

1.8 Rare, Endangered and extinct species

There are plant and animal species that have been identified as rare, endangered or extinct which include:

PLANTS:

	Extinct	Endangered	Rare
<u>Pteridophytes:</u>			
Ferns	-	Keangi turu	Keangin mwakin
Fungus	-	-	Taninga ni baa
	-	-	Te bwebwe (butterfly)
	-	-	Te mainaina (white)
	-	-	Te babobo (yellow)
	-	-	Te Roo (dark)

(English and scientific names are not available, local names are given only).

Brvophytes

Mosses	-	Te Aoibabobob	Te Aoirababa (broad)
	-	Te Aoimanii	-
Algae	-	-	Takarokaron mataia uea
	-	-	Te makano
Lichens	-	Tantan (spotty)	-

(No scientific names available).

Gymnosperms

Breadfruit varieties	Mairekereke	Maitarika	Maikeang
	-	Bokeke	Bukiraro
	-	Motiniwae	-
Others	-	Buka	Sugarcane (kaitioka)
		Biku	Bero
		Arongaa	Mbere/Chaya

(See Appendix 3 for English and scientific names)

Pandanus	Anibwanakoi	Anabwanaba	Aenaewati
	Anikairinano	Anikatouea	Anikaunauna
	Animamanang	Anikouri	Arabaikarawa
	Aniwantang	Annabai	Arabaikiaro
	Aramwenga	Antabwearake	Arabwaotin
	Arangauea	Antibitia	Arabuota
	Aratamaroanmwakin	Aramaibinben	Arakaakaia
	Aratekura	Aramaiki	Aramaoia
	Buniantonga	Aramwaieta	Aramatakoi
	Iriatabo	Araonimaai	Aramatang

Iriababonnang	Aranboia	Araumwaumwa
Iriburerua	Ararikitoa	Arauraria
Irikabwea	Arataborio	Arauriamwaere
Irikanoabouana	Arataitara	Arawaentongo
Irikeang	Aratebwai	Bakororo
Irikiko	Aratokotoko	Iroro
Irimangkoriri	Aratemam	Utongau
Irimakaei	Aratenneia	Uruutongau
Irimanriki	Aratewae	
Irimaoruru	Awaneari	
Iritai	Iribwanabwana	
Ntiuatina	Iribionga	
	Iribobutae (Iribingao)	
	Iribuangui	
	Irikaiwete	
	Irikouri	
	Irikiri	
	Irikuama	
	Irimaii	
	Irimwakiro	
	Irineiaro	
	Irionotoa	
	Iritabuaeroa	
	Iritabwena (Aratabwena)	
	Iritabuki	
	Iritebuu	
	Iritokouea (Aratokouea)	
	Iriuraura	
	Iriuatabo	
	Tetinabaikarawa	

(The scientific names for pandanus species or varieties are not available and therefore the local names are used instead; see also Appendix 3 for a complete list).

Babai (*Cyrtosperma chamissonis*)

Iabea	Aurairaki	Unikaai
Iokanai	Bamarii	Ikaraoi
	Natutebubura	Kaikui
	Oineke	Katutu
	Ikauraura	Atimainiku
	Kaoki	Ibaon
	Bakateke	Ibuota
	Antouman	Manra
		Kairoro
		Nawaro

(Species names not available, local names are used only).

Angiosperms

Food crops/Plant		Extinct	Endangered	Rare
1. Banana	<i>Musa sp.</i>			✓
2. Babaia	<i>Carica papaya</i>			✓
3. Baingan	<i>Solanum melongena</i>			✓
4. Bangke	<i>Cucurbita pepo</i>			✓
5. Bui	<i>Physalis angulata</i>			✓
6. Kabiti tiaina	<i>Brassica chinensis</i>			✓
7. Kabiti imatang	<i>Brassica oleracea</i>			✓
8. Kuava	<i>Psidium guajava</i>		✓	
9. Kukamba	<i>Cucumis sativus</i>			✓
10. Kumara	<i>Ipomoea batatas</i>		✓	
11. Mangko	<i>Mangifera indica</i>		✓	
12. Meron	<i>Citrullus lanatus</i>			✓
13. Meron	<i>Cucumis melo</i>			✓
14. Nii	<i>Cocos nucifera</i>			✓
15. Non	<i>Morinda citrifolia</i>			✓
16. Aoranti	<i>Citrus cinensis</i>		✓	
17. Raim	<i>Citrus aurantifolia</i>			✓
18. Remon	<i>Citrus limon</i>			✓
19. Nion	<i>Capsicum frutescens</i>			✓
20. Nion	<i>Annum sp.</i>			✓
21. Tiabotira			✓	
22. Tomato	<i>Solanum lycopersium</i>			✓
Ornamental Plants				
23. Akanta (Purple)	<i>Bougainvillea spectabilis</i>			✓
24. Awaua	<i>Mirabilis jalapa</i>		✓	
25. Akanta	<i>Bougainvillea grabra</i>			✓
26. Buraroti	<i>Catharanthus rosea</i>			✓
27. Kaitetua	<i>Delonix regia</i>		✓	
28. Karairai	<i>Tecoma stans</i>			✓
29. Meria (white)	<i>Plumeria obtusa</i>			✓
30. Meria (pink)	<i>Plumeria rubra</i>			✓
31. Kaituru	<i>Ixora casei</i>			✓
32. Merikora	<i>Tagetes erecta</i>			✓
33. Orion	<i>Nerium Oleander</i>		✓	
34. Roti	<i>Hibiscus Rosa sinensis</i>			✓
35. Roti	<i>Hibiscus ornamental hybrids</i>			✓
36. Roti Purple (Iaro)	<i>Pseuderanthemum carruthersii</i>			✓
37. Roti White	<i>Rosa multiflora thunb</i>			✓
38. Roti Pink	<i>Zepheranthes rosea</i>			✓
39. Roti	<i>Damask rosa damascena mill</i>		✓	

