ANNEX E ENVIRONMENT

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Table of Contents

List of Tables

ANNEX E ENVIROEMENT

E.1 ENVIRONMENTAL ISSUES

1.1 General

The Government of Tanzania has well understood that development and environmental conservation should not be perceived as separate or conflicting challenges. To address the pressing issues of natural resource use and environmental management, the Government has undertaken a policy and strategy formulation process including an action plan that provides the context for a first step long-term national approach to environmental sustainability. The overall goal of the policy is to achieve sustainable development as to maximize the long-term welfare of both present and future generations of the country. The following objectives follow from this goal:

(a) to ensure sustainable and equitable use of resources without degrading the environment or risking health and safety.
(b) to prevent and control degradation of land water, vegetation and air.
(c) to conserve and enhance natural and man-made heritage, including the biological diversities.
(d) to improve the condition and productivity of degraded areas including rural and urban settlements so that anyone can live in safe, healthful, productive and aesthetically pleasant surroundings.
(e) to raise people awareness and understanding of the essential links between environment and development and to promote individual and community participation in environmental action.
(f) to promote international cooperation on the environmental agenda, and expand the country participation to relevant bilateral, sub regional, regional, and global organizations and programs, including implementation of conventions.

The action plan to implement the environmental policy includes specific activities ministries and concerned agencies need to take, to play their part. Ministries with central roles are Natural Resources and Tourism, Agriculture, Water, Energy and Minerals; Lands Health; Education; and Science and Technology. The Planning Commission, Prime Ministries' office, the universities, research institutions and NGOs also have important tasks in this effort. However, the Directorate of Environment under the Vice-President Office has the key-coordinating role,

providing guidance for all environmental actions through environmental planning and formulation of programs, and publishing annual progress report on the implementation progress. The National Environment Management Council (NEMC), in its advisory role to Government will be responsible for developing the enabling context for the implementation of the plan, particularly in monitoring environmental problems and developing the information system relevant both for problem definition and for policy and strategy refinement overtime. NEMC will also keep under review the progress of implementation at the district level, maintain a dialogue with that level, and submit to Government proposals on strategy and policy measures to support smooth implementation.

1) Legislative Aspects and International Cooperation

Although, there is an environmental policy and an action plan to implement that policy, there is not yet a bill or concrete legislation package setting up the institutional and legal frameworks necessary to fully back up the implementation of the policy. Such legislation is being worked out and is due to come out sometimes in the year 2000. However, the NEMC has prepared an EIA procedure and guidelines, which involves stakeholders, district authorities and Government officials, and advise developers to follow this EIA procedure.

With regard to the existing legislation related to environmental management, numerous laws and decrees relate to the conservation and management of natural resources. Among these, different acts and codes include land tenure system, forest conservation, hunting, air, waste and water, mining, fishery, etc.

At the international level, Tanzania has signed several global, regional and multilateral Conventions among which the followings can be cited: Protection of World Cultural Heritage, Ramsar on wetlands, Biological diversity, Climatic change, UN Convention on sea rights, Lusaka Agreement on Co-operative enforcement operations directed at illegal trade in wild fauna and flora, African Convention on the conservation of nature and natural resources, Convention for the protection, management and development of the marine and coastal environment of the Eastern African Region, Basel Convention on toxic wastes and their disposal, International Convention on desertification, Vienna Convention on the protection of the Ozone layer, Montreal Agreement on substances affecting the Ozone layer, Bonn Convention on the conservation of migratory species of the wild fauna, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and many more.

Within the framework of international cooperation, much analysis has been done on environmental issues for Tanzania, most notably on issues of desertification and land degradation. Many actors are involved in assisting the Government address a broad agenda of environmental challenges, namely, UNEP, UNCED, UNDP, the World Bank, WWF and IUCN.

1.2 Land Use Control in Coast Region

Various types of land use exist in Coast Region, which includes agriculture, forestry, grazing land requirements and human settlements. The region has a total area of 32, 407 km^2.

1) Cultivated Land

The region has 319,000 ha of land suitable for annual crops. There are some 118,000 smallholder farms in the region, with 112, 000 ha planted with annual crops. The large farms have a total area of 105,333 ha. Small farmers hold the land they cultivate from mainly customary land tenure systems, which include inheritance, allocation by the village heads, and investment in clearing.

2) National Parks

Coast Region has no terrestrial National Park. The nearest National Park is Mikumi found in Morogoro Region, absent 123 km from Morogoro Town, on the highway towards Iringa. The Park harbours diverse flora and fauna including heards of Elephants, Buffaloes, Wildbeasts, Impalas, Hartebeasts, Lions, Leopards, etc. Bird life is also enormous.

3) Nature Reserves

Two types of reserve exist in Tanzania: Game Reserves and Forest Reserves. In both cases Director of Forestry and Beekeeping (DFOB) in case of Forest Reserve and Director of Game/Wildlife (DW) in case of Game Reserves strictly control residence and utilization within these areas.

4) Game Reserves

Coast Region has a single Game Reserve within its boundary: Saadani Game Reserve located in Bagomoyo. Its area is 300 km^2. It is an excellent site for beach activities due to the Indian Ocean bordering it in the Eastern side. The Reserve is important for its variety of herbivores including: Elephants, Buffaloes, Elands, Hartebeests, Wildebeests, Bushbucks, Reedbucks, Warthogs and Bushpigs. Primates including Monkeys, Baboons, Bushbabys, etc. are also present. Different species of

birds including Hammer Kops, Helmeted Guinea Fowls, Francolins, Spurfowls, Quails, Lesser bustards Plovers, Sandgrouses, Pigeons, Doves, Wood-doves, Cuckoos, Rollers, Ground-hornbills, Owls, Night-jars, Wood Peckers, Honey-guides swiffs and other species under the order of Passeriformese can be seen.

Wami River originating from Morogoro Region borders the Reserve on the South Eastern side and harbours varieties of not only fresh water fishes but also one of largest Mammals, the Hippotames, largest water reptiles, the Nile Crocodile and water birds.

Apart from Saadani Game Reserve, Coast Region covers a part of Selous Game Reserve. The latter is found within five (5) Regions (Namely Coast, Morogoro, Lindi, Mtwara and Ruvuma) with nine (9) districts (Namely Kisarawe, Morogoro, Rufiji, Kuosa, Mahenge, Kilwa, Nachingwea,Tunduru and Tongea).

The Reserve covers an area of 50,000 km2 and is one of the largest Reserves in the World. It harbors diverse fauna and flora. Some large animals include Elephants, Elands, Buffaloes, Hippos, Wildebeests, Hartebeests, Impalas, Warthogs, Bushpigs, Porcupines Aardvarks, Bushbucks, Reedbucks, Waterbucks, Hares, Velvet Monkeys, Bushbabys, Baboons, Crocodiles (Crocodilus Niloticus), lions, Hyaenas, Leopards, Wild cats, Great and Lesser Kudus, Sable Antelopes, Pulru, Black Rhinoceros, Giraffes, Steinboks, Dikdiks, etc. Birds and snakes of different species are also present.

The Reserve is famous for Tourist hunting whereby tourists are allowed to take their trophies after paying foreign money during hunting trips.

However, the Northern part of the Reserve is exclusively used for visual and photographic tourism. Hence, luxurious camps have been developed by investors to cater for tourists' services

The Selous Game Reserve was declared a **'World Heritage Site'** by the United Nations in 1982

5) Forest Reserves

The forests are those classified as coastal forests. Most of these forests have been completely cleared like the Mkuranga sacred forest grove, and turned into farmlands, some of which have later been abandoned to develop into coastal bush land.

The important forest reserves in the region include Vikindu, Kazimzumbwi, Pugu, in Kisarawe; Kisiju in Mkuranga; Kiwengoma, Mchungu and Kikale in Rufiji. These forests are important in having some endemic or medicinal plants species. The Zaraninge/Kiono Forest Reserve in Bagamoyo district served also as a Game Reserve.

Coast Region has 35 Forest Reserves covering a total area of more than 2,880 km^2 (288, 000 ha) divided in districts as follows: 1) Bagamoyo – Six (6) F/Reserves covering a total of 34,973 ha; 2) Kibaha – One (1) F/Reserve with a total of 31, 930 ha; 3) Kisarawe – Six (6) F/Reserves with a total of 49,001 ha; 4) Mafia – One (1) F/Reserve (Mangroves) with a total of 4,047 ha; 5) M'Kuranga – One (1) F/Reserve with a total of 1,599 ha; 6) Rufiji – Twenty (20) F/Reserves with a total of 166,634 ha.

The Reserves were set aside primarily for safeguarding of catchment areas, biodiversities and prevention of erosion on vulnerable areas.

7) Other Land Uses

Other types of land use exist, like grazing-land requirements derived from various types of livestock present in the region, and land for settlement

8) Historical Remains and Archeological Sites, Important Scenery/Landscape for Tourist or Religion

The antiquities resources of Tanzania encompass archaeological sites, historic towns, monuments and artefacts or relics. In the Coast Region however, there are no antiquities sites listed as a World Heritage, but towns with historical quarters exist in all the districts of the region (see Table E.1.1). These towns are mainly located in the coastline, which has experienced in the past several human settlements that left behind an important amount of monuments and relics from the prehistoric era or even from a more recent era.

The Region has consequently spectacular areas for tourists particularly along the coast.

Bagomoyo District Headquarters found along the coast of Indian Ocean is the town with interesting phenomena: 1) it is an archaeological site where human history and development can be learned from Arab-Slavery era, German and British rules. Bagamoyo was a centre of 19^{th} Century notorious Slave trade, the last destination in Africa where most captives saw before being sold and shipped to Arabian and

Persian Gulf. Kaole Ruins located 2 – 3 km from Bagamoyo town tells a lot about Arabs; 2) it has an ancient architectural Monument which depicts human ability to design; 3) it has got a number of comparable beaches which has attracted investors in developing tourist hotels.

Apart from Bagamoyo town, Saadani Game Reserve found within the same district offers a combination of animals and beach area where a lot of tourist undertakings can be carried out. Saadani is also an international breeding site for marine turtles.

