use control in private land is allowable along with public welfare, and
- Land should be utilised with appropriate planning.

Such articles would be indispensable to control and manage private right on land and for creating appropriate national land use.

b. Provision of Land Use Policy

The act stipulates to formulate a land use policy with a view to formulate a national land use plan. For this end, the following items should be stipulated in the act :

- Formulation of a land use policy committee,
- Coverage of land use policy,
- Formulation of land use policy paper,
- Necessity of periodical revision and amendment of land use policy, and
- Responsible organisation to formulate the policy paper.

c. Authorising National Land Use Plan

The national land use plan is to be formulated based on the land use policy prepared under the Act. The national land use plan aims at identifying the general direction of the land use policy and indicating practical strategies for solving land use conflicts.

d. Authorising Gazettement of Zones on Purpose

An authority empowered to designate zones and control land use, human activities, land development and land transactions should be stipulated in the Act. The general purpose of the designation must take into account public welfare. From the wildlife dispersal area conservation point of view, a buffer zone, which is a crucial area for conserving wildlife, should be gazetted to control/limit certain activities. From the tourism development point of view, the tourism promotion zone should be gazetted. In the Act, possible measures to control human activities as well as land transactions should be shown such as :

- Supervision of land transaction by notification to the authority, and
- Supervision of change of land use by approval from the authority.

f. Incentives and Penalties

The Act should authorise the provision of incentives and penalties.

(3) Responsible Organisation to manage the Act

Gazettement is approved by the Office of the President.

5.2.3. National Land Use Policies and National Land Use Plan

(1) National Land Use Policies

The national land use policy should be formulated to indicate the basic concept and direction of national land use and solutions to land use conflicts. The policy should be authorised by the proposed Act and provide the basic direction of the national land use plan. It should be organised by a national land policy committee ,which should be composed of the Ministry of Lands and Settlements, Ministry of Agriculture and Marketing and Livestock Production, Ministry of Local Government, Ministry of Environment and Natural Resources and KWS. The Office of the President should be responsible for co-ordinating the committee.

(2) National Land Use Plan

The national land use plan would indicate the future appropriate land use pattern, which is to be based on the land use policy. It aims at providing a guideline for development and environmental conservation as well as a framework for the development plan. Although the general land use plan in itself should not have legal enforcement power, the plan itself is necessary to show the basic direction of national land use. For this end, the national land use plan should includ the following discussion :

- Necessary area of agriculture and pastoral use to keep food security,
- Necessary area in which to conserve the natural environment,
- Necessary area for urban and suburban use,
- Priority land use in those areas, in which there is duplicated and/or conflicting land use, and
- Gazetted zones for special purposes.

5.2.4. Gazettement of Zone

(1) Type of Gazetted Zone

The purpose of a gazetted area should be to control human activities in these areas or to guid certain human activities in the zone. However, to keep social fairness and private rights, the gazettement must be limited. Possible types of such gazettement in general are as follows :

- Natural conservation and disaster prevention,
- Promoting of specific industries for the benefits of local people, and
- Public use.

The existing national parks, reserves and forest reserves are gazetted based on the above first criteria. EPZ and a coffee farm, for example, relate to the above second criteria.

(2) Control of Activities in the Gazetted Zone

Since the gazettement aims at controlling or guiding certain human activities in the zone, items to be controlled should be identified, for example by showing possible activities in the zone like shown in Table 7.3. This should be attached for gazettement.

(3) Provision of Incentives

As for the limitation of human activities, it is necessary to provide a substitution to mitigate the loss from the control of private rights. The incentives should not only be financial ones, but also by providing infrastructure, securing distribution channels and so on.

(4) Monitoring and Penalties

To control the activities, a notification and approval system for land transaction and change of land use is proposed to be introduced. The local authority should receive notice for change of land use or land transaction, and approve it. Certain penalties should be also prepared.

6. Other Related Recommendations

6.1. Provision of Legislative Position to the Zoning System of the National Parks and Reserves

As for the national parks and reserves, some sort of zoning system is being introduced by KWS. However, this zoning system does not have any enforcement power, because it lacks legal status. Since the national parks and reserves are managed by KWS and, within a limited area, County Councils, it is practically possible to provide legal status for the zoning system, in order to regulate development and activities.

6.2. Land Subdivision Control

To implement the land use plan proposed in the preceding sections, land tenure will be a basic prerequisite. In particular, natural conservation areas, including wildlife dispersal areas, and the present roles of ranches and trust land are very significant. Since land tenure tends to shift to individual holdings in accordance with economic development or modernisation in general, it is necessary to make special efforts to avoid subdivision of ranches and trust land. Opportunities for earning money as well as employment opportunities must be created by tourism development.

6.3. Agricultural Development

As described in the preceding section, large efforts have to be made in order to change land use patterns in agricultural areas. If the agricultural land spills over marginal areas, environmental degradation will be caused, and wild animals will loose their habitation. Therefore, intensification and diversification of agriculture should be promoted instead of expanding agricultural land. An agricultural development plan in the high potential area must be formulated and implemented urgently.

6.4. Soil Erosion Protection along the Tana and Sabaki Rivers

Since siltation at the river mouth causes great damage to corals along the coast, it is necessary to establish a programme against soil erosion along the Tana and Sabaki Rivers.

6.5. Implementation of Land Use Plan for National Parks and Expansion to National Reserves

Like national parks, national reserves are also important to conserve Kenya's natural environment. For the same reason, land use plans for each national reserve should be developed. Presently, there are agreements on the management of national reserves between KWS and

CHAPTER 8 ENVIRONMENTAL IMPACTS CONTROL PROGRAMME

Chapter 8 Environmental Impacts Control Programme

1. General

The environmental consideration aims at evaluating the impact of each development project through forecasting the magnitude of possible impacts. An environmental protection plan and appropriate measures will be examined based on the evaluation, when there is a significant possible impacts. This environmental consideration is to study whether the development projects will generate significant impacts or not, to evaluate the impact and to prepare an environmental protection plan and mitigation measures.

If the environmental protection measures are not implemented sufficiently, the foundation of the development project may collapse and the development itself may stop. At the same time, the people's livelihood or their subsistence will be destroyed. It is, therefore, necessary to promote sustainable development by harmonising the development project with both, the natural resources and people's livelihood and subsistence.

In order to control the above mentioned environmental impact, the following measures should be implemented and strengthened for tourism development projects:

1) Establishment of a pollution control programme,

2) Establishment of the EIA system,

3) Establishment of a natural environment conservation plan,

4) Establishment of an education system to achieve consensus on environmental conservation, and

5) Establishment of a land use plan to take careful consideration of location/siting of tourism development projects.

Out of these five measures, measures 3) and 4) are described in Chapter 6 and measure 5) is described in Chapter 7. This chapter focuses, therefore, on measures 1) and 2).

2. Application of EIA System for Tourism Development Projects

2.1. Typical Environmental Impacts of Tourism Development Projects

2.1.1. Overview

Tourism development will contribute to a local community development by creating a better amenity, which changes the surrounding existing natural environment. However, unsuitable alteration of the natural environment may cause fatal and unreversible destruction. It is therefore necessary to study and find out how much of the natural environment could be changed without affecting the ecosystem.

In the case of developing countries, 23 environmental items are identified as typical environmental impacts. Out of the 23 items, 17 items are related to tourism development projects. These items are interrelated to each other and they generate other impacts as shown in Figure 8.1.

