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FRAMEWORK CONVENTION ON CLIMATE CHANGE - Secretariat
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NATIONAL ADAPTATION PROGRAMMES OF ACTION

Summary of Projects on Coastal Zones and Marine Ecosystems identified in Submitted NAPA as of September 2008

BANGLADESH

NAPA PRIORITY PROJECT No 1

REDUCTION OF CLIMATE CHANGE HAZARDS THROUGH COASTAL AFFORESTATION WITH COMMUNITY PARTICIPATION

TYPE OF PROJECT

Intervention (with awareness raising and policy elements)

RATIONALE

The location of Bangladesh has made it prone to natural calamities like flood, drought, storms, cyclones and tidal surges. Frequency and occurrence of storm surges is projected to increase as a consequence of climate change in the coastal areas of Bangladesh. The presence of forest plays a vital role in stabilizing shorelines and providing protection against cyclones and other extreme events. The coastal areas of Bangladesh especially the Meghna estuary are exposed to cyclone and tidal surges. A thick forest belt is required to act as a buffer zone in order to provide protection to these vulnerable coastal areas. In the NAPA regional workshop held in Khulna, the threats arising from decreasing mangrove forest cover and the impacts of salinity intrusion in coastal areas were discussed. Recent experiences with tsunami have strengthened the theoretical basis that mangrove forests reduce the vulnerability from natural disasters. The participants recalled the past initiatives for the creation of greenbelts in the Forest Management Plan (FMP) and the Coastal Greenbelt Project and highlighted the need for widening of the forest belt. A community based afforestation program with deep-rooted, salt-tolerant species was suggested. The involvement of the local people, especially the women, will enhance their adaptive capacities and livelihoods in general. The project is set to provide synergy with the National Biodiversity Strategy and Action Plan, where afforestation is one of the critical working components.

DESCRIPTION

Objectives and activities

- Strengthen the adaptive capability further, so as to face the more vulnerable situation that arises out of climate change scenario;
- Creation of a shelterbelt along the coastal zone;
- Generation of Employment Opportunities;
- Enhanced Carbon sink under the global context.

Inputs and Activities

- Identify Community Based Organizations (CBO) and other participants for the implementation of social forestry programs in the coastal zones of Bangladesh;
- Capacity building of the participants through training on i) Nursery ii) Afforestation iii) Care and Maintenance;
- Capacity building of the stakeholders through various awareness tools;
- Afforestation i) Nursery ii) Planting iii) Maintenance;
- Monitoring and reporting;
- Trained manpower for community mobilization;

- Experts and experienced manpower to provide technical training on i) Nursery and, ii) Afforestation;
- Capable, experienced and expert forestry professionals to supervise on the job activities such as i) Nursery ii) Afforestation iii) Maintenance;
- Adequate fund to undertake activities envisaged.

Short-term outputs

- Generation of Employment Opportunities;
- Development of local skills;
- Enhance the income of poor while participating in the program;
- Awareness generation.

Potential long-term outcomes

- Enhancement of a vegetative cover along the coast of Bangladesh;
- Creation of vegetative cover under a 'shelterbelt' concept;
- Enhanced capability to combat the impact of cyclone and tidal surges;
- Reduction in the magnitude of devastation arising out of cyclone and tidal surges;
- Add to the global Carbon sequestration aspect;
- Manpower development;
- Creation of job opportunities Implementation.

IMPLEMENTATION

Institutional arrangement

Primary implementing agency: Forest Department
Secondary implementing agencies: NGOs and CBOs

Risks and barriers

- Administrative complexities in getting suitable land to undertake afforestation;
- Flow of funds for the project activities.

Evaluation and monitoring:

Participatory monitoring under the leadership of IUCNB shall be the evaluation and monitoring tool for the project

Financial resources:

An indicative and tentative financial resource estimate for the activities provided below:

COST

USD 23 million

BENIN

NAPA PRIORITY PROJECT 5

P 5- ZONE COTIERE

PROTECTION DE LA ZONE CÔTIÈRE FACE À L'ÉLÉVATION DU NIVEAU DE LA MER

OBJECTIF GENERAL

Corriger le déséquilibre sédimentaire, le démaigrissement et le recul de la plage, restaurer la mangrove et promouvoir une technologie améliorée d'extraction du sel combinant l'énergie solaire et le vent.

CONTEXTE ET JUSTIFICATION

La côte béninoise constitue un géosystème hérité des dernières oscillations marines, mais don't la stabilité morpho-dynamique est bouleversée ces dernières années aussi bien par des causes naturelles que par une série d'aménagement dans la zone amont.

La diminution des apports sédimentaires en provenance du Togo suite à la protection du littoral à Kpémé et à Aného, et la diminution du rôle stabilisant de plage joué par le "beach-rock" ont engendré entre 1985 et 1991 depuis Hillacondji jusqu'à Agoué (au Bénin) un déficit sédimentaire important.