Another area of tourist importance is Mafia Island, which covers one of the finest complexes of estuarine mangrove, coral reef and marine channel ecosystem in the World. The Island provided home to some of the highest diversity of marine species including coral reefs, fish, mangroves, sea grass, algae and growth form of sponges.

The island provides feeding grounds for wading birds including some of the most important nesting areas for Open-billed stork and Fish Eagles. In addition, the island harbours one of the largest colonies and probably the newest subspecies of the fruit Bat, Pteropus Comorensis, in the coastal areas of the West Indian Ocean. Furthermore, the island's Coral reefs offer some of the best snorkelling and scuba diving in the region.

Despite these resources, tourism has not been fully developed. The island is accessible either by means of water or air. Its communication facilities are extremely poor. The air's trip is poorly developed, therefore seasonal. In addition only few can afford it. Water transport is cheaper and therefore affordable by mass. Its safety is questionable due to outmoded vessels being used. Consequently both water and air navigations are unreliable making tourism least important undertaking.

Despite the shortcomings, tourists frequent the island and are served by best facilities offered by Mafia Island Lodge and several tourist camps like Kirasi, Dolphin and others.

Of recent development, Mafia Island Marine Park has been developed. Unlike other National Parks in Tanzania, which are terrestrial and used exclusively for visual, photography, camping, site seeing and scientific research, the Park also offers utilization of the resources within the Park on sustainable basis. The good point is that it involves local communities and other stakeholders within the area in decision-making and sharing benefits derived from the Park.

Another area of tourist importance is Selous Game Reserve (already mentioned above). The mass of land offers tourist activities of all forms, - sport hunting, site seeing, photographic hunting, boating, etc.

Rufiji Delta found on the month of Rufiji River where it enters the ocean offers excellent spectacular site. It is a site of largest tidal (Mangrove) forest on the eastern Coast of Africa. These mangroves support an extensive inter-tidal fishery, provide nursery grounds for a nationally important prawn industry, and produce large quantities of mangrove poles for export. Over 150,000 people inhabit the Delta and floodplain, the majority of whom subsist on fishing, cultivation and extraction of forest, woodland and wetland products.

9) Locations of Environmentally Vulnerable Areas

a) Mangrove Forests

These are found along the Coast on four of the total six districts of the Region: 1) Rufiji District – The forest covers 40,460 ha; 2) Mafia District – The forest covers 4,047 ha: 3) M'Kuranga District – The forest covers 3,448 ha; 4) Bagamoyo District – The forest covers 1,499 ha.

Note that according to Forest Ordinance Cap 389 of 1959, Mangroves are Forest Reserves and cannot be used without the consent of Director of Forestry and Beekeeping (DFOB).

b) Coral Reefs

Bagamoyo and Mafia Island have considerable marine water areas with coral and coral reefs. This is justified by incidences of dynamiting in the area. The details can be obtained from fishery department.

c) Wetlands

Three important rivers are found within the region. The rivers are:

- Wami River whose water flows across many parts of Bagamoyo.
- Ruvu River flows across Kibaha and Bagamoyo districts.
- Rufiji River flows across Rufiji district.

They form wetlands, which are used mainly for paddy and fishery. These rivers have good population of Nile crocodiles and Hippos (Hippopotamus Amphibius)

10) Endangered and Valuable Animals and Plant Species

① Black Rhinoceros: Rarely seen but found in Selous Game Reserve and is one of the endangered species

② Wild dogs: These have been spotted in recently developed ‘’WAMI-MBIKI Community based Conservation Area found in both Bagamoyo and Morogoro Districts. Pack of about 30 animals has been encountered and listed as an endangered species

③ African Elephant: Also an endangered species. Herds of them are found in Kibaha, Rufiji, Bagamoyo and Kisarawe Districts

④ Nile Crocodile: Found in rivers of Wami, Rufiji and Ruvu. The population is considerably high. The reptile is listed under vulnerable species

⑤ Pangolins: Listed under endangered species. Found all over the Region

⑥ Plant Species: Little information is available on plant species, but the information contained in CFR Program – Status reports for 11 Coastal Forests in Coast Region may be of paramount importance in understanding biodiversity endemism of flora and fauna in those areas. The followings give a brief detail concerning some of the forests.

The Vikindu Forest Reserve is important in having some endemic plant species such as *Warbargia elongata* and the rare *Tristema schliebenii.* Some important medicinal plants include *Parinari curatellifolia, Secamone parvifolia*, *Uapaca kirkii*, *Voacanga* spp., *Cissampelos pareira* and *Clerodendrum* spp. The forest covers an area of 4,486 ha, which has been extensively logged and re-planted with exotic trees such as *Eucalyptus* and *Cassia siamea.* The local people remove some of the indigenous trees and shrubs remaining along the rivers and water for timber, poles and charcoal. It is estimated that 86,000 sacks of charcoal find their way to the markets in Dar es Salaam and villages surrounding Vikindu every month.

The Pugu Forest Reserve is important in having up to 15 plant species endemic or nearly endemic to the reserve. Four rare plant species are only found there and Kenya’s coastal forests. The Pugu Forest Reserve covers an area of 2,410 ha, which consist of 185.56 ha of Open Forest, 1575.47 ha of Closed Forest, 201.34 ha of Grassland and 398.63 ha of Plantation The remaining canopy is dominated by *Manilkara sulkata, Diospyros sp. nov*, *Diospyros verrucosa*, *Lecaniodiscus sp nov*.

The Kisiju Forest Reserve is important in having over ninety different species of plants, with no endemic taxa, but probably with two rare species i.e. Xylopia spp and Oxyanthus spp. The forest covers an area of 200 ha.

The Kiwengoma Forest Reserve canopy is dominated by *Khaya senegalensis, Scorodophloeus fischeri* and *Milicia excelsa*. Some endemic taxa include

Tessmannia densiflora, Baikiae ghesquiereana and the African violet *Saintpaulia ionatha*. The vegetation of the forest is secondary having been cleared and cultivated over the past 100 years. The forest area covers 10 to 25 km^2 on the Matumbi massif.

1.3 Afforestation Programme

Deforestation is a big problem in Coast Region as it is in the country as a whole. But the problem is compounded here as compared to other regions because this region surrounds Dar es Salaam, the biggest commercial city in the country having the highest number of immigrants from other regions. The majority of Dar es Salaam population depends on wood fuel for their cooking, putting much pressure on the forests in the nearby Coast Region. Charcoal making is a major source of income in the region. This charcoal finds its way to Dar es Salaam where there is good market for it.

To remedy the problem, the Government had established the **Ruvu National Afforestation Project** between 1965 and 1984 for softwood and hardwood. This project saw a total of 576 ha planted, with softwood trees covering 433 ha while hardwood covered the remaining 143 ha. This project covered 0.7% of the total area planted under the National Afforestation Project (79,249 ha). This project was started to cater for timber poles and wood-fuel as the natural forests were being exploited for construction timber and other uses.

A Village Afforestation Programme was designed and launched in 1967/70 with the aim of planting and growing as many trees as possible by individuals, institutions, industries and village communities through people participation. The program also meant to improve wood productivity in the rural areas in order to alleviate the fuel-wood and environment degradation problems.

Agro-forestry, a system of inter-cropping trees with other crops, is another important component of the program.

The following tables estimate the trees planted under the programme.

Areas and Classification of Managed Forests by 1990

Region	Area in Hectares		Total (ha)
	Productive	Protective	
Coast (Pawni)	242,417,9	43,880.0	286,297.9

Source: Forest Division Data Bank, Gazzetment index.

Areas of Local Authority Managed Forestry by 1990

Region	Productive Forest (ha)	Protective Forest (ha)
Coast (Pwani)	87,988.0	–

Source: Forest and Bee-keeping Division Index

National Afforestation Project (in ha)

Region	Project	Year of planting	Area planted		
			Softwood	Hardwood	Total
Coast (Pwani)	Ruvu	1965 – 1984	433	143	576

Village Forestry Tree Planting from 1975 – 1990 (ha) – Coast Region

Planted									Proposed					Planted	
1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
–	–	–	148	233	70	56	303	151	97	116	139	No record	No record	–	62

NB: Planting space at 2.5m X 2.5m = 1,600 trees/ha

Source: Forest Division Annual Reports

1) Other Current Responses

The WWF is currently involved in a community-based afforestation project around various forests in the country. The project deals with the conservation of the remaining patches of lowland forest in Coast Region. The project focuses on (1) protection and (2) development of sustainable alternatives to the current over-exploitation of forest resources. The different districts concerned are: Rufiji, M'Kuranga around Vikindu F/Reserve, Bagamoyo around Zaraninge Forest and Mafia around Mlola Forest.

Legislative responses create legal limits on exploitation of the forestry resource by requiring licenses to harvest and/or sell any plant materials, from both public and

private lands. Limits depend on the intended use of the materials.
While some planting of woodlots has taken place these still only about 150,000 ha some of which are of exotic species for wood products. This total represents a rough estimate of the annual losses of woodland. The revised Tanzania Forestry Action Plan (1993) has begun to address some of the issues involved, but much remains to be done.