The following typical and significant environmental impacts are considered to arise from tourism development projects:

- Soil erosion, water pollution, forest destruction and decrease of wildlife caused by large scale reclamation or landfill,
- Degradation of flora and fauna caused by concentration or overflow of tourists,
- Water pollution and waste problems caused by the operation of tourist accommodations or tourist facilities, and
- Increase of traffic accidents and jams caused by the concentration or overflow of tourists at historical sites or museums.

Tourism development projects include not only the construction of tourism facilities, but also various infrastructure projects, which are classified into four categories as follows:

Tourism Facility Project

- Accommodation development project,
- Museum/Aquarium development project,
- Historical park development project,
- Visitor /Information centre development project, and
- Roadside facility development project.

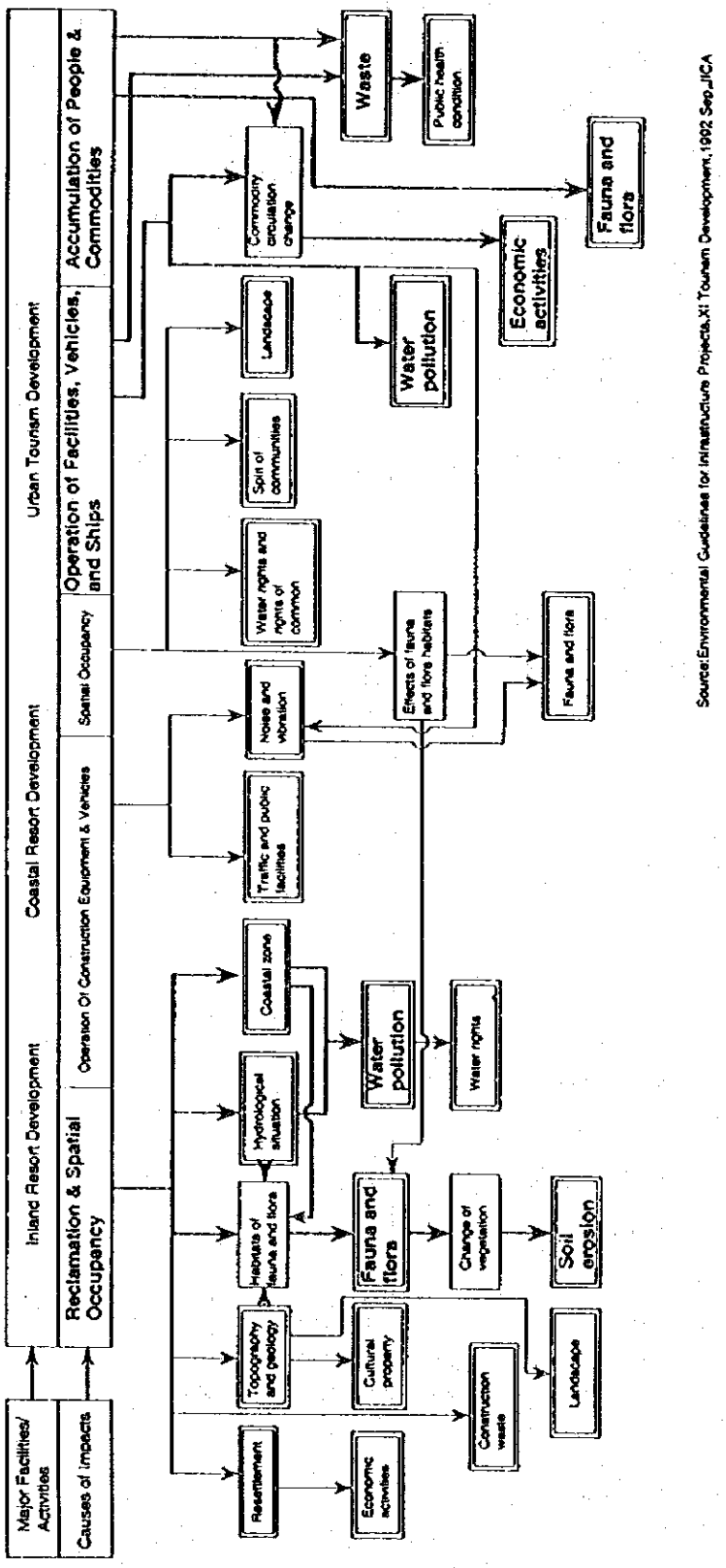
Table 8.1 Matrix for Environmental Items and Activities of Tourism Development

Environmental Items \ Activities which may cause impacts / Major Facilities / Activities			Inland Resort / Coastal Resort / Urban Tourism Development						
				Before Operation		After Operation			
			Overall Evaluation	Reclamation and Spatial Occupancy	Operation of Construction Equipment and Vehicles	Spatial Occupancy	Operation of Vehicles, Ships and Airplanes	Operation and Maintenance of Tourism Facilities	Accumulation of People and Goods
Social Environment	1	Resettlement	O	O					
	2	Economic Activities	O	O				O	O
	3	Traffic and Public Facilitis	O		O		O		
	4	Split of Communities	O			O			
	5	Cultural Property	O	O					O
	6	Water Rights / Common Rights	O	O		O			
	7	Public Health Condition	O					O	O
	8	Waste	O	O				O	O
	9	Hazards (Risks)	O	O					
Natural Environment	10	Topography and Geology	O	O					
	11	Soil Erosion	O	O					
	12	Groundwater	O		O			O	
	13	Hydrological Situation	O	O				O	
	14	Coastal Zone	O	O		O			
	15	Fauna and Flora	O	O	O	O	O	O	O
	16	Meteorology							
	17	Landscape	O	O		O			
Pollution	18	Air Pollution							
	19	Water Pollution	O	O				O	
	20	Soil Contamination							
	21	Noise and Vibration	O		O		O	O	
	22	Land Subsidence							
	23	Offensive Odor							

Note: O:The items which may have a significant impact depending on the scale of the project and site conditions
No mark:The items which may not have a significant impact

Source: Environmental Guidelines for Infrastructure Projects, XI Tourism Development,1992 Sep,JICA

Figure 8.1 **Flow Chart of Environmental Impacts of Tourism Development Plan**



Source: Environmental Guidelines for Infrastructure Projects, XI Tourism Development, 1992 Sep, JICA

Transportation Project

- Road development project,
- Railway development project,
- Airport development project, and
- Port development project.

Environmental Management Project

- Solid waste management project, and
- Sewerage treatment project.

Supply Project

- Water supply project, and
- Power supply project.

Every project is likely to affect the natural environment and people's livelihood and subsistence in accordance with their various features. Typical impacts of each category are found to be as follows.

2.1.2. Tourism Facility Project

Tourism facility projects might have the following typical impacts :

- Impact on traffic and public facilities,
- Impact on flora and fauna,
- Water pollution, and
- Noise and vibration.

(1) Impacts on Traffic and Public Facilities

As a result of a sudden inflow of tourists into historical sites and museums, an increased load will be put on the existing transportation system and on other pubic facilities. It could lead to an increased number of traffic accidents as well as worsening of traffic jams, resulting in downgrading the functions of urban activities.

(2) Impacts on Flora and Fauna

In case that a large-scale reclamation or landfill for construction of lodging and leisure facilities is undertaken, forest destruction and a decrease of wildlife may occur.

(3) Water Pollution

At the construction stage, water pollution may occur from turbid water. At the operation stage, inappropriate treatment of sewage, the waste generated by tourism accommodations and facilities may possibly cause water pollution, in case that the project sites will be located in the coastal zone.