Shrub plants				
40. Tiare	<i>Gardneia taitensis</i>		✓	
41. Mota	<i>Amaranthus viridis</i>			✓
42. Mota	<i>Amaranthus dubius</i>		✓	
43. Marou	<i>Ocimum basilicum</i>			✓
44. Marou	<i>Ocimum sanctum</i>		✓	
45. Inato	<i>Clerodendrum inerme</i>		✓	
46. Iaro White	<i>Pseudesanthemum laxi florum</i>			✓
47. Iaro Red	<i>Pseudesanthemum carruthersii</i>		✓	
48. Kaibuaka	<i>Lantana camara</i>		✓	
49. Kaibakoa	<i>Acacia farneesiana</i>		✓	
50. Kaibaun	<i>Russelia equisetiformis</i>		✓	
51. Kaiboia	<i>Dodonea viscosa</i>			✓
52. Kaibingao	<i>Hedyotis biflora</i>			✓
53. Kaimatu	<i>Sophora tomentosa</i>		✓	
54. Kaimamara	<i>Polyscias guilfoylei</i>		✓	
55. Kabekau	<i>Euphorbia cyathophora</i>			✓
56. Kaura	<i>Sida fallax</i>		✓	
57. Kaura ni Banaba	<i>Abutilon indicum</i>			✓
58. Kitoko	<i>Canavalia microcapa</i>	✓		
59. Kitoko	<i>Vigna marina</i>		✓	
60. Kitoko	<i>Mexican Gliricidia sopium</i>			✓
61. Kitoko Yellow	<i>Crotalaria refusa</i>		✓	
62. Kitoko	<i>Pueraria phaseoloides benth.</i>	✓		
63. Kiebu	<i>Crimum asiaticum</i>		✓	
64. Kiebu Queen Emma lily	<i>Crimum augustum</i>			✓
65. Kiebu (rurunaine)	<i>Crium pedunculatum</i>			
66. Tarai	<i>Euphorbia chamissonis</i>		✓	
67. Tarai beach spurge	<i>Euphorbia chamissonis.</i>			✓
68. Tarai Wild	<i>Euphorbia geniculata ortega</i>		✓	
69. Tarai spurge	<i>Euphorbia glomerifera</i>	✓		
70. Tarai Kusaie	<i>Euphorbia hirta</i>	✓		
71. Tarai Prostrate	<i>Euphorbia prostrata</i>		✓	
72. Tarai Thyme leave spurge	<i>Euphorbia rubricunda</i>		✓	
73. Urimaran	<i>Datura metel</i>		✓	
74. Uritabuki	<i>Guettarda speciosa</i>		✓	
75. Uti	<i>Stachytarpheta jamaicensis</i>		✓	
76. Ukeuke	<i>Flourea ruderalis</i>		✓	
Cripping plant				
77. Boi (pigweed)	<i>Portulaca oleracea</i>			✓
78. Boi Broad leaf	<i>Portulaca lutea</i>		✓	
79. Boi wiid	<i>Portulaca tuberosa</i>			✓
80. Kiaou	<i>Triumfetta procumbens</i>		✓	
81. Kangkong	<i>Ipomoea aquatica</i>		✓	
82. Maukinkin	<i>Tribulus cistoids</i>			✓
83. Mtea	<i>Portulaca australis</i>			✓

84. Mtea	<i>Portulaca australis</i>		✓	
85. Ntanini	<i>Cassutha filiformis</i>			✓
86. Ruku maeao	<i>Ipomeao pes caprae</i>			✓
87. Ruku moon	<i>Ipomeao macrantha</i>		✓	
88. Wao	<i>Boerhavia repens</i>		✓	
89. Wao n anti	<i>Boerhavia tetrandra</i>		✓	
Woody, coastal windbreakers plants				
90. Aitoa	<i>Lumnitze littorea</i>		✓	
91. Ango	<i>Premna serratifolia</i>			✓
92. Bam	<i>Cycas circinalis</i>		✓	
93. Baireati	<i>Barringtonia asiatica</i>		✓	
94. Itai	<i>Callophyllum inophyllum</i>		✓	
95. Ibi	<i>Inocarpus fagifer</i>		✓	
96. Ngea	<i>Pemphis acidula</i>		✓	
97. Mao	<i>Scaevola taccada</i>			✓
98. Nikabubuti	<i>Sonneratia alba</i>		✓	
99. Nimareburebu	<i>Hernandia nymphaeifolia</i>		✓	
99. Ren	<i>Tournefortia samoensis</i>			✓
100. Robu	<i>Agave rigida</i>	✓		
101. Kanawa	<i>Cordia subcordata</i>		✓	
102. Kiaiai	<i>Hibiscus tiliaceus</i>			
103. Kaibaba	<i>Bambusa vulgaris</i>	✓		
104. Kunkun	<i>Terminalia samoensis</i>		✓	
105. Tongo	<i>Rhizophora stylosa.</i>			✓
106. Tongo buanguiu	<i>Bruguiera gymnorhiza</i>		✓	
107. Ukin	<i>Terminalia catappa</i>		✓	
108. Uri Tabuki	<i>Guettarda speciosa</i>		✓	
109. Uri maran	<i>Species of quettarda</i>		✓	
110. Bam	<i>Prichardia pacifica seem</i>			✓
111. Nimatore	<i>Macaranga carolinensis.</i>		✓	
112. Bararuku	<i>Dioclea reflex hook</i>	✓		
113. Bumorimori	<i>Calatropis gigantea</i>		✓	
Grasses				
114. Mumuta	<i>Cyperus rotundus</i>		✓	
115. Maunei Sedge	<i>Eleocharis geniculata</i>		✓	
116. Maunei Smooth	<i>Cyperus laevigatus</i>			✓
117. Uteute Finger grass	<i>Chloria petraea</i>			✓
118. Uteute Finger grass	<i>Chloris inflata link.</i>		✓	
119. Uteute Four finger grass	<i>Dactyloctenium aegyptium</i>		✓	
120. Uteute Itchy	<i>Digitaria setigera</i>		✓	
121. Uteute Aine	<i>Eragrostis amabilis</i>			✓
122. Uteute mane	<i>Fimbristylis cymosa</i>			
123. Uteute Kananteaoti	<i>Lepturus repens</i>		✓	

The fin-fish species of particular interest are large groupers and hammerhead wrass - *kuau* (*Epinephelus spp.* and *Cephalopholis cyanostigma*), goldspot herring - *tarabuti* (*Herlotsichthys quadrimaculatus*), bonefish - *ikari* (*Albula vulpes*). The giant clam - *kima* (*Tridacna gigas*) and turtles are considered endangered on all islands in the Gilbert, Line and Phoenix Groups. Among the most exploited fish species include *Muraenesox fuscogilva* (mostly from Butaritari Atoll), *Gymnothorax fimbriatus* in Nonouti and Tabiteuea, *Plectropomus sp.* in Nikunau, *Chanos chanos* and some pet fish species in Kiritimati.