1.4 Other Environmental Issues

1) Environmental Impact Assessment in Tanzania

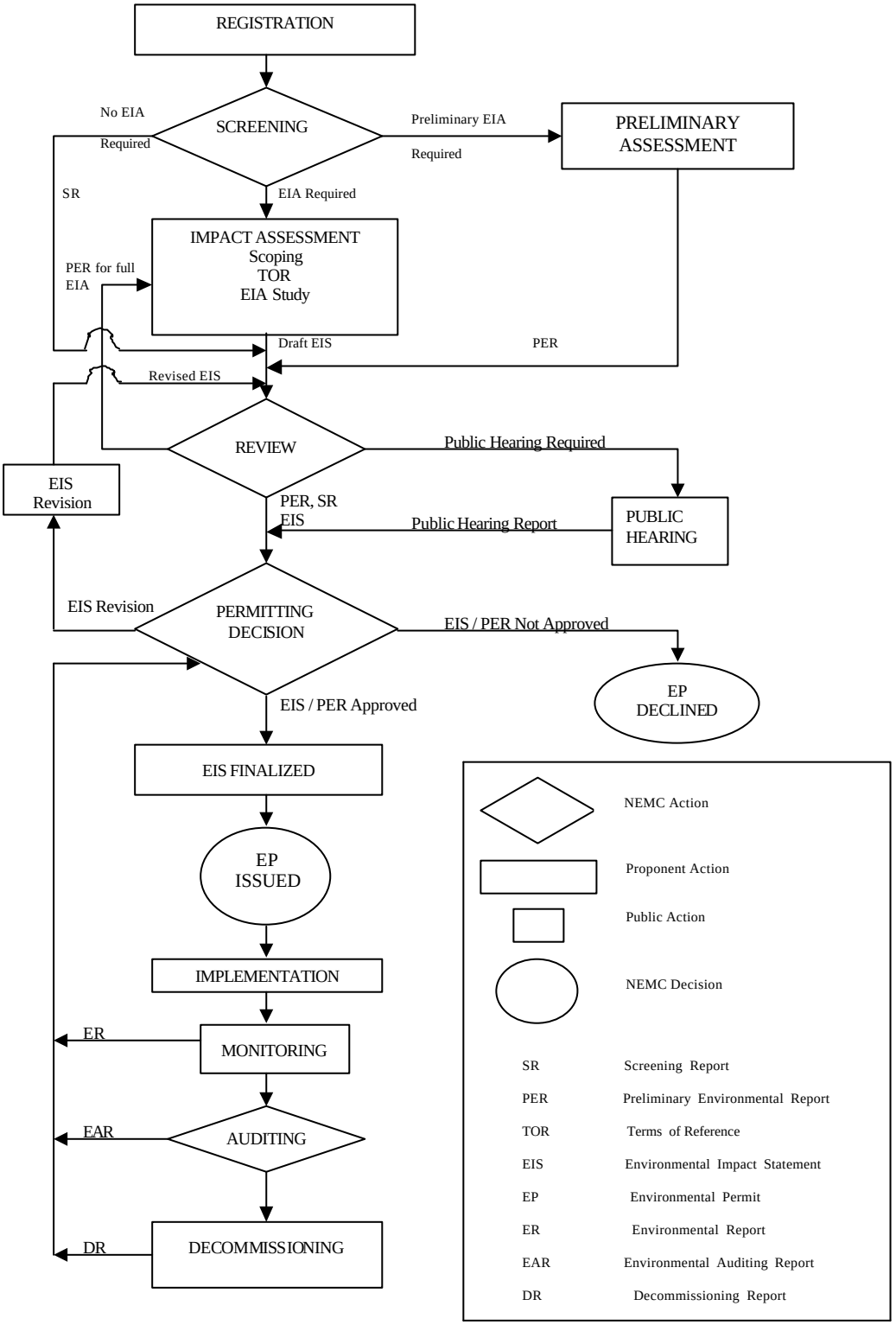
According to the '' Environment Impact Assessment Procedure'' issued by the National Environmental Council (NEMC), all projects proposal or concept should be registered with the NEMC through special application form known as ''Environmental Assessment Registration Forms''. The forms are available at NEMC offices, Environmental Units of sectoral ministries and municipal council offices, districts, and at Tanzania Investment Centre (TIC).

After registration, the NEMC will classify the project into one of the following four decisions:

- Full EIA required
- Preliminary Assessment Required (same as IEE)
- EIA not required
- Project Proposal Rejected (Stop)

Within a period of 30 days after submission of EIA registration form NEMC submits a screening report to the proponent (be it government or private developer). Screening is the classification of the proposal to determine the level at which the environmental assessment will be carried out.

The following figure shows the procedure of EIA in Tanzania



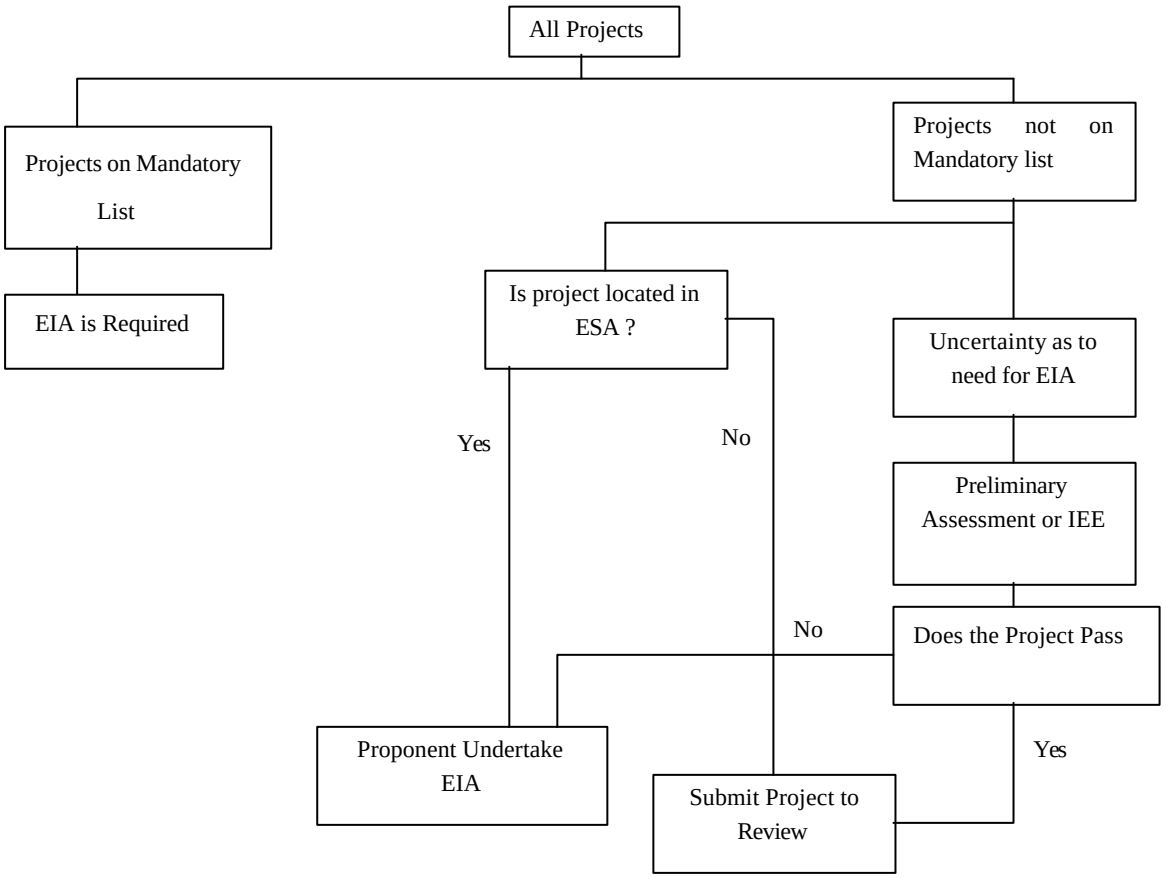
EIA Procedure in Tanzania

a) Screening Guidelines

Screening is the process of classifying a proposal to determine the level at which environmental assessment will be carried out. It is the first stage conducted by NEMC in the impact assessment process after registration of a project proposal.

The screening procedure (Figure below) can lead to one of the following decisions:

- Environment Impact Assessment (EIA) is required when the project is known to have significant adverse environmental impacts.
- Preliminary environmental assessment (IEE) is required where the project may have environmental impacts.
- Environmental Impact Assessment is not necessary where the project is unlikely to cause significant environmental impacts.
- No further consideration at all for projects contravening government policies or other legal obligations.



Screening procedure

EIA is mandatory for projects that are known from previous experience to have the potential of causing significant impacts on the environment. For agricultural projects, the following criteria require an EIA:

- Cultivating natural and semi-natural not less than 50 ha
- Water management projects for agriculture (drainage, irrigation)
- Large scale mono-culture (cash and food crops)
- Pest control projects (i.e. tsetse, army worm, quelea quelea, locusts, rodents, weeds), etc.
- Fertilizer and nutrient management
- Agricultural programs necessitating the resettlement of communities
- Introduction of new breeds of crops

EIA is not mandatory for all other developments/undertaking that are either less likely to have serious adverse consequences or are not located within or near Environmentally Sensitive/critical Areas (ESAs) (ESAs are listed in the table below). **Horticulture** is listed as one project for which EIA may not be mandatory. For such projects NEMC will conduct a screening process to determine whether EIA is required or the project is to be exempted from an assessment. Where there is uncertainty, a preliminary assessment, equivalent to IEE, will be done to assist in the decision making process.

The investigation is undertaken by the proponent to obtain enough information to determine whether or not there will be significant impacts. Preliminary assessment may be based on existing information and may require extra information to be gathered from the field.

A systematic identification, description and assessment of environmental and socio – economical impacts of the project is made. Preliminary assessment should proceed along the following steps:

- Description of the project characteristics
- Boundaries of the affected area
- Identification of impacts on local environment and socio-economic impacts
- Evaluation of the significance of impacts
- Consideration of possibilities of modification of the project design (mitigation measures) or the need for a full EIA.

ENVIRONMENTALLY SENSITIVE AREAS (ESAs) AND ECOSYSTEMS

1. Areas prone to natural disasters (geological hazards, floods, rain – storms, earthquakes, landslides, volcanic activity, etc.).
2. Wetlands:
   (Flood plains, swamps, lakes, rivers etc). Water bodies characterized by one or any combination of the following conditions.

   (a) Tapped for domestic purposes; brick making;
   (b) Within the controlled and/or protected areas;
   (c) Which support wildlife and fisheries activities;
   (d) Used for irrigated agriculture, livestock grazing

3. Mangrove swamps characterized by one or any combination of the following conditions:

   (a) With primary pristine and dense growth;
   (b) Adjoining mouth of major river systems;
   (c) Near or adjacent to traditional fishing grounds;
   (d) Which act as natural buffers against shore erosion strong winds and storm floods

4. Areas susceptible to erosion e.g.
   (a) Hilly areas with critical slopes
   (b) Unprotected or bare lands

5. Areas of importance to threatened cultural groups.
6. Areas with rare/endangered/or threatened plants and animals.
7. Areas of unique socio – cultural, history, archaeological, or scientific importance and areas with potential tourist value.
8. Polluted area
9. Area subject to desertification and bush fires.
10. Coastal areas and Marine ecosystems: -
    - Coral reef
    - Islands
    - Lagoons and estuaries
    - Continental shelves
    - Beach fronts etc.
    - Inter – tidal zones
11. Areas declared as: -

National park, Watershed reserves, forest reserves, wildlife reserves and sanctuaries, sacred areas wildlife corridors, hot – spring areas.