(4) Noise and Vibration

The operation of construction machines and vehicles will generate unwanted noise and vibrations.

2.1.3. Transportation Project

Transportation Projects might have the following typical impact:

- Impact caused by resettlement,
- Impact to water rights and rights of common,
- Impact to the coastal zone,
- Impacts on fauna and flora,
- Air pollution, and
- Noise and vibration.

(1) Impacts Caused by Re-settlement

Land acquisition for the construction of the transportation projects may displace local peoples' from their accustomed living base. Social and cultural inadaptability to the new settlement site may occur. Conflicts between the permanent residents and resettled residents may occur. Such problems lead to social and economic burdens and the deterioration of living standards after resettlement, due to inadequate compensation system.

(2) Impacts to Water Rights and Rights of Common

The fishing rights in a river, water rights and land use rights may be loat due to increase of traffic and the obstruction of fishing grounds, in case of ports located near the fishing ground and the roads and railways traverse rivers.

The obstruction of water rights and rights of common will cause another problem, such as illegal logging, due to easy access to forests.

(3) Impacts to the Coastal Zone

In case that project located along the coastal zone, coastal erosion, changes of shoreline and vegetation, especially sealed, will occur by excavation or dredging, especially port facilities construction and by the increase and decrease in sediment supply. The supply of sand and silt to the surrounding sea area would fail to alternate tide and current.

These impacts will cause the decrease or extinction of mangrove forests and coral reefs, due to coastal erosion caused by a change of littoral drift patterns and the extinction of tidal land. It may also affect the tourism as well as fishery, due to the change of fishing spots and territorial integrity by the change of the shoreline.

(4) Impacts on Flora and Fauna

Vegetation at the project sites may be removed, leading to loss of animal habitats. In case of a project located along the coastal zone, impacts for facility construction on mangroves, coral reefs, etc. and on animals inhabiting area may occur. In particular, port development projects might have significant impacts.

The disturbance of breeding and extinction of species, due to change of habitat conditions will occur by generating exhaust gas and noise by the construction of facilities and operation of cars and trains. Migratory routes and habitat areas may be disturbed by the facilities.

The above impacts may cause a decrease in wild animals and the extinction of precious species. The decrease of natural enemies and the extinction of other species could bring about an outbreak of other animals and vermin.

The disturbance of breeding and extinction of species due to change of habitat conditions will be caused by the spatial occupation and alteration of topography and vegetation, by the inflow of waste and drainage resulting from ship and facility operations, and by the disturbance of sediment caused by dredging.

These impacts may cause the decrease or extinction in biomass of seaweed, fish, and birds. Such phenomenon is caused by the diminution or extinction of habitats, the deterioration of habitat conditions caused by vegetation and substrate changes, water pollution and water temperature changes.

(5) Air Pollution

Air pollution may be caused by exhaust gas and dust from construction machine and vehicles at the construction stage. Exhaust gas will occur from vehicles at the operation stage in case of a road project. Air pollution will cause a negative impact on the health of people, plants and animals along the roads.

In the highly populated areas, such as urban areas, negative impacts of soot, carbon monoxide, nitrogen oxides and sulphur oxides must be carefully considered.

(6) Noise and Vibration

Noise and vibration will occur by the operation of construction machine, such as bulldozers and dump trucks, and detonation at the construction stage. In case of facilities requiring special tranquillity, such as hospitals and schools, the noise is annoyance. It may also interfere in the breeding of livestock, resulting in migration of wildlife. In the highly populated areas, such as urban areas and areas having specific religious facilities, special attention should be paid for avoiding noise and vibration.

At the operation stage, noise and vibration will occur by the operation of cars, trains, airplane and ships.

2.1.4. Environmental Management Project

Environmental management projects may have the following typical impacts :

- Air pollution,
- Water pollution, and
- Offensive odour.

(1) Air Pollution

Air pollution will occur when the waste is dumped and rolled or by smoke from occasional fires.

(2) Water Pollution

Rainwater and leachate leakage from the dumping sites flow into rivers and lakes in the vicinity area, causing water pollution. Ground water might also be contaminated by the leachate containing organic substances, when it leaks out from the site and infiltrates into the soil. Polluted rivers and lakes negatively affect the water resources for

living, and activities including fishery, aesthetics and recreation, and interfere with the growth of aquatic life.

Water pollution from solid waste is also caused by dust from disposal and storage facilities, by effluents in the runoff of rainwater, by oil spills and discharged waste from ships, and by disturbance of sediments by dredging.

The water pollution causes excessive loading of water with nutrients, such as nitrate and phosphate, resulting in eutrophication, red tide and blue tide, offensive odour and effects on aquatic life.

(3) Offensive Odour

Putrified odours may be created from garbage if it is not adequately covered by soil at the final disposal site. Leachate from dumping sites and waste drainage from collection vehicles would generate odour. Exhaust from heavy construction equipment, which uses heavy oil, would cause odour.

If a sewage system is of the open channel type, offensive odours will emanate. In the case of a piped sewage system, offensive odours may be generated, when leaking, pump failure, or debris clogging occurs. At sludge treatment plants and sewage treatment plants, some processing methods may also cause offensive odour.

2.1.5. Supply Project

Supply Projects might have the following typical impacts :

- Impacts on ground water, and
- Land subsidence.

(1) Ground water Pollution

Excessive utilization of ground water above change level may decrease the ground water table and the water may become exhausted, leading to drying of springs and wells, which affect the people's livelihood. Moreover, a lower ground water table may cause ground water pollution by sea water intrusion.

For environmental consideration, the present condition of ground water resources and the available pumping capacity should be examined.

(2) Land Subsidence

Land subsidence is caused by consolidation and contraction of clay layers due to the lowering of ground water. Land subsidence may bring about the transformation and functional disorder of various structures, and the spread of flood damage area, caused by the decrease in drainage capacity. These phenomena will raise the urban development cost.

2.2. Proposed EIA System

2.2.1. Implementation Body

The EIA law is under construction by the Government. After establishing the EIA law, the MENR will be responsible for all the EIA. On the other hand, KWS is also developing a guideline on the EIA for the projects in the national parks. Since the KWS has authority to manage the national park including environmental matters, authority to implement the EIA should be delegated by the MENR. For this end, the environmental unit of KWS should be strengthened so as to carry out the EIA for tourism development projects in national parks.

2.2.2. Target Projects

This EIA system should be applied to tourism development projects as follows :

- Construction, reconstruction or improvement of transportation projects, such as national roads and other roads, railways, airports and ports and harbours related to tourism development projects,
- Construction, reconstruction or improvement of infrastructure projects, such as solid waste management, sewerage, ground water development and water supply related to tourism development projects, and
- Construction, reconstruction or improvement of tourism facility projects, such as hotel, lodge, animal view hide, resting facility, road and trail in the national parks and reserves.