In general, the reefs are in excellent condition in all islands in the Gilbert, Line and Phoenix Groups, except for damage around population centers such as Tarawa Atoll (Gilbert Group) and Kiritimati Atoll (Line and Phoenix Group). At Tarawa Atoll the western reef is very much affected by anchoring while patch reefs within the eastern arm of the island have been affected by the closure of reef passages with causeways. On Kiritimati Atoll, damaged reef is very common in areas frequented by pet fish operators (see Appendix 3 for a Checklist on Corals of Kiribati).

CHAPTER 2: CONSTRAINTS TO THE SUSTAINABLE USE OF BIODIVERSITY AND DEVELOPMENT

2.1 Introduction:

To be successful, atoll development must take into consideration the constraints to sustainable development imposed by the existing environmental and social conditions within Kiribati, and external conditions in relation to stability of global economic systems. This chapter discusses the major physical, environmental, ecological, biological, economical, social and cultural factors that in some cases contradict with the philosophy of sustainable biodiversity and development.

The International Union for the Conservation of Nature (IUCN) World Conservation Strategy (1980) makes the point that human activities (such as mangrove deforestation) that are reducing the planet's fragile ecosystems must be contained. Development must be sustainable in a sense that it must integrate social, ecological, biological cultural and economic factors within the living and non-living resource base, together with the long and short term advantages and disadvantages of alternative actions.

In the Country Report for UNCED (SPREP, 1992) the Government expressed a strong support for the principles and objectives of UNCED and for the promotion of environmentally and culturally sustainable development. Globally, regionally and nationally, the Government of Kiribati hopefully anticipates a return to more sustainable lifestyle that will endure the future of our generations.

Kiribati, like other neighboring countries, needs to refocus and strengthen its national development policies to include the essence of sustainable development. Government has taken up action pertaining to the importance of sustainable development in light of a wise use of our overburdened resources. This was clearly stated in the Seventh National Development Plan: 1992-1995 (DP7) that stipulates:

"The maintenance of (Kiribati) unique environment through protection and judicious utilization of its scarce resources is extremely important for sustainable growth and development. It is necessary therefore, to control over-fishing in Kiribati EEZ, protect mangroves and stop soil erosion and pollution of sea. Measures to stop over-fishing in the Pacific are already being undertaken jointly at the regional level."

2.2 Biodiversity constraints to development

One of the overriding constraints to atoll development is the fragility of island ecosystems and the extreme vulnerability of their plant, animal, soil and water resources, and their cultures and traditional resource-use systems to outside human induced disturbance and overexploitation. The limited resources and cultures of small islands have historically been shown to be highly susceptible to irreversible degradation and extinction. Many plants, animals and even people have become extinct due to contact with the outside world.

For conventional economic development to be successful in the atoll set up the following features must be carefully considered and scrutinized: isolation and inaccessibility from markets and sources of imported products, geographical fragmentation, small size and land scarcity, mineral scarcity, tropical cyclones and periodic drought, water scarcity and high salinity, soil impoverishment, poor and endangered biota (plants and animals).

Floristic and faunal poverty represents a major limiting factor to sustainable development in comparison to the rich resource endowments of the larger islands. Intensive research on the most appropriate species for transplant and introduction purposes will boost the tremendous economic potential of these islands.

2.3 Current trends in environmental and biodiversity degradation in the South Pacific

All types of income generating developments have a number of things in common: 1) they are capital intensive; 2) external expertise dependence; 3) dependence on imported expensive technologies; 4) adversely impact the environment and the resources contained therein.

Because development planners, policy makers, and international agencies have only limited understanding of the nature of the atoll environment, and the importance of traditional environmental and resource management systems to the stability and maintenance of human communities, the introduction of western-inspired modern technologies often replace and destroy the existing systems that have been very effective since time immemorial. This underlies a need to scrutinize and revolutionize technologies that are appropriate for development in the atoll environment.

There are clear signs of ecological and cultural breakdowns in industrialized and developed nations. The long-term economic costs of pollution, environmental damage, and other activities are a concern. Even worse is the storage and poor disposal of nuclear waste material on some atolls, and the transportation of nuclear fuel and waste across the Pacific Ocean. Because of the fragility of the atoll environment and its resources the dumping and transportation of such hazardous wastes or the testing of nuclear weapons will obviously aggravate the damages that have already been sustained.

2.4 Cultural or human induced constraints

Climate and sea level changes are the major human induced constraints that impact development. Others include: overpopulation, ecological blindness, poor health, deterioration of subsistence agriculture, inappropriate fishing technologies, pollution, energy dependency, foreign domination, landform destruction, deforestation, agro-deforestation, soil destruction (bush fires), species extinction, limited industrial potential,

inadequate infrastructure, rapid urbanization, landlessness, social disintegration, epidemic pests infestations, inequality of women, and more. Because everything else is interrelated in one way or another, and because if one aspect is affected, the others must also be affected directly or indirectly.

Among the major concerns is human over-population, which is one of the key factors affecting the sustainable use of resources. Growth rate was estimated in 1990 as 2.0% and it is expected to rise to 2.2%. Because of the limited resources of the islands further increases in human population will aggravate the over-exploitation problem.

Pollution is another major factor that impacts the health of resources, people and development in general. Water pollution, which is caused by the dumping of all sorts of waste material, recyclable and non-recyclable, in the lagoons and at sea, affects marine life including corals, fish, and turtles. Raw sewerage discharge into the marine environment and the defecation on beach and reef areas should be among the major concerns that need to be addressed urgently and effectively. In a similar manner, land-based pollutants, which in most cases result from the importation of alien food items wrapped in plastic bags or other non-decomposable materials, and other commodities, must be dealt with accordingly.

Landlessness and disintegration of a society in terms of cultural and traditional norms, values and respect for the old, are causing unprecedented splits within and between families. These contribute to social problems that in most cases are uncontrollable and unbearable thus impacting development at all levels.