12. Mountainous areas water catchment areas and recharge areas of aquifer.

(Flood plains, swamps, lakes, rivers etc). Water bodies characterized by one or any combination of the following conditions.

13. Areas classified as prime agricultural lands or rangelands.
14. Green belts or public open spaces in urban areas.
15. Burial sites and graves

The above is to be reviewed periodically.

E.2 PRELIMINARY ENVIRONMENTAL ASSESSMENT (IEE) AND PROTECTIVE MEASURES

2.1 Objectives

The objective of preliminary assessment is to show whether the development will have significant impact or not. The report must therefore show whether it is necessary to conduct a full impact Assessment or if the identified impacts can be mitigated to the extent that their impacts are reduced to insignificant levels.

A national analysis has identified six major environmental problems for Tanzania, which are: a) land degradation; b) lack of accessible, good quality water for both urban and rural inhabitant; c) environmental pollution; d) loss of wild life habitats and biodiversity; e) deterioration of aquatic systems; and (f) deforestation. Therefore, EIA may be mandatory for a great number of projects that are likely to induce harmful effects on the environment. According to the NEMC's EIA criteria, a small scale horticulture development project is counted as a project for which EIA may not be mandatory, but a preliminary assessment equivalent to IEE will be done to assist in the decision making process either exempting the project from an assessment or determine whether EIA is required.

2.2 Preliminary Environmental Impact Assessment (IEE)

In view of the facts related above, a preliminary assessment has been carried out based on the field works and the evaluation of the collected data and information. The assessment was prepared following the ''Report Requirements for Preliminary Assessment'' defined by NEMC (Table E.2.1) and using the JICA screening and scoping procedures and the category of environmental impacts as a reference (Table E.2.2 – 2.5). The results have to be submitted to the appraisal of the NEMC before project implementation.

This project, which is to promote horticulture including some tree crops development on a small scale in the whole Coast Region, will mainly put emphasis on the improvement of the existing conditions (existing horticultural lands) through land consolidation, whereas farmland readjustment plots or lots may involve eventually small land clearing (few acres), and through strengthening of farmers groups to help alleviate/and or eradicate poverty. Horticultural lands are located either along rivers where vegetable growing takes place after the harvest of wet season rice, or in depression areas down valleys close to a water source such a pond

or open small surface well, or on hills where fruit crops are mixed with food crops such as cassava, maize, etc. The improvements foreseen in this project are not expected to induce major harmful impacts on the environment as the implementation sites are already under exploitation and the expected scale of development is very small. Consequently EIA would not be required; instead some protective measures regarding these impacts are proposed. The following summarizes the main issues of interest regarding these impacts. The table at the end of the chapter re evaluates some issues that are of importance for this project.

1) Impacts on the Natural and Socio-economic Environment

a) Impacts on the Soil

A controlled and improved watering system as will be planned in this project would not cause a brutal and irreversible modification of the soils. However, more regular and more intensive watering can locally create, namely on salty soils, drainage and salinization problems. While on well-drained soils more intensive cropping systems can deplete them of their nutrients. This fertility loss, when not compensated by a supply of nutrients, can in the long run create an unfavourable evolution of soil structure due namely to the low organic matter content.

b) Impacts on the Water Sources

In agriculture farmers use all kind of inputs to optimise the production conditions. Fungicides and pesticides are very important in protecting plants against diseases and insect pests. Manure and fertilizers are even more important in providing to the plants complementary nutrient sources. The application of these inputs is not without inconveniences and will induce some impacts on the environment. Though chemical fertilizer, fungicide and pesticide are utilized in very small amounts as most vegetable growing farmers cannot afford them, their application might increase with this project as farmers will be more organized and will be provided with more means to enable them to purchase these inputs. Presently farmers use manure as organic fertilizer and cut cost on fungicide and pesticide by producing vegetable on the dry season to minimize diseases and pests. For tree crops such as cashew nut, on the other hand, fungicide such as sulfur powder is used intensively to boost yields. Furthermore, several agro-chemicals are recommended for vegetables treatment in Tanzania (see Table E.2.6). Several others are supplied through various bilateral cooperations and include organophosphorus and organochlorine compounds and carbamate for the fight against locusts and birds. Some of these products such as blue copper and sulphur powder are quite toxic and can be greatly harmful when used unwisely. The potential effects of these inputs on the environment is described

below:

(1) Effects of pesticides

Given the function of these products (kill virus, bacteria and insects) it is evident that a non-controlled distribution will have an important impact on the environment. As these products can dissolve easily in water, they can contaminate it at high concentration and imperil the fauna in contact with the water, namely fishes and birds living of the fishes and drinking the water. As regard to human and animal health, dermal contact, inhalation and ingestion have to be considered.

These effects are related to the mode of dispersion, which can be:

i) dispersion by water

This mode is important because these products are soluble. The distribution can take place through runoff or infiltration in the soil. Distribution in the soil is related to permeability, length of the treatment and the amount of water.

ii) dispersion by the crops

The amount of chemical products absorbed by the plants at the roots system may add to the products absorbed externally. The danger for human lies mainly when consuming the fruits and vegetables.

iii) dispersion by wind

At the time of pesticide application the loss of products is as much as important as the wind speed is high and the radius of dispersion outside the treated plants is big. The result is not only a useless waste of the product but an immediate danger to sensitive beings (useful insects, animals, children, etc.) in the immediate vicinity of the treated plots.

iv) dispersion by manipulation and direct contact

The application on the field is accompanied by several manipulations of the product, which is transferred from its initial packaging to the spraying equipment. As a result there is a direct pollution of external parts (hands, face, feet, etc.) of the body of the workers and the material and equipment.

(2) Effects of fertilizers

Contrary to the toxic effects of pesticides and fungicides, fertilizers are not specifically dangerous for the environment. Their impact is indirect in such that they benefit not only to cultivated crops but also to other plants, weeds, algae and fishes feeding on these algae. At high concentrations in water, fertilizers can cause the proliferation of algae along with an important consumption of oxygen affecting the degree of clearness and transparency of water through eutrophication. This situation would affect the development of specific fauna and would particularly kill fishes, and namely birds that have to see their pray in order to feed.

c) Impacts on Vegetation

Construction works, in case small clearing and tilling are carried out can impact on the vegetal cover and biodiversity through the exploitation of pastureland and natural forests bordering the project sites. Afforestation and tree species diversification around vegetable gardens should be encouraged and generalized as one conservation measure.

d) Impacts on Health

A 1998 epidemiological study carried out by the Regional Medical Office (Please refer to Tables E.2.7 – A2.14) in Kibaha shows an increase of malaria, which led the list in all districts in the 10 motives for consultation, admission to hospital and death. Diarrhoeic related illnesses, though in the increase compared to 1996 and 1997, accounted only for 7% of the motives for consultation, behind anaemia, respiratory related illnesses including pneumonia, and 5% of the motives for death behind TB, anaemia, and respiratory related illnesses. Intestinal bilharzia is low in the list and accounted for only 3% of the motives for consultation among the 10 major diseases. Respiratory related illnesses are expected to rise in the future following the increase of agrochemicals, namely pesticide and fungicides. Malaria remains alarming due to its exponential increase. Cholera occurs annually in the area and could be endemic if appropriate hygienic measures are not taken regarding drinking water, toilet, etc.

e) Socio-economic Impacts

On an economical viewpoint, there will be certain positive direct impacts such as:

- The increase in the net income of the growers
- The improvement of the nutritional condition of the populations due to the increase availability of vegetable and cash to get other food crops.
- The increase availability of fresh vegetables due to the intensive gardening of women groups

The negative economic effects come from:

- The risk for the growers to contract debts when there is a decrease in production due to technical or organisational problems or due to a consecutive lack of water related to a prolonged and generalized drought.
- The risk to contract debts following a decrease in price due to market fluctuations

The socio-economic positive effects will reside in the setting of a dynamic organisational structure constituted by the farmers or growers groups. This will induce a sense of solidarity among members of a group.

The negative effects come from:

- The necessity to require the support of external institutions or suppliers for the promotion of horticultural crops creating a relationship of dependence between farmers and suppliers who are more informed of market mechanisms.
- The individualization of the debt and problems related to its payment creating the risk that persons without link with the grower may acquire rights to his/her detriment.

Overall, there will be positive and negative effects. Among these effects some will be durable and some can be reversible. The measures to take will consist in consolidating positive durable effects and correcting negative ones. The corrective measures for environmental conservation will then be to put emphasis on the components affected by the development. The Table of the Matrix of Impact on Environment below summarizes the corrective measures, which are discussed later.