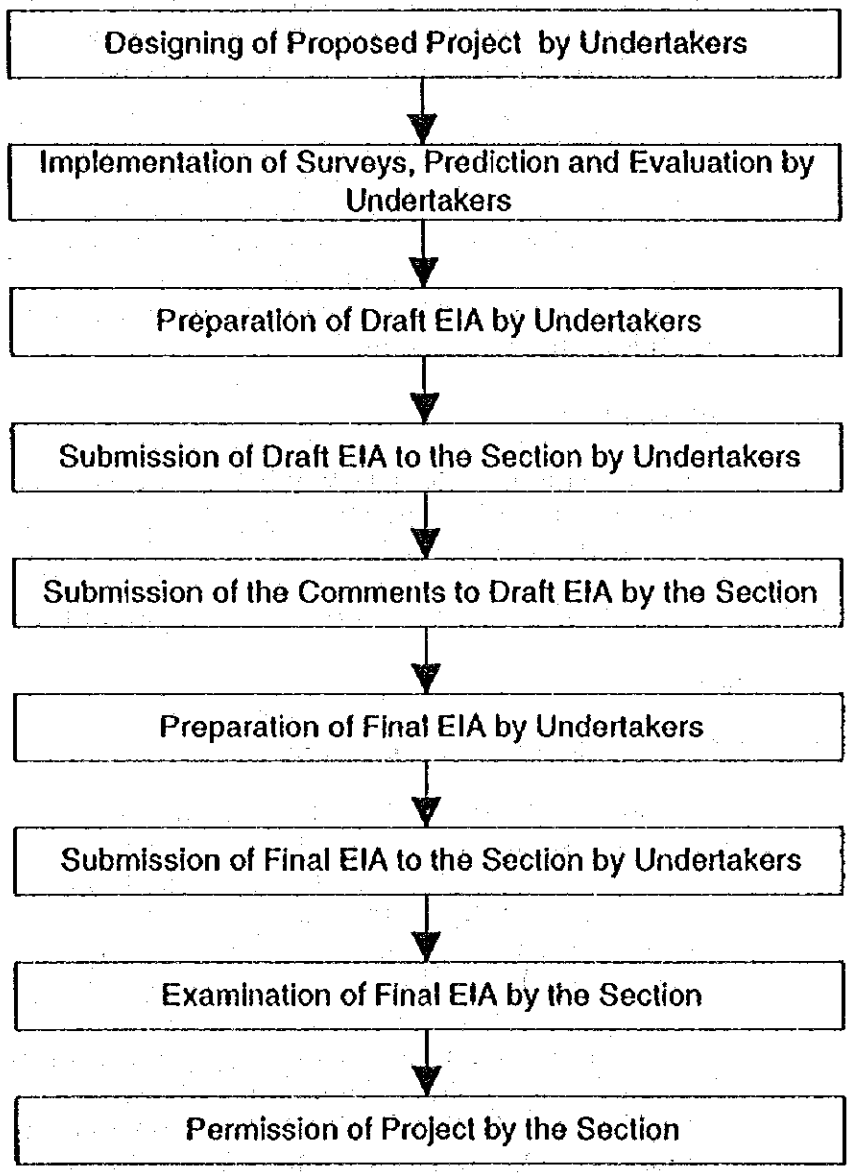
2.2.3. Procedures of EIA

The projects related to tourism development projects should be to subject to EIA procedures as outlines in Figure 8.2 :

- Project undertakers should provide a survey, prediction and evaluation beforehand and prepare a draft EIA,
- Project undertakers should present comments on the draft EIA to the Environmental Section of KWS. This section, hearing comments from related municipality governors, should submit all comments to the relevant undertakers,
- After receiving the comments on the draft EIA, the undertakers should prepare a final EIA,
- The project undertakers should send the final EIA to the involved section in KWS,

- The section should consider the environmental impact upon receipt of the final EIA,
- The permission of project certification, based on EIA requirements, should be submitted to the undertakers in case that the project will not affect the environment.

Figure 8.2 The Procedures of EIA



Source: JICA Study Team

2.2.4 Implementation of the EIA

Implementation of the EIA should be in three steps : environmental survey, prediction of foreseen impacts and evaluation.

(1) Survey

The survey is implemented with regard to the existing environmental conditions. This means collecting data by field investigations and information using references on various natural and social conditions, which are used for prediction and evaluation at a later stage.

(2) Prediction

The prediction is to make clear what impacts will occur in the environment at the construction and operation stages. Prediction is made by various methods, computers to work out calculations, experiments on models and comparison of analogies with the existing conditions and information.

(3) Evaluation

The evaluation is to study whether or not the impacts on the environment will be mitigated by pollution control and conservation of the natural environment.

3. Pollution Control Programme on Tourism Development Projects

3.1. General

3.2. Proposed Pollution Control Programme

Environmental pollution problems, such as water pollution and waste, are increasing in Kenya. It is necessary to harmonise environmental related laws/regulations and to provide appropriate incentives and penalties for wide spread adoption of environmental control measures in Kenya. The development of a national water resource management policy and land use control is also required.

Waste water from industries, sewage, domestic waste, agricultural waste and so on, pollutes rivers, lakes, the sea and surface waters. It is important to establish land enforce discharge standards, so as to central prevalence of water related/borne diseases.

3.2.1. Administrative Organisation

Environmental Pollution Control Programme should be strengthened in Kenya. However, responsibility for such a programme lies with the Ministry of Environment and Natural Resources. Therefore, the study team planned the Environmental Pollution Control Programme for tourism development projects in this study only tentatively. The Environmental Division for tourism development projects in KWS, MOH, MOLG and MOLRRSWD should be strengthened.

3.2.2. Establishment of Relevant Laws and Regulations

The regulations for strengthening the Environmental Division in KWS should be established. One section in this division should be responsible for establishing environmental quality standards for water and drinking water. It will be required to enforce the land use plans for environmental improvement of mixed residential-industrial areas.

The environmental quality standards for living environment items, which must be established, are as follows:

- Biochemical oxygen demand (BOD) for rivers, and
- Chemical oxygen demand (COD) for lakes, ponds and coastal water areas.

On the other hand, the detailed policies are as follows :

- Industrial sitting policy and permission system for industrial sitting and planning,
- Regulation on the building structure and environment friendly operation of industrial facilities,
- Traffic regulations,
- Emergency measures,
- Remedial measures for pollution-related victims,
- Assistance for the industrial sector on low interest loans for pollution control investment, and tax exemption for pollution control facilities, low pollution facilities and so on,
- Research and development, information services, and
- Penalties for violation of laws and regulations.

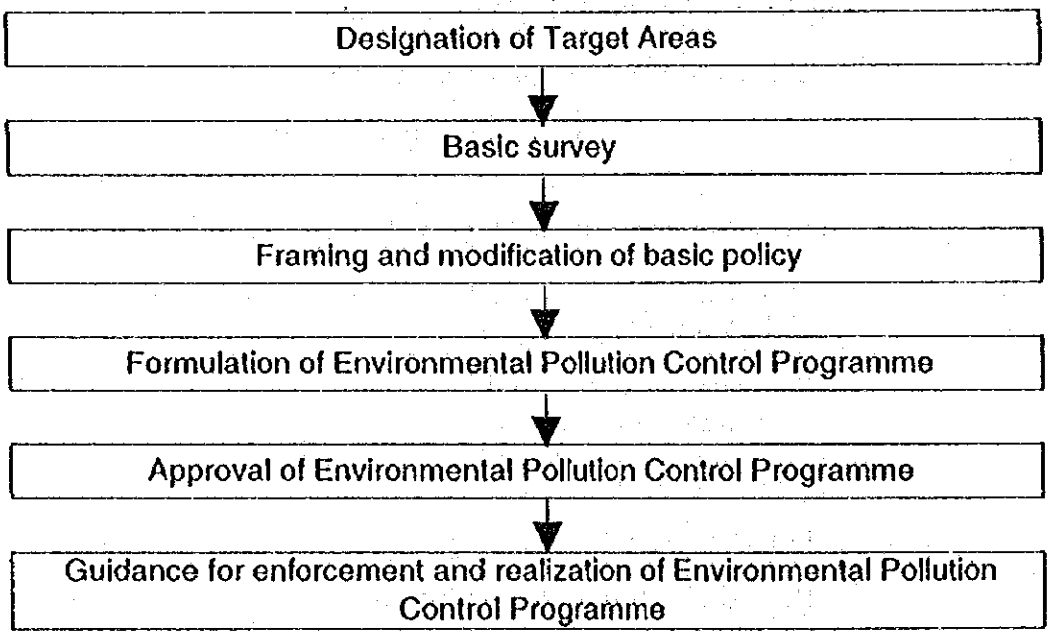
3.2.3. Proposed Target Areas for Environmental Pollution Control Programme