La mise en oeuvre du barrage de Nangbéto crée sur la côte un déficit d'apports fluviaux d'environ 100.000 m3 de sable retenus en amont ; par ailleurs les forts courants de chasse provoqués par les eaux de lâchage du barrage en période de crue explique l'ampleur actuelle de l'érosion à l'embouchure du Mono et ses environs depuis 1990.

Dans ce processus d'érosion côtière au Bénin, le cas de la ville de Grand-Popo apparaît bien spécifique et constitue encore une énigme. Le littoral à cet endroit subit périodiquement d'importantes fluctuations. Cette ville a été presque entièrement détruite par une érosion dont les premières observations remontent au début du siècle (1908) selon Henri HUBERT (1908) qui note entre 1892 et 1900 un recul de la mer de 20 mètres et entre 1900 et 1905, une avancé de 7 mètres.

Au cours de l'évaluation concertée de la vulnérabilité aux changements climatiques avec les populations, le problème majeur rencontré par les populations de la commune de Grand-Popo est l'érosion côtière. L'action prioritaire pour elles est la lutte contre l'avancé de la mer.

Par ailleurs, la mangrove occupe les secteurs central et occidental du littoral béninois et intéresse la ligne côtière, les lacs Ahémé et Nokoué et les basses vallées du Mono. Elle joue le rôle d'abri et de frayère aux espèces halieutiques et aviaires. Elle est localisée dans des conditions hydropédologiques déjà pénalisantes, souffre particulièrement des coupes pour la résolution des problèmes d'énergie, notamment la production du sel et l'aquaculture <<acadja>>. La mangrove béninoise se trouve aujourd'hui dans un état de dégradation avancée au point qu'on peut parler de catastrophe écologique. De nombreuses études consacrées à la mangrove ont montré la dégradation persistante de cet écosystème et la nécessité de la recherche de solutions appropriées pour la restaurer et la protéger. Les impacts écologiques et socio-économiques sur l'environnement côtier sont tels que la restauration devient une

préoccupation nationale. Pour atténuer la vulnérabilité des populations des zones concernées dans la gestion participative des ressources des écosystèmes aquatiques, il urge de restaurer cet écosystème dans les plans d'eau du Sud.

DESCRIPTION

Localisation

Communes de Grand-Popo et de Ouidah et les plans d'eau de la Zone Côtière.

Objectif général

Corriger le déséquilibre sédimentaire, le démaigrissement et le recul de la plage, restaurer la mangrove et promouvoir une technologie améliorée d'extraction du sel combinant l'énergie solaire et le vent.

Objectifs spécifiques

- Renforcer les capacités en matière de lutte contre l'érosion côtière;
- Promouvoir les techniques de protection à moindre coût;
- Rétablir les équilibres écologiques et socio-économiques des populations riveraines;
- Acquérir par les communautés à la base, le savoir-faire et le savoir-être par rapport à la gestion durable de la mangrove;
- Promouvoir la production du sel à énergie douce combinant l'énergie solaire et le vent;
- Mieux gérer les ressources de la biodiversité des zones concernées;
- Organiser les producteurs et les autres acteurs du secteur salicole en filière.

Activités et plan de financement

N°	Activités	Coût (USD)
1	Sensibilisation des populations riveraines	30 000
2	Renforcement du mécanisme de contrôle et de suivi de l'évolution du trait de côte	100 000
3	Contribution à l'ouverture des carrières de sable hors littoral	200 000
4	Reboisement des périmètres littoraux et les villages salicoles	220 000
5	Financement de la production de sel solaire dans les villages des lagunes côtières	110 000
6	Restauration des périmètres de cocoteraies de manière à stabiliser les dunes littorales mobilisées par le vent suite à la destruction des anciennes plantations	240 000
8	Prise de mesures réglementaires	
9	Organisation en réseau des acteurs de la filière salicole et formation en technique de gestion	10 000
10	Octroie de crédits à faible taux d'intérêt aux Salicultrices formées	200 000
11	Organisation des ateliers annuels d'échanges d'expériences regroupant tous les acteurs de la filière salicole	10 000
12	Installation des pépinières, repiquage et suivi des plants	160 000
13	Coordination et Gestion	11 000
14	Suivi et évaluation	5 000
	Total	1 296 000

Sources

LDCF 50% (USD **648,000**); Cofinancement 50% (Budget National, coopération bilatérale et multilatérale, populations bénéficiaires) soit USD **648,000** - Coût estimatif global: USD **1,296,000**

Moyens

Humains: Environnementaliste, Ingénieur du génie côtier, Forestier, Sociologue, Juriste, Techniciens des pêches, Agro-Economiste, Ouvriers, populations.
Matériels: Graines, plants, matériel de fabrication du sel solaire.
Financement: Partenaires; Budget National ; Bénéficiaires (élus locaux).