MATRIX OF IMPACT ON ENVIRONMENT

Period and Impacts	Meaning of Impacts		Corrective Measures	Importance of Impacts				JICA Category of Envir. Impacts Ref.#
	Posit.	Neg.		Non signif.	Significant			
					Less	Moder	High	
A. Construction Period								
Changes in Vegetation		◯	Afforestation		◯			22
Erosion due to clearing		◯	Flat areas and wind break	◯				30
B. Operational Period								
HUMAN ASPECTS								3, 12
Integration in credit system	◯	◯	Judicious choice of credit system			◯		
Development of farmers sense of solidarity	◯		Reinforcement of farmers groups					3
Improvement of food self-sufficiency and income	◯						◯	3
Risk of debts contracting by farmers		◯	Crop intensification and promotion of groups in dynamic economic role				◯	3, 12
Relationship of dependence of farmers		◯	Promotion of group in dynamic economic role			◯		3, 12
Health problems related to pesticides and fungicides and water		◯	Monitored used of recommended products and Improvement of health system		◯			14, 16,17
EFFECTS ON WATER								
1/ Pesticides								14, 17, 43
a) Surface water quality, including closed water bodies		◯	Monitoring water quality And use of recommended products		◯			
b) Groundwater quality		◯	Sampling and observation of ground water		◯			
2) Fertilizers								14, 17, 43
a) Surface water quality, including closed water bodies		◯	Monitoring water quality And extension of application techniques		◯			
b) Groundwater quality		◯	Monitoring water quality And extension of application techniques		◯			
EFFECTS ON SOIL								
1/ Pesticides		◯	Use of recommended products	◯				14, 17,32, 33
2) Fertilizers	◯							14, 17, 32, 33,
3) Salinization and Alcanization		◯	Carry out observations and sampling analysis		◯			31
EFFECTS ON AIR								
1/ Pesticides	◯		Monitoring application and use of recommended products		◯			47

2.3 Protective Measures for the Conservation of Environment

In accordance with the community participation approach developed through this study, measures for the protection of environment can be effectively disseminated using a model development approach where, at the local level, conservation techniques are taught to farmers through trials and demonstration in a station or pilot farm similar to the one proposed in a different paragraph in the text. Farmers should have the responsibility for the operation and maintenance of the proposed farm. To establish and provide the integrated conservation measures for the farmers, the pilot farm should be operated with the cooperation of other sectors involved at

the district and regional levels, especially those dealing with environment, forest and health. At the national level, environmental measures should be integrated parts of the policy of environmental protection defined by the Government that is in charge of conception, planning, monitoring and control of the environmental policy.

The measures of environmental conservation/protection referred to in the above are already summarized in the table depicting the matrix of impact on environment and relate mainly to both the natural and socio-economic environments, which include potential land degradation through erosion and vegetation loss, impacts related to the increase use of agrochemical and a series of other issues that will be dealt with through the monitoring and mitigation measures proposed below.

1) Natural effects

a) Improvement of Vegetation and the Ligneous Cover

A village afforestation program similar to the one launched in 1967/70 with the aim of planting and growing as many trees as possible by individuals, institutions, industries and village communities through people participation should be developed in the framework of this project implementation and promoted in the demonstration or trials planned in the study. The program should also mean to improve wood productivity around all villages included in the project in order to alleviate the fuel-wood and environment degradation problems.

Agro-forestry should also be another important component of the program.

The installation of windbreak should be encouraged especially around vegetable gardens to limit soil erosion.

All these activities can only be carried out through the full involvement and participation of the communities on the one hand, and through the production of plants in village nurseries on the other. Consequently, some nursery specialists should be trained.

b) Improvement of Water Quality and Soils

(1) Water Quality

Corrective measures related to the use of agrochemicals are based on the negative impacts occurring from the projected increase use of these products.

A/ Pesticides

Products of higher toxicity such as some organochlorine compounds and those with lesser toxicity as some organophosphorus compounds, which would exceed the norms prescribed by OMS or which are not properly registered under the Tropical

Pesticide Research Institute (TPRI) should be traced with the collaboration of the institute and systematically banned by the organization managing the project. Farmers should first get an authorization for the use of their pesticides. They should give the date, name and the dose. The application must be strictly controlled.

Some measures of caution include:

- use of protective equipment
- minimization of the losses by undertaking the application when there is no wind and in the absence of rain if possible (no risk of runoff)
- minimization of dispersion by washing the body and cleaning the spraying material at the site in an isolated pan.

B/ Fertilizers

On poor soils, the effects caused by fertilizers would be positive and result in an increase of nutrients content of the soils. However, it is proposed to include in the plan some type of training on fertilizer application methods to avoid over dosage and potential discharge in water through runoff.

① River water

The type and quantity of pesticides used by farmers should be monitored. Pesticides constitute a health risk for anybody working in the area of application as long as the products can be disseminated by water. The monitoring of pesticides application should be a common interest, and it is proposed that farmers groups, with the help of the organization managing the project, create a monitoring unit through which each farmer has to declare the quantities and types of pesticides he/she has utilized and consult each time it is deemed necessary to exceed the dose habitually prescribed.

The population living in the area must be informed of the kind of risks they incur with pesticides and particularly with the domestic use of water from ponds or rivers in order to mitigate these risks.

Data on concentration observed as a result of analysis carried out in the area must be made available to the farmers groups and used to inform the public.

Fertilizer application should be monitored the same way as pesticides even though their toxicity is minor. Their negative effects include water eutrophication and proliferation of aquatic plants. Farmers should be trained in the correct use of fertilizers, namely through good land preparation. The farmers groups should take charge of this training and sensitise individual members in the correct management of fertilizer use; this would consequently result in a substantial saving for them.

② Underground water

Taking into consideration the small risks to contaminate underground water, the measures proposed above concerning river water would be largely enough to mitigate any risk of contaminating underground water.

(2) Soil

Salinisation/alcalinisation: it is proposed to flush the paddy field plots where vegetables are grown after rice at the end of the dry season. This is particular true for vertisols where the salt concentrations are relatively high. Flushing may be efficient, even though vegetables are presently cultivated without it every year after paddy.

Loss of soil fertility:

- adequate application of fertilizer and manure
- organization or improvement of the credit system for the acquisition of fertilizers
- introduction of manure collecting pits for better conservation of nitrogen and organic matter

c) Socio-economic Effects

The planned horticulture development ultimately aims at improving the communities' living standards. These communities will participate only when they foresee their well being into it. Therefore, the measures to take along that line consist in:

i. helping them to better manage their production spaces through the provision of the necessary responsibilities for that.

ii. making accessible to them the new production techniques and production means.

iii. ensuring them the conditions for the diversification of their production in order to reach food as well as income security.

This supposes that farmers have to be very well trained and be able to adequately manage the means of production by themselves. On an economic standpoint, options to reduce operation costs or economize on the use of given inputs have to be necessarily examined. It means reducing the quantity of inputs used without reducing production, which can be done when the calendar and modality of application of these inputs are respected by the book. This reduction has 2 advantages:

- a positive impact on the natural environment;
- a positive impact on the socio-economic environment.

d) Measures Related to Health

(1) Disease Prevention and Fight against Vectors

Disease prevention and fight against vectors can be carried out through spraying and pulverization. The organochlorine compounds that have been the main fighting tools against malaria are cheaper but present some toxicity risk relatively high, making their use as domestic insecticides no more applicable. Some organophosphorus compounds such as Fenthion, Fenitrothion can be used as insecticides by pulverization in anti- malaria campaign. They are less toxic for human and fishes. There are several other organophosphorus compounds presenting very low toxicity with a high LD_{50} value (quantity of product necessary to kill 50% of a population under study) that can be used in the fight against malaria. Some other measures include:

- use of molluscicide plants: numerous plants present some molluscicide characteristics; their use can be considered.
- use of predators such as larva eating fishes
- drainage of permanent and semi permanent reservoirs
- deflection of vectors by setting housings away from shelters for domestic animals; mosquitoes will be taking their daily blood feeding with the animals (animal shelters established between villages and larva sites)

(2) Extension and Sensitization at Village Level

These are necessary namely concerning the mechanical prophylactic measures to take regarding the fight against vectors, the dangers of bathing in infected water of ponds or the preparation of re-hydration salts in case of diarrhea.

(3) Logistics for Health Centers and Dispensaries

Logistics need to be reinforced to allow the centres to adequately carry out the allocated tasks and prevent the spread of diseases. In addition, an adequate supply for medicine that can be easily out of stock should be ensured: quinine, injection materials, serum, anti-parasites, antibiotics, etc.

List of Tables

* * *

Table E.1.1 List of Antiquities in Coast Region

District	Name of Site	Locality	Description
Bagamoyo	Bagamoyo	Bagamoyo	19th Century town, main port for the Slave and Ivory trade on mainland Tanzania and the first capital of the Germany East Africa
	Bimbini	Mkwaja	Ruins of two large plain graves.
	Mkwaja	Mkwaja	Ruins of a 19th Century mosque and a Germany Fort
	Ushonga Mtoni	Mkwaja	Ruins of a grave probably 18th Century
	Uzimia	Mkwaja	Ruins of 18th – 19th Century graves
	Chanyungu	Utondwe	Graves
	Utondwe	Utondwe	An important settlement during the 18th and 19th Centuries. Ruins of a mosque and graves
	Kaole	Kaole	Swahili/Islamic Ruins of 15th Century mosque
	Malindi	Malindi	Mosque and graves
	Mbegani	Mbegani	18th – 19th Century Tombs
	Mkadini	Mkadini	Remains of a 13th – 14th Century settlement. No monumental remains
	Nunge	Nunge	18th – 19th Century graves
	Saadani	Saadani	13th – 15th Century remains, 19th Century trading settlement, ruins of a German Fort
	Ukutani	Ukutani	Ruins of 14th – 15th Century mosque and two tombs; 18th – 19th Century graves
	Winde	Winde	An 18th – 19th Century trading settlement. Ruins of a defensive wall which surrounded the village and graves
Kisarawe	Bandarini	Bandarini	Swahili/Islamic site 14th – 15th Century mosque
	Boza	Boza	Ruins of 18th Century mosque
	Dindini	Kisiju	Swahili/Islamic remains
	Kera	Kisiju	Ruins 14th – 15th Century
	Kisiju	Kisiju	Several sites with ruins of 18th – 19th Century mosques
	Kutani	Kisiju	Swahili/Islamic settlement with 14th – 15th Century and later graves Ruins
	Mkuramani	Kisiju	Ruins of a mosque probably 18th Century
	Tonga	Kisiju	Ruins of an 18th Century mosque
	Kimbiji	Kimbiji	Ruins of a mosque
	Rasikanzi	Kimbiji	Ruins of a mosque
	Sala	Kimbiji	Swahili/Islamic ruins
	Koma Island	Koma Island	Ruins of a mosque
	Makungo Dege	Makungo Dege	18th – 19th Century ruins of a mosque, two houses and a group of graves
	Mbuamaji	Mbuamaji	14th – 15th Century mosque
	Ngobanyi	---	
Mafia	Chole	Chole	Original German administrative headquarters, 19th Century ruins of houses, two mosques and many graves
	Jumbe	Juani Island	Swahili/Islamic ruins of a 14th – 15th Century mosque
	Kua	Juani Island	Ruins of a 14th – 15th Century mosques, houses and a big palace
	Jibondo	Jibondo Island	Swahili/Islamic ruins of a 15th Century mosque
	Kirongwe	Kirongwe	14th – 15th Century mosque, probably demolished
	Kisiwani Mafia	Kisiwani Mafia	An important Swahili/Islamic town dating from the 13th – 16th Centuries
	Msikitini	Msikitini	Ruins of mosque
Rufiji	Lukiliro	Selous Game Reserve	Early Stone Age Site
	Matandu	Matandu	Middle stone Age Site
	Msungu	---	Mosque and graves between Msungu and Kikunji
	Nyemsati	---	Reported ruins including a mosque
	Pemba	Pemba	Early 19th Century settlement with stone built Hindu graves
	Rufiji Delta	Rufiji Delta	Scattered ruins of tombs, mosque and houses

Table E.2.1 Report Requirements for Preliminary Assessment

The objective of preliminary assessment is to show whether the development will have significant impact or not.