It is common knowledge that it will be extremely difficult to achieve effective environmental pollution control without taking comprehensive control measures. The Environmental Pollution Control Programme should cover parts all of Kenya. Specific areas are the protected areas such as national parks, national reserves and forest reserves, which are located in important or sensitive areas, Nairobi City and Mombasa, in which environmental pollution is likely to become a serious problem, due to rapidly increasing population, industry.

3.2.4. Procedure of the Environmental Pollution Control Programme

The recommended procedure for the programme is formulated in Figure 8.3.

Figure 8.3 The Formulation of the Environmental Pollution Control Programme



Source: JICA Study Team

3.2.5. Components of Environmental Pollution Control Programme

In the Environmental Pollution Control Programme, undertakers should be required to take measures to prevent air pollution and water pollution as measures for environmental pollution control. Local government bodies should be requested to take measures such as regulations for sources, evaluation of environmental effects, guidance on industrial orientation, rationalisation of land use and measures for medium and small scale enterprises as well as to promote such public activities as :

- Establishment of sewerage, waste treating installations and drainage basin excrement treatment installation,
- Dredging (rivers, ports and harbours and coastal areas),
- Soil covering and oil-and dirt fence (ports and harbours),
- Land improvement for environmental pollution control,
- Establishment of water quality corruption monitoring system, and
- Laboratories for studies on environmental pollution.

CHAPTER 9 ENVIRONMENTAL CONSIDERATIONS FOR TOURISM DEVELOPMENT

Chapter 9 Environmental Considerations for Tourism Development

1. General Recognition on Tourism Development and Environmental Conservation

1.1. Roles of Tourism Development for Environmental Conservation

In comparison with other human activities agriculture and industry, the tourism is a good example for the non-consumptive use of natural resources and the optimum long-term land use witless serious damage to the natural environment. It is, accordingly, said that the tourism seems to contribute to the country's sustainable development from both, ecological and economic points of views, if its development is made with proper management and directions.

Tourism development, which uses the natural environment and resources may contribute to environmental conservation. The roles of tourism development for environmental conservation in Kenya are as follows :

- Increase revenues for environmental conservation,
- Minimise environmental impacts caused by uncontrolled tourism development and operations,
- Generate local people's understanding and support for environmental conservation, and
- Increase national/international understanding and support for Kenya's environmental conservation efforts.

1.2. Environmental Conservation Concept for Tourism Development

Basically, one should develop the tourism industry without damaging the main characteristics of Kenya's natural ecosystem, which are as follows :

- Variety of eco-zones from Afro-alpine to coastal ocean and vast area of arid/semi-arid land,
- High biodiversity of flora and fauna, especially in forest and wetland, and
- Abundance in population of large ungulates/carnivores and their migration in arid/semi-arid land.

In order to assure this concept, the following areas of attention in tourism development are pointed out :

- Minimise tourism impact on the natural environment by monitoring of the impact and visitor numbers,
- Promote eco-tourism, which is environmentally, socially and economically sustainable, and develop its best styles for each tourism destination,
- Develop proper zoning for land use in terms of environmental conservation with dispersion of tourism destinations, and
- Promote a principle of sharing responsibilities by users ,who are tourists, in environmental conservation.

1.3. Environmental Endurance for Tourism Development

The relative environmental endurance, including restoration, for tourism development in each ecological zone is shown in Table 9.1.

Basically, no development activities can be carried out without influencing the natural environment. All of the ecological zones have very little environmental endurance against large-scale development which causes geographical changes, such as clear felling, irrigation/reclamation works and dam construction. It will take very long time, or may even be impossible, to restore a primitive natural environment including biodiversity to the degree which was reached before such development.

On the other hand, small-scale development, such as selective logging, traditional farming/fishing and small house construction, has a smaller impact on the natural environment than large-scale development. Tourism development may conform to this kind of development in most of the cases. For instance, the zone III has very low primary productivity of plants with low biodiversity, and can be thus evaluated as having very low environmental endurance. In the same manner, the zone I has high primary productivity with high biodiversity in forests, and can be thus evaluated as having medium endurance.

However, it is considered that environmental endurance for tourism development may depend on the scale of the development, visitor numbers in relation to carrying capacity and environmental management measures to be taken. For example, the zone I, which has medium environmental endurance in forests, can be regarded as having very low endurance in case of over-use by tourism beyond its carrying capacity or inappropriate development management.

Table 9.1 Environmental Endurance for Tourism Development in Ecological Zones

Zone Areas		Primary Productivity	Biodiversity	Environmental Endurance for Development
I	Afro-alpine to Highland	Very low to high	High	Low in Afro-alpine to medium in forest
II	Plateau to Lowland	Low to medium	Medium	Low
III-1	Eastern Arid Land	Very low	Low	Very low
III-2	Northern Arid Land	Very low	Low	Very low
IV	Coast (incl. Indian Ocean)	Medium to high	High	Low in coastal wetland to medium in forest

Note: The development assumed here is small-scale development regarding both time and space.
Source: JICA Study Team

2. Environmental Considerations for Tourism Development and Problems

2.1. Tourism Problems

2.1.1. Generals

Compared to natural disasters (drought, flood, bush fire and so on) and other human activities (agriculture, pastoralism, industrialisation and so on), tourism development generally has a smaller negative impact on the natural environment and supposedly a positive impact on socio-economic features. However, when carried out without proper management, regulations and directions, tourism development also can easily have or enhance influence on both, the natural ecosystem and human activity at local or regional levels.

The tourism-related problems contribute to the deterioration of the natural environment/resources for tourism, such as wildlife, their habitats and landscape. Wild animals may be driven away from NP/NRs to the outside and that animal watching becomes difficult. These problems, besides over-crowding of tourists, vehicles or even boats on one spot or area can result tolower satisfaction/experience of visitor and eventually result in to a decrease of the visitor number in the future.

On the other hand, excessive tourism development over a short time span may lead to a rapid increase in economic benefits and opportunities for local people from increased foreign visitors. There is, however, a potential threat that such development radically changes their life styles and spoils their traditional societies and cultures. There are also worries that poaching, fishing/collecting and encroachment into NP/NRs will increase, as the number of settlements around NP/NRs increases.

2.1.2. Tourism Problems in Specific Areas

Tourism-related problems are conspicuous in popular NP/NRs (that is Amboseli NP, Lake Nakuru NP, Masai Mara NR, Samburu NR) and parts of the coastal area. These areas, including future proposed nature-based tourism areas, are regarded as the specific areas in this section. The tourism problems in these areas can be categorised, for practical reasons, into common and specific problems.