Impacts

- Stabilisation de la plage;
- restauration de la mangrove;
- Accroissement des revenus des populations riveraines.

MISE EN OEUVRE ET EXÉCUTION

Ancrage institutionnel du projet

- Agence de mise en oeuvre: Ministère en charge de l'Environnement;
- Agence d'exécution: Ministère en charge de l'Erosion Côtière et l'Intercommunalité;
- Comité de pilotage: Ministères en charge de lutte contre l'érosion côtière, de l'environnement, SNG, Autorités communales.

Analyse des risques et obstacles

- Faible mobilisation des fonds;
- Lenteur administrative;
- Non appropriation par les populations des acquis du projet pour la pérennisation des actions.

Suivi et évaluation

Indicateurs

- Superficies de périmètres littoraux reboisés;
- nombre de carrières de sable hors littoral ouvertes;
- superficie des sites restaurés;
- nombre de communautés sensibilisées et formées;
- niveau de production de sel solaire;
- réseaux des acteurs de la filière fonctionnels.

Mécanismes

- Visites de terrain;
- Réunions de concertation des principaux acteurs;
- Collecte de données sur le terrain;
- Evaluation à mi-parcours;
- Evaluation finale réalisée à la fin du projet.

Durée du projet

Cinq (5) ans

COÛT

USD 1,296,000

CAMBODIA

NAPA HIGH PRIORITY PROJECT 4B (NON-HEALTH)

COMMUNITY MANGROVE RESTORATION AND SUSTAINABLE USE OF NATURAL RESOURCES

SECTOR

Coastal Zone

RATIONALE

Mangrove forests are essential for shoreline stabilisation, prevention of seawater intrusion, and provision of biodiversity products for local communities. Some portions of mangroves in the coastal area have been converted to saltpans, shrimp farms and have been degraded from firewood extraction.

DESCRIPTION

Objectives

- To stabilise shoreline;
- To reduce sea water intrusion;
- To reduce coastal erosion;
- To protect coastal areas from storm.

Activities

- Replant mangrove species in degraded areas through community participation;
- Restock mangroves with fish and crab;
- Assist local communities in sustainable mangrove utilisation and management;
- Develop a sustainable harvest method of natural resources from restored mangroves.

Short-term outputs

- 500 ha of mangroves replanted and protected;
- 4 mangrove user communities established; and
- Areas defined with formal authorisation from relevant authorities placed under community management.

Potential long-term outcomes

- Neighbouring areas protected from windstorm, seawater intrusion and coastal erosion;
- Mangrove products and biodiversity enhanced; and
- Poverty reduced.

Location

The project will be implemented in the following provinces: Kampot (Treouy Koh in Kampot District), Koh Kong (Botum Sakor and Mondol Seima Districts), and Kep Municipality (Angkoul in Damnak Chang'aeur District).

Time frame

3 years.

IMPLEMENTATION

Institutional arrangement
MoE will coordinate the project and NGOs will implement it in collaboration with local authorities and SEILA.

Risks and barriers

Potential land use conflict, land availability, and weak social capital in local communities.

Evaluation and monitoring

The following indicators will be used: extent of mangroves planted and protected, and number of community of mangrove users established.

RELATED DEVELOPMENTS

There are at least three modules of similar community based natural resource management established and/or functioning in coastal areas including at Peam Krasaop Wildlife Sanctuary supported by the Participatory Management of Mangrove Resources of IDRC/MoE, the community fishery at Ream National Park, and the mangrove management model of Thmei Village supported by DANIDA's coastal zone management project.

COST

USD 1,000,000.

CAPE VERDE

NAPA PRIORITY PROJECT 3

INTEGRATED PROTECTION AND MANAGEMENT OF COASTAL ZONES

JUSTIFICATION

The insular character of Cape Verde (small islands) already constitutes by itself a potential vulnerability in relation to an eventual rise of the sea. It is estimated that 80% of the population in the archipelago, today, is concentrated in the coastal zones. Comparing the relief of the islands and the level of the sea, the flat islands such as Sal, Boavista and Maio are considered the most vulnerable.

A sensible variation of the level of the sea may constitute a danger for Cape Verde's economic sector, particularly the tourism sector, since tourist infrastructures (most of them hotels, airports, fishing zones, and others) are located along the coastal zones. Sal Island, due to the large tourism investments carried out there, constitutes one of the most vulnerable zones of the country.

On the other hand, Cape Verde's coastal zones are negatively affected by the large population density in certain centres, by tourist activity, by the occasional discharge of hydro-carbons, by the abusive and uncontrolled extraction of inert materials (sands and rocks) and by saline intrusion, besides the orography of the maritime edges that, in most cases, is very scarped and very vulnerable to the effects of the tides.