2.5 Promoting culturally and ecologically sustainable development

In order to attain sustainable development within the philosophy of sound ecological, biodiversity and environmental stability we must prepare ourselves to be more innovative and actively search out strategies which achieve balance between traditional and modern ways of production and do away with inappropriate imported technologies.

Community-based resource management could play an important role in sustainable development. It has been proven that government alone cannot effectively manage our natural resources, and the cost of maintaining and providing custody required for management purposes surpasses the returns from those resources. Traditional

knowledge of our natural resources is so important in the understanding of the threshold and potential of each resource. The passing on of this knowledge to the younger generations will eventually help in the long term sustainability of the overburdened resources and the stability of the fragile ecosystems.

Domestic Agriculture, Mariculture Restocking and Propagation of degraded timber tree species.

Captions to Plates

- Plate 1: Division of Agriculture of the Ministry of Natural Resources Development, located in Tanaea past the Bonrki International Airport, Tarawa, Kiribati. Poultry and piggery cross breeding programmes including other agricultural services provide support to individual farmers.
- Plate 2: Chicken brood stock
- Plate 3: Vegetable home gardening - Chinese cabbage, kumara and pawpaw (papaya)
- Plate 4: Home gardening - pumpkin, cucumber and pawpaw.
- Plate 5: Weaned piglets ready for dispatch to farmers.

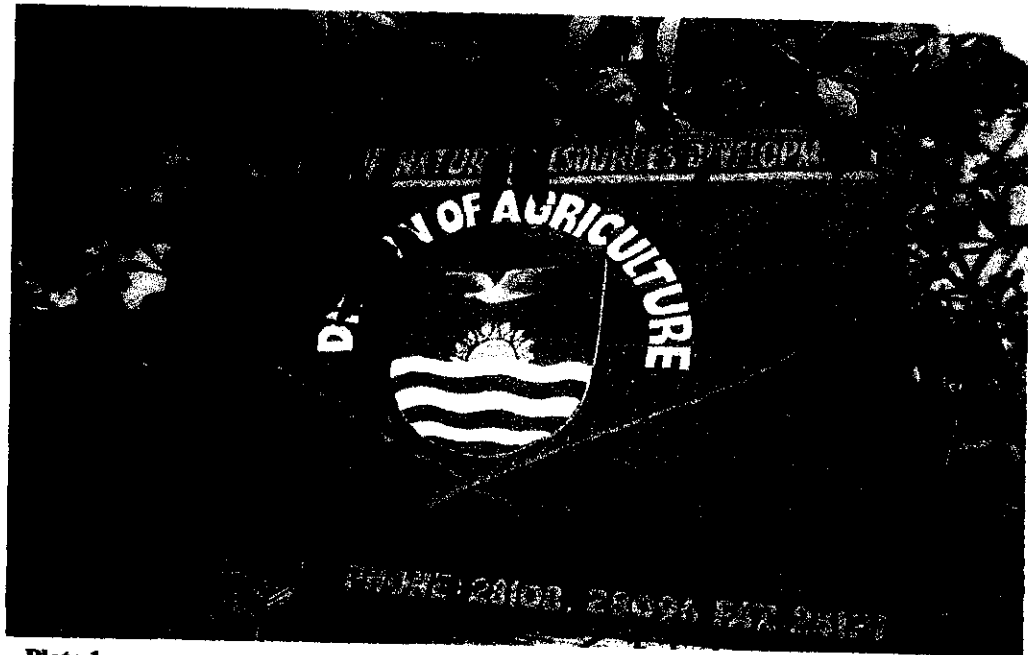


Plate 1



Plate 2

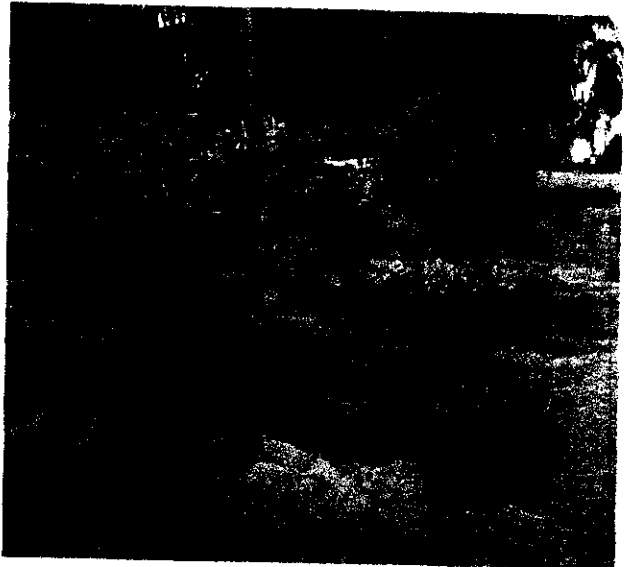


Plate 3



Plate 4



Plate 5

- Plate 12:** Eten Botanical Garden owned by the Traditional Healers Association – Maurin Kiribati. An example of community initiative to enhance rare plants and trees. Located near University of the South Pacific Extension Centre, Tarawa, Kiribati.
- Plate 13:** One of the rare trees, *Canophyllum inophyllum* – te itai. Used for building, medicine, arts and craft, and witchcrafting.
- Plate 14:** Pandanus tree (*Pandanus tectorius*). One hundred varieties were recorded, only 2 dozens varieties remain, the rest are either extinct or very rare. The trees were cut down for building purposes. Its many uses include medicine, food, handicraft making, etc.
- Plate 15:** One of the most popular medicinal plants, *Morinda citrifolia*, te non. Rare in South Tarawa. The fruit can be used as food, and medicine. The root and leaf are used for medicine. Branches are used for building material.
- Plate 16:** Another rare plant, *Terminalia samoensis*, te ukin. All parts are used for medicine.