The report must therefore show whether it is necessary to conduct a full impact Assessment or if the identified impacts can be mitigated to the extent that their impacts are reduced to insignificant levels.

In the preliminary assessment report, it is important to provide summary statements of 'no impact' based on the identified 'environmental characteristics'.

Where the preliminary assessment indicates that the development will have no impacts on the environment, it is essential for the consultant and the proponent to indicate their own commitment to such statements, in such a way, they take responsibility for the finding of no significant impacts.

If the preliminary assessment reveals obvious impacts, then these may be usefully presented in a table to assist reviewers and other decision-makers. Where, it is found necessary to provide additional (specialist) information to justify further the presence or absence of impacts, this can be done in an attachment(s).

The elements necessary for inclusion in initial Assessment report would therefore be:

- Name or title of proposal
- Proponent
- Location
- Main findings
- Conclusion, backed with reasons for the particular finding.
- Consultant(s) name including, qualification/ relevant experience, contact (address/phone/fax/E-mail No.).

Table E.2.2 **Checklist for Screening**

I. Social Environment

	Category of Environmental Impact	Evaluation Yes	No	Unk.	Evaluation Basis
(1) Socio-economic issues (Unk.= Unknown)					
(1)-1 Social issues					
1	Planned residential settlement	__	X	__	Not applicable
2	Involuntary resettlement	__	X	__	Not applicable
3	Substantial changes in way of life	__	__	X	Positive and negative changes will be observed in the project areas
4	Conflict among communities and peoples	__	X	__	Not applicable
5	Impact on native peoples	__	X	__	Development concerns all social groups of the areas, who undoubtly need it
(1)-2 Demographic issues					
6	Population increase	__	__	X	Increase of living standard and income are expected
7	Drastic change in population composition	__	X	__	Ancient villages exist; composition has stayed the same despite new developments
(1)-3 Economic activities					
8	Changes in basis of economic activities	__	X	__	Not expected
9	Occupational change and loss of job opportunity	__	X	__	Not expected
10	Increase in income disparities	__	X	__	Not expected
(1)-4 Institutional and custom related issues					
11	Adjustment & regulation of water of fishing (riparian) right	__	X	__	Not expected
12	Changes in social and institutional structures	__	__	X	Depends on what is planned in the project
13	Changes in existing institutions and custom	__	X	__	Based on survey results in similar projects
(2) Health and sanitary issues					
14	Increased use of agrochemicals	X	__	__	Augmentation possible with intensification
15	Outbreak of endemic diseases	__	X	__	Not applicable
16	Spreading of epidemic diseases	__	__	X	Malaria is spread out; cholera occurs yearly possibly from contamination and water
17	Residual toxicity of agrochemicals	X	__	__	Possible in depressional areas without without drainage outlet
18	Increase in domestic and other human wastes	__	X	__	Not applicable
(3) Cultural asset issues					
19	Impairment of historic remains and cultural assets	__	X	__	No known remains exist in project areas

Table E.2.2 **Checklist for Screening (continued)**

I. Social Environment (continued)

	Category of Environmental Impact	Evaluation Yes	No	Unk.	Evaluation Basis
20	Damage to aesthetic sites	__	X	__	No known remains exist in project areas
21	Impairment of buried assets	__	X	__	No known remains exist in project areas

II. Natural Environment

	Category of Environmental Impact	Evaluation Yes	No	Unk.	Evaluation Basis
(4) Biological and ecological issues					
22	Changes in vegetation	X	__	__	Expected if extension applies
23	Negative impacts on important or indigenous fauna and flora	__	__	X	No clear evidence of existence of important fauna and flora in project sites
24	Degradation of ecosystems with biological diversity	__	__	X	No clear evidence of existence of important fauna and flora in project sites
25	Proliferation of exotic and/or hazardous species	__	X	__	Not applicable
26	Destruction of wetlands and peat land	__	X	__	Not applicable
27	Encroachment into tropical rain forests and wild lands	__	X	__	Not applicable
28	Destruction or degeneration of mangrove forests	__	X	__	Not applicable
29	Degradation of coral reefs	__	X	__	Not applicable
(5) Soil and land resources (5)-1 Soil resources					
30	Soil erosion	X	__	__	Possible if no measures taken
31	Soil salinization	__	__	X	Possible in some soils with the intensification planned
32	Deterioration of soil fertility	__	__	X	Possible if use of agrochemicals is not monitored
33	Soil contamination by agrochemicals and others	__	__	X	Use not significant but is expected to increase with intensification
(5)-2 Land resources					
34	Devastation or desertification of land	__	X	__	Not expected
35	Devastation of hinterland	__	X	__	Not expected
36	Ground subsidence	__	X	__	Not expected
(6) Hydrology, water quality and air (6)-1 Hydrology					
37	Changes in surface water hydrology	__	X	__	Not expected

Table E.2.2 **Checklist for Screening (continued)**

II. Natural Environment (continued)

	Category of Environmental Impact	Evaluation Yes	No	Unk.	Evaluation Basis
38	Change in ground water hydrology	__	X	__	Not expected
39	Inundation and flooding	__	X	__	Not expected
40	Sedimentation	__	X	__	Not expected
41	Riverbed degradation	__	X	__	Not expected
42	Impediment of inland navigation	__	X	__	Not expected
(6)-2 Water quality and temperature					
43	Water contamination and detrio-ration of water quality	__	__	X	Pesticide and fungicide should be properly monitored
44	Water eutrophication	__	X	__	Not expected
45	Sea water intrusion	__	X	__	Not expected
46	Change in temperature of water	__	X	__	Not expected
(6)-3 Atmosphere					
47	Air pollution	__	__	X	Possible if proper measures not taken with pesticides and fungicides

	Overall Evaluation (Necessity of IEE, ~~EIA~~)	X	__	__	Preliminary assessment of potential impacts necessry to decide on EIA

Table E.2.3 Checklist for Scoping

1) Applicable development activities :
   ~~Irrigation; Drainage~~; ~~Land clearing and leveling~~; ~~Sea/swamp reclamation~~; Land consolidation; ~~New land settlement; Dam and reservoir; Substantial change in farming system~~
2) Applicable development type :
   ~~New project or~~ Rehabilitation
3) Applicable environmental sensitive area :
   ~~Arid and semi-arid lands; Tropical rain forests; Wild lands; Wetlands; Peatlands, Coastal zones; Mangrove forests; Coral reefs; Mountainous, steep sloped, erodible or devastated lands~~; Closed water bodies ~~in upstream or downstream~~
   (Irrelevant items in the above are deleted)

I. Social Environment

	Category of Environmental Impact	Evaluation A	B	C	D	Evaluation Basis
1	Planned residential settlement			X		Not applicable
2	Involuntary resettlement			X		Not applicable
3	Substantial changes in way of life				X	Positive and negative changes will be observed in project sites
4	Conflict among communities and peoples			X		Not applicable
5	Impact on native peoples			X		Development concerns all social groups of the area
6	Population increase				X	Increase of living standards and income are expected
7	Drastic change in population composition			X		Not expected
8	Changes in bases of economic activities			X		Not expected
9	Occupational change and loss of job opportunity			X		Not expected
10	Increase in income disparities			X		Not expected
11	Adjustment & regulation of water or fishing (reparian) rights			X		Not expected
12	Changes in social and institutional structures				X	Depends on what is planned in the project
13	Changes in existing institutions and customs			X		Based on survey results in similar projects
14	Increase use of agrochemicals		X			Augmentation possible with intensification
15	Outbreak of endemic diseases			X		Not applicable

Table E.2.3 Checklist for Scoping (continued)

I. Social Environment (continued)

	Categories of Environmental Impact	Evaluation				Evaluation Basis
		A	B	C	D	
16	Spreading of epidemic diseases				X	Malaria is very much spread out; cholera also occurs yearly seemingly related to contamination, not water
17	Residual toxicity of agrochemicals		X			Possible in closed water bodies in the valleys
18	Increase in domestic and other human wastes			X		Not applicable
19	Impairment of historic remains and cultural assets			X		No known remains in project sites
20	Damage to aesthetic sites			X		No known remains in project sites
21	Impairment of buried assets			X		No known remains in project sites

II. Natural Environment

	Category of Environmental Impact	Evaluation				Evaluation Basis
		A	B	C	D	
22	Changes in vegetation		X			Expected if clearing applies
23	Negative impacts on important or indigenous fauna and flora				X	No clear evidence of existence in project sites, but particular attention to pay to vicinity
24	Degradation of ecosystems with biological diversity				X	No clear evidence of existence in project sites, but particular attention to pay to vicinity
25	Proliferation of exotic and/or hazardous species			X		Not expected
26	Destruction of wetlands and peatlands			X		Not expected
27	Encroachment into tropical rain forests and wild lands			X		Not expected
28	Destruction or degeneration of mangrove forests			X		Not expected
29	Degradation of coral reefs			X		Not expected
30	Soil erosion		X			Possible without conservation measures
31	Soil salinization		X			Possible in some soils with salt problems
32	Deterioration of soil fertility		X			Possible if used of agrochemicals not monitored
33	Soil contamination by agro-chemicals and others		X			Their use is unsignificant now, but excepted to increase with development
34	Devastation or desertification of land			X		Not expected
35	Devastation of hinterland			X		Not expected