Extreme events such as floods mark the culminating points of vulnerability to the climate changes, with high socio-economic impacts. In Cape Verde, the frequent torrential rains have provoked large losses of infrastructure, agricultural production, enormous amounts of water into the sea, and at times, they originate displacement of families or loss of human lives.

These problems require an urgent action since they may cause loss of maritime habitats, having as main consequences the disappearance of species, the decrease of national potentialities in what concerns leisure places, the fast advance of seawaters, thus reducing the interface edge between the sea and the land, the increase of soil salinity and the reduction of its production capacity, with serious negative repercussions for the agricultural activities developed along the coastal zones.

The climate changes, namely those related to the rise of the level of the sea, accentuate the pressures on the coastal zones, thus leading to the aggravation of the degradation of ecosystems, infrastructure and economic activities. They can also aggravate the amplitude of the current aggressions, provoking flooding of the low altitude zones, displacement of populations, contamination of potable water sources and threatening the means of subsistence of the coastal populations, limiting the development options of the countries where the coastal zones contribute considerably for the economy.

On the other hand, the regional project "*Adaptation to Climate Change: Responding to shoreline Change and its human dimensions in West Africa, through integrated coastal area management (ACCC)*", that includes Cape Verde and has as objective the reinforcement of the capacities of adaptation to the climate change, is being implemented and constitutes the basis of this programme.

As a complement to the ACCC regional capacity reinforcement project, this project insists on field activities, in order to strengthen the resistance of the coastal zones to variability and climate change.

DESCRIPTION

Specific Objective

The specific objective of this project is to increase the capacity of resistance of coastal zones to climate change, through integrated management of the coastal resources, in order to invert the trend of established degradation.

Duration

The estimated duration of the Project is five (5) years.

COMPONENTS, RESULTS AND ACTIVITIES

COMPONENT 1: Reinforcement of stakeholder's capacities in matters of adaptation to the climate and variability changes under the systemic, organizational and individual point of view

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Result 1

The central governmental, decentralized and communitarian structures are equipped to contribute significantly for management of the coastal regions.

Activities

- Revision of the national regulatory framework for integration of the protection needs of the coastal zones in terms of adaptation to climate variability and climate change;
- Harmonization and integration of management activities in the coastal zones within the existing regulatory frameworks;
- Qualification of the decentralized and communitarian governmental structures, in order to allow them to implement the laws and the programs that facilitate adaptation to climate change in coastal regions;
- Elaboration of a contingency plan for the high risk coastal zones;

COMPONENT 2: Investment, conservation and field protection activities

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Result 2

The resistance capacity of the coastal zones is increased and the pressure on coastal resources is decreased.

Activities

- Installation and rehabilitation of coastal protection systems (flexible and rigid);
- Anti-erosive fight along the coasts through construction of channels, reforestation, fight against deforestation and exploration of inert materials, among others;
- Diversification and rationing of income generating activities for explorers of inert materials, through the creation of a micro-credit fund;
- Installation of weather radar for detection and monitoring of significant meteorological phenomena.

COMPONENT 3: Research/action in matters related to utilization and exploration of inert materials in costal zones

Result 3

Alternatives to utilization of coastal resources (inerts) are utilized in construction of infrastructure

Activities

- Experimentation of materials and alternative means of construction, in order to reduce pressures over the coastal resources;
- Diffusion of technological packages.

COMPONENT 4: Mobilization, Information, Sensitization

Result 4

An early warning system is created and the populations under risk are aware of their status and prepared to manage eventual calamities.

Activities

- Creation of an early warning system linked to the sub-regional and global network;
- Elaboration and diffusion of project informative and promotional documents;
- Creation of a multi-partner platform according to the GWP orientations;
- Preparation of a sensitization campaign for the coastal populations on the eventual risks due to climate changes and variability and the urgency measures to take in case of need;
- Cooperation and support to the participation of Cape Verde in the information networks on issues related to adaptation to climate changes and coastal management.

PROJECT COST ESTIMATES

COMPONENTS	**%**	**COST ESTIMATES** (USD)
1. Reinforcement of stakeholder's capacities in matters of adaptation to the climate and variability changes under the systemic, organizational and individual point of view	20%	300 000
2. Investment, conservation and field protection activities	45%	675 000
3. Research/action in matters related to utilization and exploration of inert materials in costal zones	15%	225 000
4. IEM stakeholders on the risks inherent to the MCs and VCs	15%	150 000
5. Project management costs	10%	150 000
TOTAL	**100%**	1 500 000

Potential donors identified

- Government of Cape Verde
- Global Environment Facility (GEF)
- United Nations System in Cape Verde
- European Union
- African Development Bank (ADB)
- Global Mechanism CCD