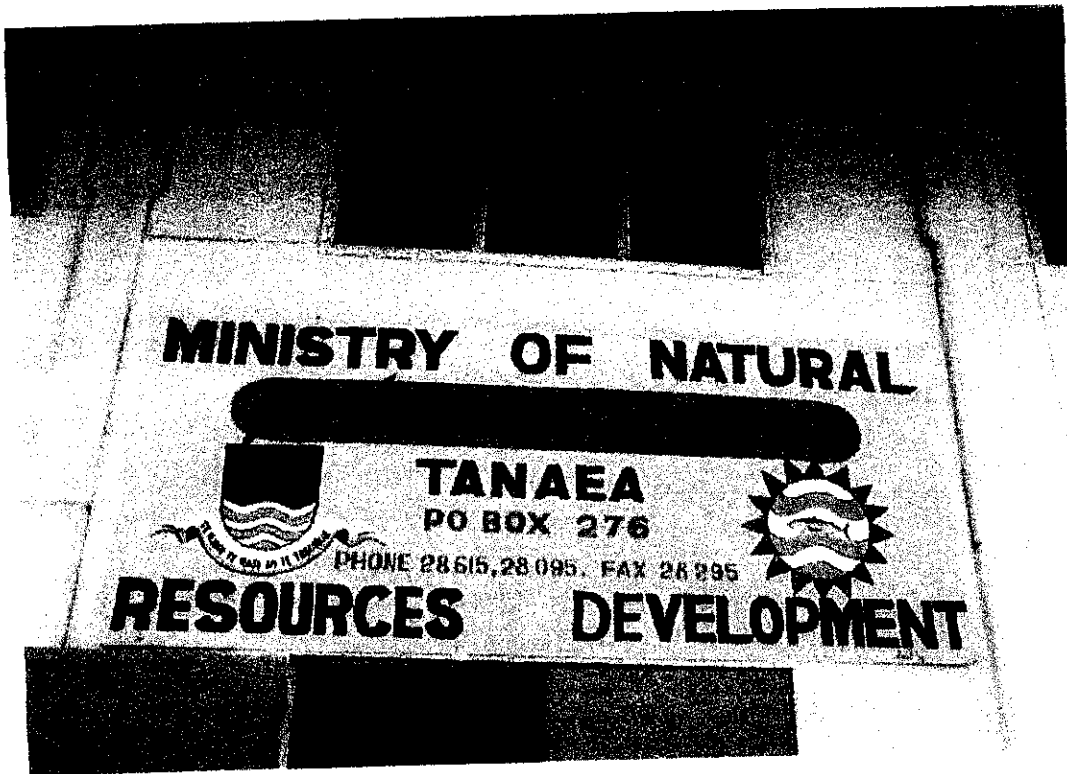


Plate 6



Plate 7



Plate 8



Plate 9



Plate 10



Plate 11

CAPTIONS TO PLATES

- Plate 1:** Division of Agriculture of the Ministry of Natural Resources Development, located in Tanaea past the Bonriki International Airport, Tarawa, Kiribati. Poultry and piggery breeding programmes including other agricultural services provide support to individual farmers.
- Plate 2:** Chicken brood stock.
- Plate 3:** Vegetable home gardening – Chinese cabbage, kumara and pawpaw (papaya).
- Plate 4:** Home gardening – pumpkin, cucumber and pawpaw.
- Plate 5:** Wonned piglets ready for dispatch to farmers.



Plate 12



Plate 13



Plate 14



Plate 15



Plate 16

SECTION 2:
RESPONSES AND PRIORITIES FOR
PROMOTING CONSERVATION OF
BIODIVERSITY

CHAPTER 3. RESPONSES TO BIODIVERSITY ISSUES AND DEVELOPMENT

3.1 Biodiversity issues and development

Some of the problems related to biodiversity degradation and over-exploitation are lack of understanding of the nature of the ecological systems, their relationship to each other, human greed aggravated by a market economy, and suppression of traditional systems. Physical, cultural, environmental and socio-economic factors also play a major role. These problems could be minimized by setting up a framework for planning and policy making, legislation, coordination and implementation.

3.2 Policies, legislation and institutions in general

Kiribati did not have a comprehensive national environment policy that enshrines the conservation of biological diversity until recently. During the November sitting of the House of Parliament the Environmental Bill was debated and endorsed. Within the Bill are sections that recognize the need to protect and manage biological diversity and ecosystems. Acts relating to specific sections of the Bill need to be formulated and designed according to the individual resource to be protected or managed.

The Constitution of Kiribati does not include set clauses relating directly to environmental and resource policy, but its preambular declaration that "the natural resources of Kiribati are vested in the people and their Government" can be taken to imply the notion of sustainable resource use.

Existing legislation relevant to specific environmental and resource concerns, such as 1) land or resource use and management and access to terrestrial and marine resources, 2) coastal management and protection, 3) conservation of strategic or endangered marine and terrestrial resources, 4) water, sanitation and environmental health, and 5) control of specific potentially polluting, dangerous or environmentally disruptive substances and materials, also include other specific legislation under Land or Resource Use and Management.

3.3 International Conventions

Because of the small size and limited political leverage of Kiribati and other Pacific Island states, regional and international conventions and initiatives have shown to be among the most effective ways of addressing both global and many national biodiversity and resource management issues. Kiribati is a signatory, or has succeeded to the following environment-related conventions including the Convention of Parties on Conservation of Biological Diversity:

1. Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP Convention).
2. South Pacific Nuclear Free Zone Treaty (Rarotonga Treaty).
3. Nuclear Non-Proliferation Treaty.
4. Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Tarawa Declaration).
5. London Dumping Convention.
6. International Maritime Organization Convention.
7. UN Framework Convention on Climate Change.

Kiribati continues to advocate the ban of all activities and technologies that are destructive to the environment and resources. It is one of the small countries that oppose further increases in carbon dioxide and other noxious gases that contribute to global warming and sea level rise.

3.4 Coordinating biodiversity planning

The Environment Unit of the Ministry of Environment and Social Development is the coordinating body of the Biodiversity Strategy and Action Plan Project. The Coordinator of the project is responsible to the Coordinator of the Environment Unit who is in turn responsible to the Secretary. The Steering Committee and the Planning Team work under the auspices of the Environment Unit Coordinator. The former is chaired by the Secretary while the latter is chaired by the Environment Unit Coordinator.

The International and National consultants work under the directions of the Environment Unit Coordinator, the Steering Committee and the Planning Team, in

collaboration with the Coordinator of the BSAP project. The BSAP coordinator reports to the UNDP and GEF offices.