Table E.2.3 Checklist for Scoping (continued)

II. Natural Environment (continued)

	Categories of Environmental Impact	Evaluation				Evaluation Basis
		A	B	C	D	
36	Ground subsidence			X		Not expected
37	Changes in surface water hydrology			X		Not expected
38	Changes in groundwater hydrology			X		Not expected
39	Inundation and flooding			X		Not expected
40	Sedimentation			X		Not expected
41	Riverbed degradation			X		Not expected
42	Impediment of inland navigation			X		Not expected
43	Water contamination and deterioration of water quality				X	Pesticides and fungicides should be properly monitored
44	Water eutrophication			X		Not expected
45	Sea water intrusion			X		Not expected
46	Changes in temperature of water			X		Not expected
47	Air pollution		X			Possible if proper measures not taken with pesticides and fungicides

1) Evaluation of SEI : Applicable columns with following impact degree are marked with "X"
(SEI : Significant Environmental Impact)
A : The subject SEI is unquestionably induced by the project
B : The subject SEI is likely to be induced by the project
C : There is no possibility of the subject SEI being induced by the project
D : The SEI is not fully known

2) Potential impact, etc., are filled in referring to "Significant Environment Impact and Issues"

Table E.2.4 Overall Evaluation

I. Social Environment

	Category of Environmental Impact	Overall Evaluation	Necessary Study Items
14	Increase use of agrochemicals	B	Estimation of the use of agrochemicals in the new development
17	Residual toxicity of agrochemicals	B	Study regarding the light use of agrochemicals
3	Substantial changes in way of life	D	Estimation of the positive and negative changes in the project areas
6	Population increase	D	Estimation of population increase in the project areas and surrounding
12	Changes in social and institutional structures	D	Study of new social and institutional structures as related to the project
16	Spreading of epidemic diseases	D	Study related to the improvement of community health and means to control the disease vectors

1) Overall evaluation : Applicable columns with the following impact degree are marked with "X"

(SEI : Significant Environmental Impact)

A : The subject SEI is unquestionably induced by the project

B : The subject SEI is likely to be induced by the project

C : There is no possibility of the subject SEI being induced by the project

D : The SEI is not fully known

Table E.2.4 Overall Evaluation continued)

II. Natural Environment

	Category of Environmental Impact	Overall Evaluation	Necessary Study Items
22	Changes in vegetation	B	Study of vegetation in the cleared areas and surroundings

30	Soil erosion	B	Conservation plan to improve and control erosion problems
31	Soil salinization	B	Detailed study of the soils in the areas
32	Deterioration of soil fertility	B	Study regarding soil fertility conservation
33	Soil contamination by agrochemicals and others	B	Study regarding the appropriate use of agrochemicals and elaboration of a practical guide
47	Air pollution	B	Study regarding the appropriate use of agrochemicals and elaboration of a practical guide
23	Negative impacts on important indigenous fauna and flora	D	Field study and evaluation of impacts on species
24	Degradation of ecosystems wi biological diversity	D	Field study and evaluation of impacts on species
43	Water contamination and deterioration of water quality	D	Monitoring and control of water quality

1) Overall Evaluation : Applicable columns with the following impact degree are marked with "X"

(SEI : Significant Environmental Impact)

A : The subject SEI is unquestionably induced by the project

B : The subject SEI is likely to be induced by the project

C : There is no possibility of the subject SEI being induced by the project

D : The SEI is not fully known

Table E.2.5 Definition of Environmental Impact Categories

I. Social Environment

Category of Environmental Impact	Definition
(1) Socio-economic issues (1)-1 Social issues	
1. Planned residential settlement	(1) New land settlement implemented in agricultural and rural development projects such as land clearing and leveling, sea/swamp reclamation and irrigation development. (2) New land settlement exemplified by the estate project approach with settlement schemes for nomad, landless farmers or shifting cultivator
2. Involuntary resettlement	Forced resettlement to move inhabitants away from their original dwelling places in area that will be inundated as part of development projects
3. Substantial changes in way of life	Change in the way of life of the affected people, and in particular changes in the role of women in family and society brought about by agricultural and rural development
4. Conflict among communities and peoples	Friction due to conflicting interests between beneficiaries and non-beneficiaries, people in favor of and those against development, new settlers and host people, people involved in development and outsiders, people in a project area and those affected in the surrounded area
5. Impact on native peoples	Adverse effects of development on local communities composed partly or entirely of indigenous peoples (including tribal groups), low-caste groups, ethnic minorities, or nomads
(1)-2 Demographic issues	
6. Population increase	Significant population increase in a project or surrounding area due to development
7. Drastic change in population composition	Drastic change in population composition in a project or surrounding area due to development
(1)-3 Economic activities	
8. Changes in bases of economic activities	Forced or involuntary relocation of economic bases or means such as farmland, fishing grounds, etc., under a project due to land acquisition, changes in land use regulation, and deterioration or depletion of bases or means for economic activities

Table E.2.5 Definition of Environmental Impact Categories

I. Social Environment (continued)

Category of Environmental Impact	Definition
9. Occupational change and loss of job opportunity	Forced or involuntary occupational change due to land acquisition and loss or deterioration of means or bases of economic activities ; it includes loss of job opportunities due to farm mechanization
10. Increase in income disparities	Increase in income disparities among groups brought about by development ; it implies relative impoverishment of the economically weak
(1)-4 Institutional and custom related issues	
11. Adjustment and regulation of water or fishing (riparian) rights	Adverse development effects on water or fishing (riparian) rights and necessary adjustments or regulations to rectify the same
12. Changes in social and institutional structure	Changes in social and institutional structures as a result of establishment of new, or modification of existing, rural organizations caused by development
13. Changes in existing institutions and customs	Changes in existing institutions and customs involved in or induced by development activities
(2) Health and sanitary issues	
14. Increases use of agrochemicals	Increases use of chemical pesticides due to intensification of agriculture ; introduction of high-yielding varieties and new crops and irrigation development
15. Outbreak of endemic diseases 16. Spreading of epidemic diseases	Spreading of endemic diseases as a result of the adverse effects of development
17. Residual toxicity of agrochemicals	Spreading of epidemic diseases attributable to the adverse effects of development
18. Increase in domestic and other human wastes	Accumulation in the natural environment (soil, water, etc.) of agrochemicals or chemical substances with high residual toxicity such as organo-chloric insecticides, etc. Increase in domestic and other human wastes due to the consequences of development such as population increase

Table E.2.5 Definition of Environmental Impact Categories

I. Social Environment (continued)

Category of Environmental Impact	Definition
(3) Cultural asset issues	
19. Impairment of historic remains and cultural assets	Direct or indirect impairment or destruction of sites, structures, and remains of archaeological, historical, religious, cultural, or aesthetic value as result of development
20. Damage to aesthetic sites	Direct or indirect negative effects on aesthetic features as a result of development
21. Impairment of buried assets	Impairment or destruction of buried assets due to development activities

II. Natural Environment

Categories of Environmental Impact	Definition
(4) Biological and ecological issues	
22. Changes in vegetation	Direct or indirect deterioration or degradation of vegetation due to development activities including removal of vegetation cover, alteration of land use, encroachment on forest, alteration of environmental conditions, etc.
23. Negative impacts on important or indigenous fauna and flora	Adverse effects on important or indigenous animal and plant species due to destruction of or changes in habitats
24. Degradation of ecosystems with biological diversity	Degradation of ecosystems with biological diversity refers to the varieties of biological resources and living organisms. Biological diversity is the characteristics of wild species and natural ecosystems that allowa them to withstand external stress
25. Proliferation of exotic and/or hazardous species	Introduction of pathogenic agents or spreading of hazardous species due to creation of environment condition to their propagation
26. Destruction of wetlands and peatlands	Extinction of wetlands or peatlands due to direct destruction caused by development activities such as large-scale earth filling ; or extinction due to indirect effects such as drying and decomposition due to changes in hydrological regime

Table E.2.5 Definition of Environmental Impact Categories

II. Natural Environment (continued)

Category of Environmental Impact	Definition
27. Encroachment into tropical rain forests and wild lands	Decrease or disappearance of tropical rain forests due to direct and indirest effects of development
28. Destruction or degradation of mangrove forests	Disappearance of mangrove forests attributable to direct destruction or deterioration of supporting environmental conditions
29. Degradation of coral reefs	Encroachment due to direct destruction, or damage to and deterioration of the supporting environment caused by sedimentation, etc.
(5) Soil and land resources (5)-1 Soil resources	
30. Soil erosion	Washing or blowing away of soil from the earth surface by the action of water or wind
31. Soil salinization	Phenomena in which soluble salts accumulate in the surface layer of soils and crop growth is consequently adversely affected
32. Deterioration of soil fertility	Deterioration of soil productivity due to leaching and decomposition of nutrients, nutrient absorption by plants, surface soil erosion, salinization, failure in soil management, etc.
33. Soil contamination by agro-chemicals and others	Accumulation of agrochemicals in soil with high residual toxicity
(5)-2 Land resources	
34. Devastation or desertification of land	Deterioration of land productivity or desertification caused by artificial or natural impacts
35. Devastation of hinterland	Devastation of area surrounding a project area as a result of secondary or indirect impacts of development
36. Ground subsidence	Settlement of ground caused by the dehydration or drying of wetlands, peat swamps, or reclamation lands, or excessive exploitation of groundwater