DEMOCRATIC REPUBLIC OF CONGO

NAPA PRIORITY PROJECT NO. 3

DR CONGO NAPA ANNEX 4

PROJET DE CONSERVATION ET D'AMÉNAGEMENT DE LA BIODIVERSITÉ DU PARC MARIN DES MANGROVES

RÉSUMÉ

La RD Congo partage avec les pays côtiers de sa sous–région une des côtes les plus riches en biodiversité au monde. Cette côte est fréquentée chaque année par diverses espèces d'oiseaux migrateurs. Elle présente des sites d'intérêt mondial pour la conservation des espèces dont le Parc Marin des Mangroves (PMM), où on retrouve des aires de reproduction des poissons, des crustacées, des tortues marines et des mammifères marins tels que le lamantin. Cependant, plusieurs menaces vont compromettre d'ici peu la survie de cette richesse.

Ainsi, au niveau de PMM, l'intensification de l'exploitation des palétuviers pour la carbonisation suite à la pauvreté, à l'ignorance écologique et incompétence des populations se traduit par un déboisement. Il s'ensuit une perte considérable de la biodiversité et une dégradation sévère du couvert végétal.

Par ailleurs, l'exploitation concentrée sur la côte est responsable de l'émission des effluents liquides, solides et gazeux. Elle constitue non seulement une source additionnelle de destruction des habitats et des espèces mais présente également un danger pour la santé humaine.

Le même constat s'appert au niveau de l'accélération de l'urbanisation de la frange côtière entraînant la destruction des sites fragiles à haute importance écologique notamment des zones de ponte des tortues marines et les aires de nidifications des oiseaux migrateurs.

L'urbanisation et les besoins qu'elle suscite jouent aussi un rôle majeur dans l'érosion du littoral.

De ce qui précède, le projet a pour objectif global l'aménagement en vue de sa meilleur conservation du Parc Marin des Mangroves. Concrètement, il va falloir:

- Assister le gouvernement de la RD Congo à travers l'ICCN:
    - à développer une stratégie pour la conservation et la gestion durable des ressources naturelles du PMM avec la participation des communautés riveraines;
    - proposer un plan d'aménagement participatif du PMM après des études menées sur le terrain et les structures mises en place qui prévoit.
- les besoins immédiats et à long terme des communautés riveraines;
- la sauvegarde de la biodiversité du Parc.

Quatre objectifs spécifiques permettront d'atteindre l'objectif global sus étayé:

1. Fournir les données de base à travers des études et recherches biologiques, socio économiques et des impacts.
2. Améliorer le niveau de vie des populations riveraines à travers les organisations locales de base pour une bonne gestion des ressources naturelles moyennant des petits projets pilotes et développement communautaire.

3. Eduquer la population sur le plan mésologique à travers une participation communautaire et sensibilisation. Concrètement il va falloir:
    - créer des clubs des amis de la nature dans des écoles primaires et secondaires au sein du Parc,
    - mettre en place le programme de l'éducation environnementale dans les écoles,
    - renforcer les capacités humaines et organisationnelles des populations locales à travers les comités de gestion des ressources naturelles.
4. Aménager le PMM à travers:
    - la mise en place des limites du Parc en tenant compte de la réalité de l'utilisation des terres (cartographie du Parc).

JUSTIFICATION/CONTEXTE

Le modèle non durable d'exploitation des ressources qui repose largement sur une méconnaissance des espèces et des écosystèmes et de leurs interactions, s'applique à toutes les activités (pêche, exploitation des palétuviers,…) exercées dans le Parc par les Communautés riveraines.

Le mode de prélèvement actuel des ressources ne parvient pas à discriminer les espèces totalement protégées par la loi. Ainsi, les populations de tortues marines (trois espèces), de lamantins et des oiseaux migrateurs ou pélagiques jadis importantes sont maintenant considérées comme en voie d'extinction. La faiblesse institutionnelle technique et matérielle de l'organisme étatique chargé de gérer les ressources du Parc constitue une entrave moyenne à une bonne conservation de la diversité. De plus, l'ignorance des textes et leur applicabilité posent d'énormes problèmes. Par ailleurs, l'analyse de la gestion traditionnelle des ressources naturelles de la région marine et côtière, a montré la nécessité de l'implication et de la responsabilisation inévitable des populations locales.

La politique de co- gestion que lance ce projet constitue une opportunité de réhabilitation de certaines pratiques de cette forme de gestion traditionnelle. Les activités suivantes sont retenues pour faire face à cette situation.

- le renforcement institutionnel ;
- la promotion d'une mise en adéquation des textes avec les réalités sociales, économiques et environnementales ;
- la vulgarisation des textes règlementaires.

La relation étroite qui existe entre les habitants marins, côtiers et environnementaux, justifie une approche globale pour appréhender la problématique de conservation des ressources biologiques du Parc Marin des Mangroves.