3.5 Outer islands outreach

The main target group in this project was the rural communities outside the capital city. Community consultation and informal education took the form of workshops whose participants were picked from a cross-section of the community that included representatives of the elders, women groups, youth and councilors. Experts from various fields such as agriculture, fisheries, conservation areas, environmental impact assessment, climate and sea level changes, biologist and sociologist were part of the team. Other resource personnel were identified at each workshop site. Four workshops were conducted, one each for the northern, southern, central islands in the Gilbert group, another one for the Line and Phoenix group. Two national workshops were held at the capital, Tarawa.

3.6 Agriculture, Fisheries, EIA and Eco-tourism.

These are some of the main areas that were fully discussed in each workshop because there was so much interest in them and that development and resource utilization are very closely related to these fields. Inventories on all aspects of agriculture, fisheries and other resources were collected as part of a comprehensive database for future planning and implementation.

At the divisional and departmental levels specific activities are being planned, while others are in place, to foster and nurture developments that are in tune with the aim and objectives of biodiversity conservation and management. The Tourism Sector of the Ministry of Commerce, Industry and Tourism is embarking on the following:

- Kiritimati Nature Tourism Project whose aim is to promote tourism on the island by providing promotional materials on bird-watching and bonefish game-fishing, as well as formulating marketing plans and physical plans for the tourism industry on the island.
- Landscaping Architect - the project will recruit a short time architect and consultant to do a feasible study that will lead to the development and

establishment of the World War 2 park on Tarawa and the bird sanctuaries on Kiritimati Island.

The Attorney General Chambers has been working vigorously on the drafting of the Sustainable Development Bill along with the Environment Act, 1999. The latter has been debated and passed by Parliament while the former is yet to be presented to Parliament for approval. The areas covered by the Bill are: biodiversity, environmental assessment impact, enforcement machinery, penalties and civil liability.

The Fisheries Division of the Ministry of Natural Resources Development is embarking on the following activities for the year 1999:

- Marine resource surveys - Starbuck, Vostock, Caroline (Millenium Island), Flint, Kiritimati, Tabuaeran, Teraina and Banaba; assessment - Butaritari, Abaiang, Abemama, Nonouti, Tabiteuea North, Onotoa and Tarawa.
- Marine protected areas - all islands in the Gilbert and Line and Phoenix groups.
- Introduction of non-indigenous commercial important marine species - Makin, Marakei, Kuria, Nikunau, Tamana, Arorae and Banaba.
- Enhancement of over-harvested fish species - the whole of Kiribati.
- Review and development of fisheries legislation - for the whole of Kiribati.

The Office of the Line and Phoenix Group has kindly provided useful information on the status of both marine and agricultural products and exports from the island of Kiritimati. Pet fish export which is one of the fast-money making commodities requires urgent environmental assessment as well as some control on the number of operators. Sea cucumber harvest done by scuba diving needs to be controlled. There ought to be both size and depth limits to ensure that the breed stock in the deeper areas is untouched. Fishing activities in the ponds and lagoon need a tighter control to ensure that wastage is avoided. It is also highlighted that shells used in handicraft decoration could soon be a problem as handicrafts are sold mainly to overseas buyers. Some form of assessment is required. Coastal erosion is being associated with seaweed farming. There

is no proof to suggest the cause and effect but requires assessment to look into the problem.

Agricultural produce is scarce and limited due to lack of seed. There is ample number of swine that are locally fed on fish. Copra quality is becoming a problem in that non-mature nuts are also harvested with the use of 'butika' or wooden poles with a sharp knife at the end. This needs to be discouraged as it also opens up the harvest of young nuts used for drinking.

The Wild Life and Conservation Unit is working hard patrolling the closed and conservation areas - these include the fish-ponds, the bonefish aggregating areas and bird sanctuaries.

The Chamber of Commerce has considered taking on a project that will look into the beautification and cleaning-up of South Tarawa and Betio. This will include the replanting of plants and trees along the Nippon Causeway and other public areas.

CHAPTER 4: PRIORITIES FOR FURTHER ACTION

4.1 Conservation of Biodiversity as a priority

As previously mentioned from the very outset, all environmental, historical, cultural, political and judicial issues may impact biological diversity in one way or another. Government recognizes the importance of a sustainable and a wise use of our resources and biodiversity, as well as development to enhance the wellbeing of mankind. This is particularly important in the context of Kiribati whose natural resources are scarce and limited.

As an initial step toward conserving biodiversity, conservation areas were first set up. These pave the way to further conservation and management activities that are enhanced in the Biodiversity project. In order for conservation of biodiversity to succeed, the community at a village level, and who are also the principal users of the resources and biodiversity, must be well informed, consulted and involved in all matters pertaining to conservation and management. Government should encourage and support this because in the long term management and conservation of biodiversity could be well rested in the hands and care of the rural communities.

Through local governments on each island, except for Kiritimati island, the central government could actively provide technical, professional and financial support in major areas. This is in accordance with the long-term plan of Government for outer islands development.

Sections of the Environment Bill that deal with conservation of biodiversity and natural resources need to be rewritten and expanded to enshrine all aspects of biodiversity that are not covered in the Bill. This would make a new Act more meaningful and comprehensive to all members of society. Emphasis should be on 1) a 'wise use of resources and biodiversity', and 2) the enhancement of renewable resources for future generations.

In the words of the former Minister of the then Ministry of Environment and Natural Resources Development the Government of Kiribati:

'Our aim is to achieve what is normally referred to as an environmentally sustainable development, which means that the present generation will be able to earn its living without compromising the ability of future generations to live out of the same natural resources'.

The President of the same government, now member of the Opposition Party after retiring from Secretary General of the Forum Secretariat, put it clearly saying:

'For the people and Government of the Republic of Kiribati the object of the exercise of "sustainable development" is to survive on the atolls forever.... until the end of the world! Sustainability is the idea that we can survive from day to day and ever after'.

The present Government is fully supportive of this broad outlook for the future and in doing so it endeavors to encourage and support activities that embark on conservation and sustainable use of resources and biodiversity.

4.2 Constraints and priorities

It is important to note that constraints are inter-related in many ways. It is difficult to prioritize and deal with each one individually. A cross-sectoral approach may be

called for in such a situation in which case each ministry and division ought to make an effort to identify and resolve problems that are within their reach.