(1) Common Problems

In principle, there are two common problems: more visitors beyond resorts' carrying capacity and lack of discipline among tourists/tour personnel as shown in Figure 9.1. The over-use by tourism appears as a result of a combination of these problems and it facilitates various specific problems that are evident and critical. The over-use by tourism means that visitor numbers and tourism activities in some areas are beyond its carrying capacity. This capacity is determined by environmental features, but it can be influenced and changed by the diversification of tourism activities and tourism traffic to other less utilized resorts, conditions of infrastructure/facilities and management/regulations. The problem of axcess visitors over carrying of a resort is a fundamental factor in the over-use and thus has a direct affect. The problem of lack of discipline, which often causes harmful or illegal tourism activities, indirectly enhances the over-use, but it can be a key factor even when the visitor number is under carrying capacity.

(2) Specific Problems

The flow chart depicting possible specific problems by tourism development is shown in Figure 9.2. There are two main cause the various problems. One is the construction and operation of tourism facilities, such as hotels and roads, and the other is tourism activities and increase in traffic.

a. Construction and Operation of Tourism Facilities

As for the construction of tourism facilities, vegetation cover at building sites is directly destroyed and soil erosion may follow. Construction, of roads and other relevant tourism facilities, may disrupt wildlife dispersal/migration areas.

As for the operation of tourism facilities, environmental pollution, especially of water, occurs if the volume of sewage and waste exceeds treatment capacity of the facilities. Tourism facilities and litter scattered by tourists can spoil the scenic beauty of the natural landscape. Water exhaustion, due to high water consumption by the facilities, is a severe problem particularly in the coast (e.g. Mombasa, Lamu).

Figure 9.1 **Proposed Actions for Common Problems by Tourism Development in Relation to Over-use by Tourism**

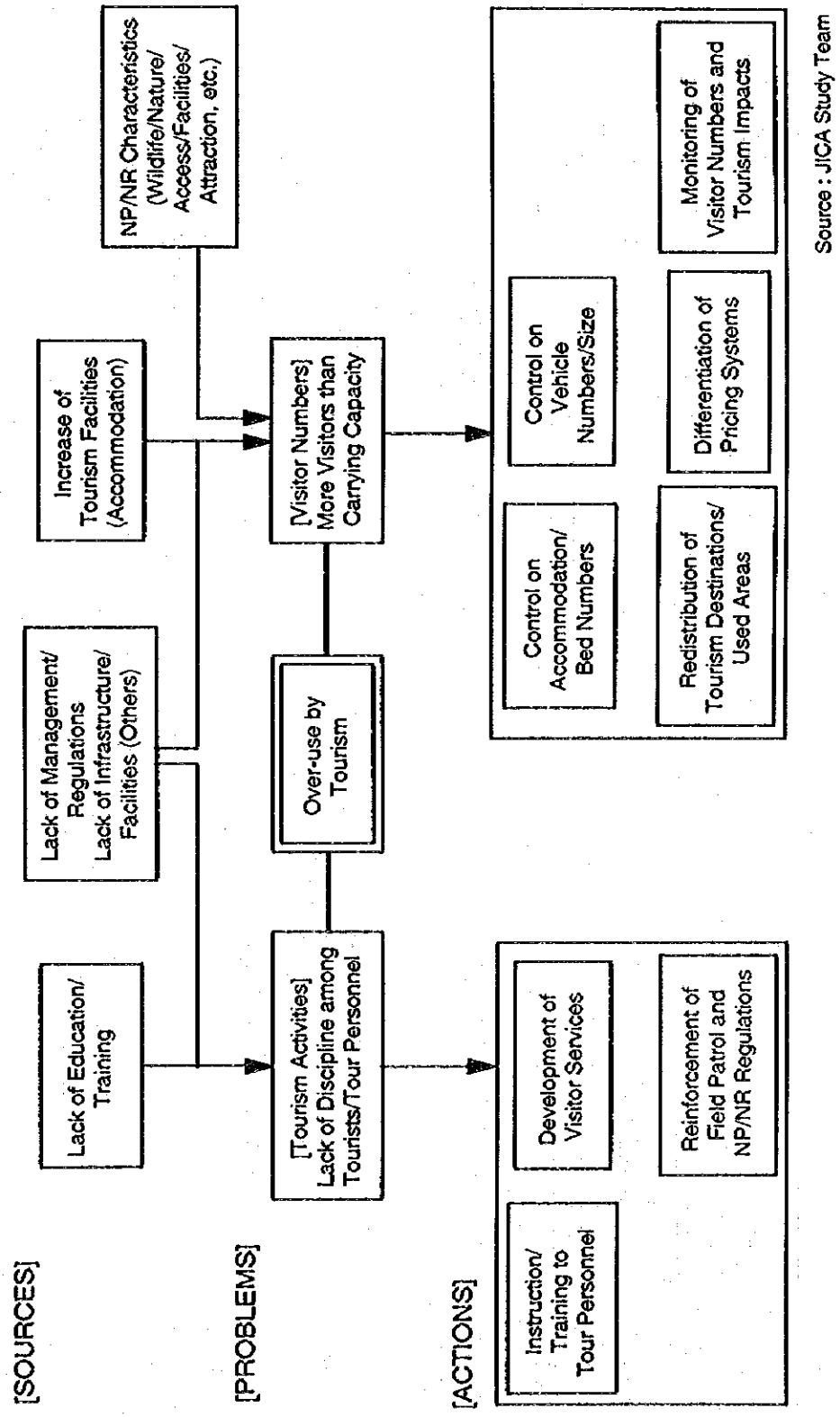


Figure 9.2 Specific Problems Caused by Tourism Development

Source: JICA Study Team

b. Tourism Activities and Traffic Increase

Tourism activities and traffic increase contribute to ecological deterioration and disturbance of wildlife and their habitats. Off-road driving is a critical problem in some popular NP/NRs, in which tourism management is not well implemented. It causes damage to the vegetation cover, contributes harassement of animal and lows the aesthetic of the environment. Illegal driving is sometimes a result of bad road conditions, and searching for some popular animals, to satisfy tourists guest of watching the animals. Balloon safari in Masai Mara NR is one of the most valuable attractions for the tourism industry. However, balloon safaris often cause off-road driving by vehicles accompanying the balloons and noise from the burner to blow hot air into the balloon and their low flight height disturb wild animals from the air.

Popular animals such as carnivores (lion, cheetah, leopard) elephants and rhinos, are frequently harassed being surrounded or followed by tourist vehicles. This affects their breeding/feeding behaviour through interference with their, hunting, moving, resting and mating. In the case of sea turtles, their breeding is disturbed through watching the breeding activities, trampling the breeding sites on sand beaches by tourists and lighting from hotels to beaches during night time. Tourists after feed animals while some lodges have set up feeding places for animals (leopard, crocodile) as well as salt-lucks to attract animals. Some animals (elephant, hyenas, baboons and so on) feed garbage from garbage-pits at lodges/camping sites. These can change their feeding behaviour and may cause diseases such as indigestion, abiotrophy and poisoning. Furthermore, tamed animals are sometimes dangerous and may do harm to tourists or tour personnel.