Ainsi, le projet se propose de mettre en oeuvre des mécanismes concertés en gestion dont un des objectifs sera de faciliter l'harmonisation des initiatives en cours et des projets en voie d'implantation. Pour y parvenir, il est prévu des activités suivantes:

- favoriser l'harmonisation des réunions avec les autres initiatives en vu de créer des synergies et une complémentarité au niveau des projets;
- Appuyer les activités des structures étatiques qui deviennent pour la coordination des projets relatifs à la conservation la biodiversité;
- Soutenir les échanges d'informations et des résultats partiels entre les projets dont la problématique commune est la conservation des ressources biologiques du Parc Marin des Mangroves.

DESCRIPTION DE LA RÉGION

Le PMM est situé dans le Territoire de Moanda, Province du Bas Congo, entre 5°45'et 6°55'de latitude Sud, et entre 12°45'et 13° de Longitude Est.

Il couvre une superficie de 66 000ha (MFU, 1995) comme le présente la figure X. Le PMM est en forme de L dont une étroite bande côtière (2km de large) se prolongeant à la perpendiculaire dans l'estuaire du fleuve, entre la frontière Angolaise au sud, et la route Boma - Moanda au nord, jusqu'au village de MBULU à l'est (DOUMENGE, 1990).

Le PMM est constitué de deux zones dont les statuts sont différents:

- La zone A à protection intégrale et la zone B de protection partielle;
- La zone A est celle à Mangroves tandis que la zone B comprend la savane humide et une bande côtière de 2km de large le long de l'océan;
- L'échelle altitudinale du PMM s'étend de 0 à 110m.La plage et le Terrain marécageux baignés par le fleuve sont prolongés vers l'intérieur par deux plaines, la première de 20 à 30m d'altitude et la seconde atteignant 110m(DOUMENGE,1990);
- Le littoral côtier congolais bénéficie d'un climat tropical humide de type AW4 suivant la classification de Koppen.

Il est caractérisé par un fort contraste entre deux saisons bien distinctes: la saison des pluies d'octobre à mai, et la saison sèche de juin à septembre (MINAFENV, 2001).

La population connaît un exode rural important due aux conditions de vie difficiles, à la pauvreté et au chômage engendrant des conflits divers. Les communautés riveraines du PMM vivent essentiellement de la pêche, de l'élevage, de l'agriculture et de la carbonisation. Les palétuviers du PMM sont caractérisés par les espèces suivantes (de l'extérieur vers l'intérieur de terre): Rhizophora racemosa,G.F.W.meyer et Avicennia germinans(L).L,Conocarpus erectus L.,Laguncularia racemosa(L)Gaertn.f.,Hibiscus tiliacens L.,Achrostichum aureum L.

On y rencontre aussi des formations herbeuses sur sols humides à Heteropogon contortus (L).Roem et Schult et Andropogon schirinsis Hochst.Ex Rich. Dans le Nord Est ,entre coupées ça et là des formations basses,avec parfois de lambeaux des forêts à corynthe pariculare welw. Et des formations herbeuses à Annona senegalensis Pers. et Annizophylea quangensis Angle (DOUMENGE, 1990).

Toutes les activités (pêche, agriculture, carbonisation, élevage…) exercées anarchiquement dans le PMM, présentent des menaces pour la conservation de la Biodiversité du Parc. En les comparant entre elles, il ressort que les unes se révèlent plus dangereuses que les autres. La carbonisation par exemple est plus destructrice que la pêche car la couverture végétale se modifie et perturbe l'évolution normale de la végétation avec comme conséquence, la destruction de l'habitat naturel de certaines espèces qui se raréfient ou disparaissent. Les déchets pétroliers représentent une grave menace car ils modifient les habitats naturels de diverses espèces et appauvrissent la faune. Par ailleurs, l'eau étant une ressource à usage collectif,toute pollution d'une portion de la surface de l'eau se répercute de diverses manières sur l'ensemble de la planète probablement les déchets pétroliers rejetés dans l'atmosphère peuvent occasionner des pluies acides et avoir des impacts sur le sol et la végétation.

Toutes les activités ainsi répertoriées dans le PMM ne contribuent pas à leur manière actuelle au maintien de cet écosystème mais plutôt à sa dégradation. Les principales

parties prenantes dans la co- gestion des ressources biologiques du PMM autour du présent Projet sont: l'ICCN,l'Administration publique locale, les ONG(OCPE,CCPN,ACODES…),les organisations communautaires de base, les associations des pêcheurs(ACOPEBA,IPEN…) et les communautés riveraines.

GROUPE CIBLE ET PARTICIPATION DE LA COMMUNAUTÉ LOCALE

Le caractère multisectoriel du projet justifie le besoin de mobiliser le plus grand nombre possible d'acteurs provenant de l'ensemble de la société civile; de la communauté nationale, sous-régionale et internationale afin de bénéficier d'un maximum d'appui et de contributions techniques, matérielles, et financières suffisantes en vue d'atteindre les objectifs sus étayés.