Highest on the list of priorities is the threat posed by climate and sea level changes that could make the habitation of our atolls problematic. Although the scenarios that have been talked about may not be that certain, what is important is to be prepared for the worst. Even so it remains a major consideration for future planning and development.

Of equal or parallel concern is an increase in human population at the rate of 2.2% compounded by urban drift, joblessness, undernourishment and other related factors. But most significantly is a burden on the natural resources, particularly marine resources, that are being over-exploited, some almost to extinction in South Tarawa lagoon, eg. giant clam - *kima* (*Tridacna gigas*). Most traditional foods are not locally available and canned and imported food items make the substitutes. This is not healthy.

One of the fundamental resources for living organisms is water. This resource needs to be well enhanced and looked after. Means and ways of making the resource available to the populace must be sought through government and partnership initiatives. High priority also ought to be placed on the conservation and protection of terrestrial and marine fauna and flora, and other distinct systems such as mangroves, sea-grass beds and coral reefs.

Other areas that are linked to ecological and environmental problems include pollution, waste management, increasing dependence on imported inorganic fuel, coastal erosion and deforestation, to name a few. The long-term impact of nuclear weapons on the marine environment of Kiribati ought to be addressed in international fora.

4.3 Constraints to address major biodiversity issues

Kiribati is faced with many challenges within its own make up. These exacerbate constraints that need to be dealt with accordingly, as discussed above, and include: geographical, ecological, technological, social and economic issues. All are typical of the atoll environment. Most important is the scarcity and limited resources that cannot sustain development in terms of subsistence and commercial production. This is

compounded by the lack of information and understanding of the nature of the resources, often resulting in mismanagement that leads to over-exploitation.

The isolation and scatteredness of the islands have many impacts on communication, transportation, trading, and the implementation of development projects. These may be costly in terms of time and money. Economically, nutritionally and technologically Kiribati is dangerously becoming so dependent on external influences that it is not healthy for the development of the country. Inferior products such as medicine, food items, vehicles and more, are being dumped in the developing and underdeveloped countries. Richer countries are taking advantage of the weak economies of the small island nations. This needs to be corrected.

It is very common to come across people trying to copy planning and infrastructures from other countries with the hope of boosting the economy and development. This is a gross mistake because often models that work in some places may not work in others. Development models and infrastructure that are in tune with geographic, cultural and economic potentials are best.

Education is one of the most costly ventures. This should take into account traditional knowledge and skills as well as other knowledge and skills that are appropriate to the development of Kiribati. Within that framework, emphasis should be on areas that would enhance conservation of biodiversity and all the resources.

Lastly but not least, is the expediting of legislation and policy that will safeguard all ecosystems and biodiversity in general. Without these Kiribati will never succeed in the conservation and management of its natural resources and biological diversity.

4.4 Strategies to encourage conservation of biodiversity

There is an endless list of strategies that may assist in the conservation and wise use of biodiversity. The most urgent strategies will be briefly outlined, and the reader is encouraged to add a list of other strategies that he/she thinks need to be considered.

4.4.1 Local initiatives

At the local level the following may be considered:

- Make the integration of biodiversity plans with other existing programs (mentioned above) a priority.
- Maintain a broad based and multi-sectoral Steering Committee and the Planning Team.
- Draft appropriate biodiversity conservation Act and enforcement strategies.
- Set up a team of experts from various fields and target the communities at a grass-root level.
- Promote biodiversity conservation through media.
- Conduct workshops and community consultation for grassroots people.
- Work out a time schedule for monitoring purposes in collaboration with government and non-government programs.
- Establish a system whereby work programs of other agencies are available and try to coincide the program visits with other program visits to allow the sharing of resources and information, and cut down on costs.
- Encourage customary and traditional conservation practices and involve the community in all levels of resource management and conservation.
- Foster in schools the importance of cultural and traditional values, especially conservation concept and its implications.
- Encourage the setting up of marine reserves/protected areas, parks, botanical gardens for endangered, rare and threatened plant species useful for medicinal and herbal medicine and other purposes, with the full involvement of community.
- Introduction of co-management development on the outer islands.
- Design and establish a resource information system on biodiversity and related fields.
- Design research projects that will enhance rare and endangered species.
- Make up an inventory of all indigenous natural resources and indicate those endangered. Work out a strategy in collaboration with other relevant organizations.
- Encourage family planning activities.

4.4.2 Regional and International initiatives

Initiatives that require international action in collaboration with Kiribati Government may include:

- Action for the reduction of greenhouse gases.
- Action to reduce deforestation and encourage forestation.
- Action to reduce and stop the felling, slaughtering and exploitation of endangered species regionally and globally.
- Accession to international treaties prohibiting the use of destructive harvesting technologies.
- Accession to treaties, agreements and programs to conserve and preserve biodiversity and endangered species.
- Continued collaboration with SPREP, UNEP, GEF, UNDP, IUCN, CBD and other regional and international organizations to promote conservation of biodiversity.
- Support international initiatives that are inter-related with conservation and management of biodiversity and resources.
- International joint action on conservation of trans-boundary (migratory) species, particularly regarding tuna in Kiribati and birds in the Line and Phoenix group.

CHAPTER 5: PROCEDURAL MATTERS RELATED TO THE PREPARATION AND ENDORSEMENT OF THE REPORT

This chapter presents the events and activities that led to the preparation of the Republic of Kiribati National Report for the Conference of the Parties (COP) on Sustainable Biodiversity.

The preparation of the national report was carried out over a fourteen-month period by the National Biodiversity Strategy and Action Plan (BSAP) International Consultant, Mr. Temakei Tebano (Atoll Research Programme, University of the South Pacific), National Consultants, Mr. Ribanataake Awira and Kaitu Koina, the BSAP Steering Committee and Planning Team, the BSAP Coordinator and the Environment Unit of the Ministry of Environment and Social Development. Information was obtained from national reports, ministerial activity reports, NGO activity reports and other relevant material. The following is a record of events taking place for the preparation process:

1. First week of October, 1998: Recruitment of the international and national consultants, the BSAP project coordinator, the setting up of the BSAP Steering Committee (SC) and Planning Team (PT).
2. Second week of October: The Steering Committee met and endorsed the nomination of the International Consultant, the Project Coordinator and the composition of the Planning Team members. The activities for the preparation of the BSAP and the National Report were discussed and outlined.
3. Third week of October: International Consultant and one Fisheries official (temporary national consultant) visited Kiritimati. Returned on last week of October.
4. First week of November: 3-day Inter-island Workshop (central group) was held at Otintaai Hotel. Consultants reported on Kiritimati Island surveys and community consultation.
5. Second week to fourth week of November: Compilation of the BSAP Document and the National Report.
6. Fourth week of November: Review of the BSAP document draft by the Steering Committee. Discussion on the contribution of the national consultants to the National Report for COP.