Increase of traffic waste, such as exhaust gas and oil spills, cause air and water pollution. Increase of traffic with road expansion and over-speeding in NP/NR may result in to accidents/dealt of wild animals and tourists. In the coastal ocean, operation and anchorage of tourist boats and snorkeling by tourists can lead to the destruction of corals. These as well as illegal collection of marine creatures (coral stones, shells and so on) by tourists and water pollution by tourism facilities can increase the level of degradation in the coral reef ecosystem.

2.2. General Environmental Considerations

One objective for environmental considerations is to balance environmental conservation with tourism development and, at the same time minimise tourism impact on the natural environment. The Environmental Impact Assessment (EIA) must be undertaken before any kind of tourism development is implemented. In principle, alternation of the landscape due to facilities development should be avoided. Once construction of tourism facilities are planned, sewerage and waste disposal systems should be installed at a high standard as the perfect counter-measures for environmental pollution. Tourism development in ecologically important or well-preserved areas must be carried out with greatest care.

In the highland and mountains, which sustain most of Kenya's forests, illegal uncontrolled logging trees should be avoided. Construction of large-scale facilities and polluting damage basins should be disallowed. Unsuitable development in this area can cause environmental problems not only in this area, but also in the lower land in the form of siltation and water pollution.

In the plain land and plateau, in which the main wildlife dispersal areas are found, establishment of fences or other buildings, which obstruct migration routes of wild animals, must be avoided. Wildlife conflicts with local people are prominent in parts of this area. They should be reduced by extension of wildlife-based development including eco-tourism.

At the coast, appropriate measures against destruction of the coastal marine ecosystem, such as mangroves, coral reefs, seagrass beds and sand beaches should be enforced. The crucial points for tourism development are pollution control on effluent from tourism facilities and control of tourism activities. In addition to these, sustainable management of fisheries will become more and more important in the future; because marine resources, such as fishes and shellfishes, may decline further due to over-fishing/collecting to meet the demand of food and souvenirs for increasing numbers of visitors. Also the sites for tourism facilities to be constructed along the coastal shore have to be carefully selected; because it is expected that the sea level may increase by about 10 to 30 cm by the year 2030, due to by global climate changes (by IPCC report), leading to retreat of the shoreline.

In order to prevent radical change or spoilage of traditional societies and cultures by tourism development, proper education and care must be provided to the local communities concerned.

2.3. Environmental Considerations in Specific Areas

The most important environmental consideration in the specific areas is over-use by tourism, which is more or less related to all other problems. In order to improve the present environmental conditions and to promote sustainable tourism development, the following proposed actions, covering common and specific problems, should be taken. It is necessary for the proposed actions to take into account improvement of infrastructure/facilities, reinforcement of management/regulations and development of visitor services and tour personnel training/instruction. However, it should be noted that these problems cannot be solved by taking each action separately, but only a combination of them.

(1) Proposed Actions for Common Problems

The actions proposed for addressing common problems, that is the number of visitors above resorts the carrying capacity and lack of discipline by tourists/tour personnel, were shown in the previous Figure 9.1. The proposed actions can be applied to all the tourism-related problems, which represent the over-use problem.

As the result of implementing those actions, carrying capacity can be improved in some specific areas. This in turn may allow to sustain visitor numbers at the same as the present level, or to increase further visitor numbers even in the areas, where over-use by tourism is currently observed.

a. More Visitors than Carrying Capacity

The problem of excess visitors is above resorts' carring capacity produced mainly by the increase in tourist accommodation, which is influenced by several characteristics of NP/NRs. In other words, visitor numbers are directly affected by capacity of tourist accommodations. Thus, visitor numbers can be directly controlled by limiting the construction of tourist accommodations. New tourist accommodations and amenities should not be constructed within and even adjacent to NP/NRs, where over-use has already been observed.

However, such direct control on visitor numbers is necessary to restrain the further over-use, but it cannot fundamentally solve present over-use. Also, it is usually difficult to take such action, because the local governments and private land owners wish to construct new facilities in order to increase their revenues from tourism. Therefore, at the same time, indirect control measures on visitor numbers should be encouraged by redistributing tourism destinations or used areas. Tourists, however, should have the

opportunity to choose resorts taking several tourism conditions into consideration. Among several measures to be taken for this purpose, differentiation in the pricing system would have an long-term effect. It is therefore suggested to co-ordinate the implementation of such measures with the results of the "KWS Tourism Pricing and Development Study", which is underway.

In summary, direct and indirect control measures would typically include :

Direct Control

- Control of the number of beds for tourist accommodation or its construction within/adjacent to NP/NRs in negotiations with the local governments and private land owners,
- Control of the number and size of vehicles entering NP/NRs at the entrance gates in negotiations with the local governments and tour companies.

Indirect Control

- Redistribute tourism traffic from major to minor NP/NRs by development of infrastructure/facilities, diversification of tourism products, promotion with effective advertisement, protection of key animals for tourism and maintenance of security,
- Redistribute tourism traffic with in over-used areas in NP/NRs by zoning for use purposes, regulation on accommodation sites and access roads, and careful expansion of road networks in under-used areas,
- Adopt differential pricing systems for the entry fees to NP/NRs and the zones to be established inside NP/NRs, that is high pricing for the popular NP/NRs or over-used areas and low pricing for the developing/under-developed NP/NRs or under-used areas (refer to Table 6.1),
- Monitor visitor numbers and tourism impact on the natural environment (as well as the socio-cultural and economic features) to estimate the carrying capacity to establish optional visitor number for each NP/NR.

b. Lack of Discipline among Tourists/Tour Personnel

The problem of lack of discipline is cosesed by little understanding of wildlife, ecosystems and NP/NRs by tourists and tour personnel. This is reflected in insufficient visitor education and tour personnel training. Development of visitor services and tour personnel

training/instruction is an effective solution to this problem as well as other specific problems related to tourism activities. It is a long-term as well as low-cost measure. Other control measures are to:

- Develop visitor services, such as education, information and interpretation services, by providing pamphlets, maps and notice boards in major languages (Swahili, English, Italian, German, Spanish, French and so on), which should be supplied to tourists at Information Centres in each NP/NR and other tourism facilities,
- Train and instruct tour personnel, such as tour operators, drivers, guides and lodge operators, and introduction of a kind of license system for certain tourism activities, including grades, certificates and penalties,
- Improve and establish facilities concerning education and training, such as Infomation Centres in all NP/NRs, Visitor Centres, Environmental Education Centres and Training Institutes/Schools,
- Reinforce field patrol for tourist's and tour personnel's activities by KWS as well as County Council staff, and
- Reinforce NP/NR regulations with deferent penalties against illegal tourists' and tour personnels activities.