A ce titre, les activités de promotion suivantes sont proposées:

1. Distribution d'un dépliant du Projet;
2. Création d'un forum d'échange et de débat à partir d'un site Internet;
3. Participation des ONGs et organisation communautaire de base et du secteur privé à des Fora et foire;
4. Marketing des activités auprès des bailleurs des fonds pour des financements additionnels.

Les groupes cibles sont principalement les communautés riveraines du Parc, l'Administration publique locale,les organisations de conservation(ICCN), les ONGs locales,organisation communautaire de base (OCB) (Associations de pêcheurs,agriculteurs…), les partenaires internationaux(PTF/CN- UICN, NOVIB,… et le gouvernement congolais.

Les communautés locales participeront effectivement à la définition, à l'élaboration et à la mise en oeuvre de différentes activités alternatives pour la multiplication et l'amélioration de leurs sources de revenus. Le projet devra permettre la formation des villageois en matière de législation (vulgarisation du nouveau code forestier et décentralisation) et de gestion de ressources naturelles.

Par ailleurs, les communautés riveraines bénéficieront activement de l'apprentissage des techniques de reboisement ainsi que l'ostréiculture, élevage de porc et volaille et de mise en place des pépinières des plantes forestières et

fruitières.

Il faut signaler que la participation des populations locales est impérative à la réalisation de diverses études socio économiques sur les filières du poisson, des huîtres et crevettes.

De même, le projet facilitera la formation des enseignants et de villageois pour l'exécution d'un programme d'éducation environnementale en milieu scolaire, dans certains villages du Parc, et en milieu non formel dans d'autres villages, et ce en étroite collaboration avec l'inspection provinciale de l'enseignement national.

LES ASPECTS LIÉS AU GENRE

Les précédentes études socio économiques réalisées par l'OCPE au Parc Marin des Mangroves révèlent que les femmes sont occupées essentiellement par l'agriculture, la collecte des huîtres, et le salage de poissons en dehors des lourdes tâches ménagères (collecte de bois de chauffe, recherche de l'eau de consommation, …).

Ainsi le projet permettra de renfoncer les capacités techniques et organisationnelles des femmes par le développement de diverses activités ci-dessous à leur intention en vue de mieux organiser leur accès aux ressources;
Améliorer leurs revenues:

- apprentissage des meilleures techniques agricoles et des salages du poisson;
- la formation en Ostréiculture;
- appui en matériel et intrants agricoles pour les cultures maraîchères;
- les consultations pour l'organisation des filières commerciales des produits;
- halieutiques et forestières non ligneux;
- réunion des sensibilisations des femmes à l'hygiène du milieu.

BUTS ET OBJECTIFS

Le projet de conservation et d'aménagement de la biodiversité du Parc Marin des Mangroves a pour but:
D'assister le gouvernement Congolais à travers l'institut congolais pour la conservation de la nature à développer une stratégie de conservation et de gestion durable des ressources du Parc Marin des Mangroves avec la participation des communautés locales.

Par ailleurs, le projet entant contribuer à la proposition d'un plan d'aménagement participatif du parc après les études menées sur terrain.

Les Objectifs spécifiques

A terme le Projet devra atteindre 7 objectifs ci-après:

- Fournir les données biologiques et socio économiques de base (inventaire, recherche…);
- Promouvoir le développement communautaire à travers le regroupement des villageois en association de soutiens techniques et financiers aux activités alternatives (petit projet pilote);
- Développer les infrastructures du Projet;
- Organiser et promouvoir les groupes villageois, institution traditionnelle et les comités de gestion de ressources naturelles;
- Promouvoir l'éducation environnementale et régénérer naturellement ou artificiellement les forêts des mangroves;
- Promouvoir l'intégration de la femme dans le développement communautaire;
- Former spécifiquement les agents du Projet et quelques villageois en vue du développement durable.

Activités et résultats

Les activités ci après seront réalisées:

Résultats attendus 1

Les données biologiques et socio économiques de base sont disponibilisées.

***Activités 1.1**

- Réaliser les inventaires faunistique et floristique pour l'élaboration du plan d'aménagement;
- Réaliser les enquêtes socio économiques complémentaires;
- Prélever les données climatologiques et cartographiques;
- Centraliser, classer et rendre disponible la documentation préexistante;
- Vulgariser et diffuser les expériences concluantes à tous les niveaux;

- Organiser les ateliers de restitution.