7. Second week of December: The Coordinator and International Consultant met to prepare a preliminary plan for the inter-island and national workshops. The same week the Planning Team was called on to examine and endorse the plan.
8. Third week of December: The Steering Committee met to review progress on the BSAP and the workshops. The budget was heavily reviewed and the initial 10-month period for the project was extended to 14 months.
9. Last week of December: The Project Coordinator and the International Consultant met to prepare the revised budget and travel arrangements for the inter-island workshops, the national workshops. A list of hardware and software required for the project communication system under the UNDP Clearing House additional aid package was compiled. The revised BSAP document was submitted to the Coordinator for circulation to the Steering Committee for final reading and review before submission to Cabinet for endorsement. This marks the end of the first 3-month phase of the project.
10. First week of January 1999: The Planning Committee met to discuss the northern Gilberts workshop to be held in Butaritari and the Coordinators' workshop in Nadi.
11. First week of February 1999. The BSAP Coordinator attended a 3-day workshop in Nadi. He also had a chance of visiting UNDP Office in Suva to clarify outstanding issues such as the budget format, the Clearing House and funding. Came back in the second week. Held an urgent Planning Committee meeting to finalize plans for the northern islands workshop. Travel, per diem and the workshop program were approved. Proceeded to Butaritari in third week to organize everything with the Butaritari Island Council.
12. Final week of February. A two and half day-workshop was held at Butaritari Island Council maneaba - traditional meeting-house (Wednesday noon through Friday afternoon). Community consultations were held at the Kiribati Protestant Church and the Roman Catholic headquarters at Butaritari village.
13. A short meeting between the Coordinator and the International Consultant was held at the Atoll Research Programme's maneaba (5/3/99) to discuss changes in the Clearing House mechanism budget and planning for the southern Gilbert workshop. The International Consultant (IC) voiced his concern over the overdue contract agreement for the second phase of the project and the unstated per diem level.
14. A letter from the IC was passed on to the Coordinator of the Environment Unit (EU) and the BSAP Coordinator for consideration.

15. The Planning Committee meeting was called on Thursday 25th February. The meeting was held at the EU boardroom at 10 am through lunch. The finalization of plans, budget, etc. for the southern Gilbert workshop was discussed. The IC's concerns were also tabled, were responded to appropriately prior to the meeting. The workshop was planned for April 14-17.
16. The workshop for southern Gilbert group succeeded as planned. Information on past records of drought periods (1935 till early 1999) and severity as compared to the latest drought was gathered. Information on any changes in the number and diversity of fauna and flora, mostly those that benefit the human population most was also gathered through dialogue with the participants from the 8 southern islands.
17. A workshop for the Line and Phoenix group was held between 16th and 18th September, 1999. It was attended by representatives from Tabuaeran, Teraina and Kiritimati islands.
18. The Central Gilbert Workshop was held between 24th and 26th of October and followed by a second national workshop (27th and 28th October) in which the Environment Bill and the BSAP draft documents were presented and discussed.
19. A Steering Committee meeting was held at the MESD "Board Room on December 4, 1999. The highlight of the meeting was a prolonged discussion on the role of the national consultants in the preparation of the BSAP document and the Country Report to COP. The extra budget for Kiritimati workshop was questioned. The Committee agreed that the national consultants be rewarded for the outstanding contribution they have made to the project and that all the monies borrowed from the project be reimbursed.
20. A narrative report on the activities of the BSAP Project for the 2nd Quarter of 1999 is presented below:

Activities Undertaken:

In addition to administrative and secretarial activities the second quarter has been devoted to the execution of the under listed activities contained in the action plan for this quarter.

- a) Organising and conducting of the second inter-island consultation and workshop for 8 Southern Islands, Nonouti – Arorae in April at Tab.North.
- b) Making of plans for convening the third inter-island consultation and workshop for the Line Islands which would have been conducted this month (October) on Kiritimati Island had funds been available.
- c) Making of an inventory for rare, extinct, threatened species and pests.

- d) Collecting of data.
- e) Drafting and compiling of outstanding financial and narrative reports.
- f) Conducting a meeting of the Planning Team.
- g) Drafting of a provisional action plan for the third quarter.
- h) Compiling financial and narrative reports for this quarter.

Significant Developments:

- (a) Completion and submission of outstanding reports.
- (b) Integration of activities of this project with existing environmental programs and other Ministers' programs.
- (c) Increase of Outer-islands stakeholders' awareness, interest and support to the Project.
- (d) Government's agreement in making and compiling environmental legislation and regulations now being drafted by the Attorney General's chamber.
- (e) International consultant and National consultants' effort in making inventory and in collecting data.

Problems Encountered:

- (a) Communication – due to limited access to computer, Internet and having no telephone.
- (b) Inability to execute some activities planned for the second quarter, especially conducting of the consultation and workshop for the Line and Phoenix Islands.
- (c) The long waiting for the approval of the BSAP proposal document and the release of funding for the project.

Solutions to the problems encountered:

- (a) Immediate provision of sufficient funds for purchasing accessories to complete the computing and the Internet system as well as a separate telephone line for the project.
- (b) Immediate transfer of the requested advance shown in our financial report for this quarter that has been faxed to UNDP Suva on the 30th June, 1999

- (c) Conveying information on the current status of the BSAP proposal document to the Project coordinator.

Activities planned for the third quarter:

- (a) Conducting the consultation and workshop for the Line Island in Kiritimati in July or August this year, 1999
- (b) Organizing and conducting the last consultation and workshop for 8 central Island that was combined with a national workshop to be held in the second week of December 1999 on South Tarawa.
- (c) Continuity of inventory making.
- (d) Continuity of data collecting.
- (e) Conducting of surveys.
- (f) Administrative and secretarial activities.