(2) Proposed Actions for Specific Problems

In addition to these common actions, several actions are proposed to address each specific problem as follows:

- Facility and road construction,
- Litter, sewage and waste disposal,
- Off-road and over-speed driving,
- Balloon safari,
- Disturbance to wild animals, and
- Destruction of coral reefs.

a. Facility and Road Construction

Construction of tourism facilities and roads can cause degradation of vegetation/habitats and may disrupt wildlife dispersal/migration areas. Accordingly, there is a need to carefully plan the construction sites, scales and methods, taking into consideration the characteristics of the natural environment, and carry out construction works following implementation of the EIA. Proposed regulatory measure are to:

- Restrict construction of tourism facilities within/adjacent to NP/NRs, particularly where over-use by tourism is observed, in negotiations with the local governments and private land owners,
- Restrict development activities by prohibiting fencing or making other obstructions along roads over important migration routes of wild animals,
- Implement the EIA under KWS guidelines before any construction of tourism facilities and roads,
- Avoid to change the natural landscape by construction works and rather adopt to make good use of the natural landscape,
- Avoid to construct buildings on slopes and keep a proper distance from water resources and the coastal shoreline to construction sites,
- Prohibit felling of indigenous trees for construction works and replant trees in case of felling exotic trees,
- Examine preventive measures for traffic accidents with wild animals on roads, and
- Observe the facility development guidelines mentioned in Chapter 5 of the National Tourism Development Master Plan.

b. Litter, Sewage and Waste Disposal

Litter, sewage and waste are produced by tourists and operation of tourism facilities, causing water pollution, aesthetic spoilage and a kind of animal disturbance. The solution to this problem is installment and proper operation of adequate disposal facilities with full treatment capacity at tourism facilities. However, proper operation of such facilities is sometimes difficult to keep and it becomes an obstacle to the solution. Other proposed control measures are to: -

- Install and maintain litter-bins, garbage-pits, incinerators and composts at lodges/camping sites,
- Install and maintain sewerage systems with septic tanks and soak pits at lodges/camping sites, especially toilets at camping sites,
- Provide tax incentives for the installment of the disposal facilities acceptable to KWS standards, and
- Reinforce regulations on sewage/waste disposal and monitor operation conditions of the disposal facilities and water quality in effluent from lodges/camping sites.

c. Off-road and Over-speed Driving

The main environmental impact caused by off-road driving is degradation of vegetation/habitats, animal harassment and degredation of aesthetic beavly of the land scape. These should be prohibited in NP/NRs.

In NP/NRs, if some main destinations for mass tourism, the natural environment must be protected as much as possible, since they are legally protected areas. This can contribute to improve the tourism style and image of NP/NRs into eco-tourism and it would benefit both, environmental conservation and tourism development.

However, in some NRs, and stopping of off-roafd driving seems difficult for one reason or another , off-road driving may be permitted tentatively with the establishment of a special area, system and regulations. Adopting this option exceptionally may contribute to decreasing off-road-driving in other areas. In this case, it is necessary to carry out monitoring of vegetation damage to determine the limit of vegetation damage, which is restorable in a short period.

The measures proposed for the overall prohibition and some ideas for tentative and temporary permission are:

Overall Prohibition

- Develop visitor education and tour personnel training and reinforce patrol on off-road/over-speed driving,
- Physically prevent the illegal driving by new road designs and construction methods, such as all-weather gravel roads with side ditches and suitable curved lines,
- Maintain and carefully expand road networks with effective signposts in under-used areas within NP/NRs, and close illegal roads made by off-road driving with physical blocks and warning signs,
- Diversify tourism products from the present major game viewing with vehicles to other attractions, such as walking safari, camel/horse safari and fixed-point observation.

Tentative Permission

- Establish a guideline for the operation of off-road driving, such as vehicle number, size and driving time,

- Use only KWS (or County Council) vehicles or tour company's vehicles, which are accompanied by KWS staff and give no permission to private tourist vehicles,
- Introduce a license system for the operation of off-road driving,
- Establish a special area for off-road driving in NRs along with a zoning system for use purposes, which will be near lodges and rotated yearly,
- Charge a special fee for off-road driving and use the revenue for intensive patrol in other prohibited areas or vegetation restoration in special areas, and
- Monitor the conditions of the vegetation damage and use the data to evaluate future permission or cancellation of permission.

d. Balloon Safari

Balloon safari has the same negative impact as off-road driving on vegetation/habitats, caused by vehicles accompanying balloon. Falling into line with the prohibition of off-road driving, the present types of balloon safari should also be legally prohibited inside NP/NRs.

However, it seems to be very difficult to do so immediately, because balloon safari has become very familiar to tourists who visit Masai Mara NR. Tour companies and lodge owners are likely to defend to their vested interests in balloon safaris. There is therefore a need to develop alternative amusements, which are environmentally sound and economically as valuable as balloon safari. Another approach would be to restrict balloon safaris with the establishment of appropriate systems for its operations. Notwithstanding the above, it is preferable to operate balloon safari outside NP/NRs, particularly on private ranches. (in the neighbourhood of Amboseli NP. as at present).

In the case of conditional approval of balloon safaris in NRs or its adjacent areas, the following measures are proposed to be taken :

- Develop alternative amusements for balloon safari, such as fixed/tied balloons, small-size airships and trains (e.g. Moving Tree Top or The Ark, Circuit Style),
- Provide a kind of incentive, such as special fee collection for the operation inside NRs or tax reduction for shifting the operation areas from inside to outside NRs,
- Establish a stricter guideline for the operation of balloon safari, such as for flight number, time, noise and height,

- Reduce the number of vehicles accompanying the balloon and prohibit taking of shortcuts to balloon landing points by off-road driving,
- Introduce a license system for the operation of balloon safari,
- Establish a special area for balloon safari in NRs along with a zoning system for use purposes, which will be near lodges and rotated yearly, and
- Monitor the conditions of the vegetation damage and use the data to evaluate the future permission or prohibition.

e. Disturbance to Wild Animals

Disturbance to wild animals is through by animal harassment, animal feeding and garbage feeding. This may cause behavioural change, stress and disease in wild animals and decrease their population size inside NP/NRs. Since disturbance to wild animals results from several other problems, such as too many visitors, lack of discipline, off-road/over-speed driving, balloon safari and garbage disposal, the main solutions for this problem are related to development of visitor education and tour personnel training and reinforcement of patrol/regulations on tourism activities. Proposed solutions, therefore are to:

- Develop visitor education and tour personnel training and reinforce patrols on tourism activities,
- Establish a guideline for game viewing of attractive animals, such as for approach distance, encirclement range and vehicle numbers, with reference to the results of the study made in Masai Mara NR (Gakahu, 1992),
- Reinforce prevention of off-road/over-speed driving,
- Diversify tourism products from the present major game viewing with vehicles to other attractions, such as walking safari, camel/horse safari and fixed-point observation,
- Install and maintain garbage-pits, incinerators and composts with enclosures or ditches at lodges/camping sites,
- Drive away wild animals visiting lodges/camping sites to prowl about for garbage,
- Prohibit setting up feeding places for wild animals, where tourists can feed animals freely, at lodges/camping sites,
- Establish a guideline for sea turtle's watching, such as for approach timing and tourist numbers, and

- Restrict tourism activities at breeding sites of sea turtles and regulate lighting toward beaches by hotels during night time.

f. Destruction of Coral Reefs

Destruction of coral reefs is caused by tourism activities and it will contribute to degrading important marine life habitats. The main solutions to the problem is emphasis on the development of visitor education as well as tour personnel training and patrol/regulations on tourism activities. Other complementary solutions to the problem are to:

- Develop visitor education and tour personnel training and reinforce patrol on tourism activities,
- Advise tourists activities allowed MNP/MNRs through oral speaking and printed materials in major foreign languages,
- Prohibit some tourism activities, such as marine skiing and high-speed boat driving inside coral reefs, and restrict anchorage for tourist boats,
- Differentiate tourism activities depending on their experiences in marine sports and zoning to be adapted in each MNP/MNR,
- Difficult to enforce/embarrassing or intimidating to tourists,
- Develop other marine amusements which will not damage the coral reef ecosystem, such as by artificial floating beaches and glass boats with submarine rooms, and
- Install and maintain sewage/waste disposal systems at hotels/lodges and monitor its operation conditions and water quality in the effluent.

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