Table E.2.5 Definition of Environmental Impact Categories

II. Natural Environment (continued)

Category of Environmental Impact	Definition
(6) Hydrology, water quality and air	
(6)-1 Hydrology	
37. Change in surface water hydrology	Alternation of river discharge or water level as the effects of reservoir construction, irrigation water intake, or drainage
38. Change in groundwater hydrology	Change in groundwater recharge mechanism or groundwater table caused by infiltration of irrigated water and explotation of groundwater
39. Inundation and flooding	Overflowing of a river onto the surrounding land or the surfing of sea water on to the coastal land. Inundation or flooding are caused by increased river or run-off discharge or poor water management
40. Sedimentation	Settlement of transported sediment in rivers, estuaries, and reservoirs
41. Riverbed degradation	Degradation of riverbeds in lower basin areas due to in sufficient sediment load to maintain riverbed level
42. Impediment of inland navigation	Adverse impacts on navigation due to development activity
(6)-2 Water quality and temperature	
43. Water contamination and detrio-ration of water quality	Deterioration of water quality due to development activities
44. Water eutrophication	Accumulation in water of nutritive soluble salts such as nitrate and phosphate
45. Sea water intrusion	Intrusion of a salt water wadge along a riverbed
46. Change in temperature of water	Adverse impact of low irrigation water temperature on crops
(6)-3 Atmosphere	
47. Air pollution	Diffusion of agrochemicals and sand dust and odoriferous particles such as exhaust from vehicles and machinery into the air

Table E.2.6 Recommended Chemicals for Vegetables

Products' name	Trade name(s)	Manufacturer(s)	(Acute oral)Toxicity LD50 (mg/kg)	Chemical group
A/ Insecticides				
1. Lambda - cylahothrin	Karate, Grenade	ZENECA	Dermal, 243	Pyrethroid
2. Deltamethrin	Decis	Rousel - Uclaf	Dermal, 135 – 5000	Pyrethroid
3. Pirimiphus - methyl	Actellic	ZENECA	Dermal, 2050	Organophosphorus
4. Carbofuran	Furudan; FMC Carbodan Curaterr	Makhteshim – Agan Bayer	Dermal, 8 – 14	Carbamate
5. Phosphamidon	Dimecron	Ciba - Geigy	Dermal, 17 – 30	Organophosphorus
6. Profenofos	Selecron; Curacron	Ciba - Geigy	Dermal, 350	Organophosphorus
7. Dichlorvos	Nogos; Nuvan Dedevap – Dedevap Vapona – Vapona DDVP	Ciba – Geigy Bayer Shell Trivial name	Dermal, 50 – 80	Organophosphorus
B/ Fungicides				
8. Mancozeb	Dithane M45 Manzarite Critox Micene Vondozeb	Rohm & Haas Du-Pont Sipa Sipcam Elf Atochem	Dermal, 75000	Carbamate
9. Metalaxyl & Mancozeb	Ridomil	Ciba - Geigy	Dermal – Metalaxyl, 633 Dermal – Mancozeb, 5000	Not among common known chemical groups
10. Propineb	Antracol	Bayer	Dermal, 1000	Carbamate
11. Copper hydroxide	Kocide	Griffin	Dermal, 1000	Inorganic
12. Chlorothalonil	Bravo; daconil Clorotocaffora Bombardier	Fermanta ASC, Bioscience Corp. Caffaro SPA Universal Crop Protection	Dermal, > 10,000	Organochlorine
13. Triadimefon	Bayleton	Bayer	Dermal, 1000	Not among common known chemical groups
14. Cupric hydroxide (red)	Champion	Agrivet	Dermal, 1000	Inorganic
15. Copper oxychloride (green to blue – green powder)	Cobox Coprantol Cupro Caffaro Percopper	BASF; Cupravit; Bayer Ciba-Geigy; Recop; Sandoz Caffaro; Cuprokylt; Universal Crop Protection Chemolimpex Hungarian Trading Co.	Dermal, 700 – 800	Inorganic

Source: Ministry of Agriculture & Cooperatives, Plant Protection Department

Table E.2.7 Health Facilities in Coast Region

District	Hospital			Bed			Health Centers		Dispensaries			
	Public	Parastatal NGO	Private	Public	Parastatal	Total	No.	Bed	Public	Parastatal	Private	Total
Bagamoyo	1	0	0	90	0	90	4	60	19	20	3	42
Kibaha	0	1	0	0	231	231	2	4	15	2	11	28
Kisarawe	1	0	0	120	0	120	2	32	13	0	2	15
Mafia	1	0	0	150	0	150	0	0	9	0	1	10
Mkuranga	0	0	0	0	0	0	2	50	12	5	2	19
Rufiji	1	1	0	105	100	205	4	82	41	4	1	46
Total	4	2	0	465	331	796	14	228	109	31	20	

Table E.2.8 Ratio of Population over No. of Health Centres and Dispensaries

District	Population (Projected)	Health Centers	Ratio	Dispensaries	Ratio
Bagamoyo	220,468	4	1:55,117	42	1:5249
Kibaha	99,232	2	1:49,616	28	1:3544
Kisarawe	99,525	2	1:49,763	15	1:6635
Mafia	47,078	0	-	10	1:4708
Mkuranga	146,154	2	1:73,077	19	1:7692
Rufiji	173,317	4	1:43,330	46	1:3768
Total	785,774	14	1:56,128	160	1:4911

Source: Medical Report 1998 by Regional Medical Office to RAS, Coast Region

*Note: The health logistics of Coast Region include 26 vehicles (10 out of order), 16 motorcycles (5 out of order)

Table E.2.9 Ten (10) Motives for Admission to Hospital

Motives	Bagamoyo	Kibaha	Kisarawe	Mafia	Rufiji	1998	1997	1996
Malaria	1,886	3,009	14,650	1,056	380	20,981	10,235	3,792
Anaemia	446	1,128	2,791		177	4,542	4,805	640
U.R.T.I.	308	108	2,304	206	11	2,937	822	167
Diarrhoea	531	147	2,303	186	114	3,281	1,794	680
PTB	185	357	485	20	60	1,107	2,694	399
Pneumonia	778	577	412	110	149	2,026	2,166	1,380
Deliveries			1,919		26	1,945		
Severe Malnutrition			136	16		152	382	
AIDS R.C.	45	171	59			275	231	220
UTI	162	188	108		8	466		
PID	125				21	146		
Peptic Ulcers					7	7		
Skin Infection	39					39		
Fractures		301				301		
Worms				20		20	414	
Hepatitis				77		77		
STD				28		28		
Hypertension		81				81		

Table E.2.10 Main Motives Leading to Death

Motives	Bagamoyo	Kibaha	Kisarawe	Mafia	Rufiji	1998	1997
Malaria	22	63	31	10	7	133	162
TB	12	59	19	0	5	95	75
Anaemia	19	34	13	0	14	80	84
Diarrhoea	3	4	8	0	6	21	47
Pneumonia	15	12	0	3	2	32	47
AIDS R.C.	14	35	0	0	0	49	62
Card.Vas. Disease	9	0	0	0	0	9	0
Hypertension	3	8	0	0	0	11	23
ARI (Acute Resp. Infect.)	2	8	0	0	2	12	0
Other Diagnosis	6	0	2	9	2	19	19
PEM				2	2	4	23
Fractures					0	0	35
Cholera				2	0	2	
Hepatitis					2	2	
U.T.I.		1			0		

Table E.2.11 Ten (10) Main Motives for Death

Disease	Death	%
Malaria	133	31
TB	95	22
Anaemia	66	15.2
ARC	49	11..3
Pneumonia	32	7.4
Diarrhoeal	21	4.8
ARI	12	2.7
Hypertension	11	2.5
Cardio Vas. Disease	9	2
Fractures	6	1.4
Total	434	100

Table E.2.12 Main Motives for Consultation

Motives	Bagamoyo	Kibaha	Kisarawe	Mafia	Mkuranga	Utete	1998	1997	1996
Malaria	60,221	301,384	45,674	18,681	53,165	107,439	586,564	428,796	316,104
ARI	18,949	25,163	24,120	6,672	16,993	26,721	118,619	171,670	111,327
Diarrhea	11,335	28,925	15,711	2,800	9,072	16,407	84,250	85,267	85,394
Eye Disease	7,300	7,134	6,810	1,854	9,428	17,221	49,747	44,440	48,635
Anemia	13,144	108,658	6,614	1,618	6,454	14,937	151,425	77,423	71,355
Worms	14,909	16,803	6,955	1,645	10,168	13,948	64,428	66,338	56,545
Pneumonia	9,682	65,548	5,753	1,870	5,775	14,567	103,195	66,536	32,251
Skin Infect.	8,110	8,551	3,822	1,612	5,551	10,277	37,923	41,331	33,455
Accident			2,880						
UTI	2,975	26,499	2,735	768			32,977	54,620	2,443
Non Infect. Gastr.						6,074			
Surgical Conditions	5,760			1,135	6,803	9,223	22,921		
Genital Discharge								32,391	
Nutritional Disorder									8,568
Total	**152,385**	**588,665**	**121,074**	**38,655**	**123,409**	**236,814**	**1,252,049**	**1,068,812**	**766,077**

Table E.2.13 Ten (10) Main Motives for Consultation

	Disease	Patients	%
1	Malaria	586,564	46.8
2	Anaemia	151,425	12.8
3	Acute Respiratory C	118,613	9.4
4	Pneumonia	103,195	8
5	Diarrhoeal	84,250	6.7
6	Helminths	64,428	5
7	Eye Disease	49,747	3.9
8	Skin Infection	37,923	3
9	U.T.I. (Urinary T. I)	32,977	2.6
10	Surgical Conditions	22,921	1.8
	Total	1,252,049	100

Table E.2.14 Transmitted Diseases

	Cholera		Yellow Fever		Dogbites		Typhoid	
District	Contracted	Deaths	Contracted	Deaths	Contracted	Deaths	Contracted	Deaths
Bagamoyo	313	24	0	0	16	0	0	0
Kibaha	84	4	0	0	50	0	0	0
Kisarawe	0	0	0	0	0	0	0	0
Mafia	0	0	0	0	0	0	0	0
Mkuranga	0	0	0	0	0	0	0	0
Rufiji	414	13	0	0	6	0	14	0
Total 1998	811	41	0	0	72	0	0	0
Total 1997	1,796	187	12	0	12	0	105	0
Total 1997	0	0	69	0	69	0	0	0