Résultats attendus 2

Le développement communautaire est promu, les villageois sont regroupés, les projets pilotes sont réalisés.
Activités 2.1: Appuyer financièrement et techniquement les associations des pêcheurs et Agriculteurs existants.
Activités 2.2: Soutenir le regroupement des villageois en association pour un contrôle maximum des filières productives et commerciales aussi qu'une meilleure gestion des ressources des mangroves.
Activités 2.3: Assurer l'encadrement technique et financier des groupements ostréicoles.
Activités 2.4: Appuyer techniquement, matériellement la réalisation des micros projets Pilotes.

Résultats attendus 3

Les infrastructures du Projet sont développées.
Activités 3.1: Disponibiliser (location) un bâtiment abritant le Projet.
Activités 3.2: Assurer un équipement au Projet:

- Acquérir un véhicule 4x4 pour le déplacement du personnel et du matériel du Projet;
- Acquérir une Moto;
- Acquérir un canot rapide pour le déplacement et surveillance dans l'eau;
- Acquérir le matériel de projection audio visuel pour les campagnes de sensibilisation des populations sur l'utilisation durable des ressources;
- Acquérir les équipements scientifiques, spectrophotomètre, 4 ordinateurs, 1 scanner, 2 photocopieuses, 4 imprimantes, une caméra numérique, 1GPS;
- Acquérir un matériel de couchage léger (pour 8personnes);
- Acquérir le matériel et consommables de bureau:6 table de bureau,12 chaises,15 chaises en plastiques,2 bibliothèques,2 téléviseurs,2 DVD,2 Deck vidéo,une cuisinière, 2 cafetières,4 ventilateurs,1 groupe électrogène,1 congélateurs, 2 petits frigos.

Résultats attendus 4

Les groupes villageois; les institutions traditionnelles et les comités de gestion des ressources naturelles sont organisés et promus.
Activités 4.1: Organiser des campagnes de sensibilisation dans les villages concernés.
Activités 4.2: Encourager la mise en place des groupes villageois d'intérêts Communautaire (G.I.C) dans chaque village.
Activités 4.3: Appuyer techniquement et financièrement les institutions traditionnelles. Existantes pour la gestion durable des ressources naturelles.
Activités 4.4: Organiser des visites inter villages
Activités 4.5: Former des équipes de reboisement, des pépiniéristes et d'exploitants forestiers.
Activités 4.6: Définir des règles d'accès et des droits individuels et collectifs de prélèvement dans la mangrove, en collaboration avec les comités de gestion villageois.

Résultats attendus 5

L'éducation environnementale est promue et les forêts des mangroves sont régénérées.

Activités 5.1: Organiser des séances d'information dans les villages concernés.
Activités 5.2: Animer des campagnes d'éducation à l'environnement dans les écoles et Villages.
Activités 5.3: Créer des clubs des amies de la nature dans les écoles,
Activités 5.4: Vulgariser les textes existants en matière de la conservation et du nouveau Code forestier.
Activités 5.5: Vulgariser et étendre les techniques de coupe de régénération.
Activités 5.6: Implanter des pépinières villageoises.
Activités 5.7: Reboiser la mangrove.

Résultats attendus 6

L'intégration effective des femmes au développement communautaire est promue.
Activités 6.1: Appuyer techniquement et financièrement les femmes maraîchères;
Activités 6.2: Assurer l'apprentissage de meilleures techniques de salage des poissons;
Activités 6.3: Former les femmes en éducation environnementale et ostréiculture dans les Villages concernés;
Activités 6.4: Soutenir les consultations avec les femmes pour l'organisation des filières Commerciales de produits forestiers non ligneux et halieutiques;
Activités 6.5: Mettre en place une coopérative de soutien aux activités des femmes.

Résultats attendus 7

Les agents du Projet et quelques villageois sont formés spécifiquement pour une meilleure gestion des ressources du Parc.
Activités 7.1: Appuyer la participation aux cours, formation et stage spécifique des agents du Projet et/ou des villageois;
Activités 7.2: Assurer l'encadrement technique des groupements Ostréicoles.

BUDGET PROJET

Catégories	Prix Unitaire (Euros)	Nombre des pièces	TOTAL CATEGORIES	S/TOTAL GENERAL
1. EQUIPEMENTS				
-Jeep (4x4)		12 000	1	12 000
-Moto		3 000	1	3 000
-Hors bord (85 ch.)		5 000	1	5000
-Coque		3 000	1	3 000
-Vidéo Project. +Sono		3 000	1	3 000
-Spectrophotomètre		6500	1	6500
-Ordinateur		800	4	3200
-Photocopieuse		700	2	1400
-Scanner		800	1	800
-Imprimantes		250	1	250
-Caméra numérique		500	1	500
-GPS		300	1	300
-Tables du Bureau		700	4	2800
-Chaise du Bureau		50	12	600
-Chaise en plastique		10	15	150
-Armoires		100	4	400
-Bibliothèques		200	2	400

-DVD		300	2	600
-Dek Vidéo		500	2	1000
-Cuisinière		400	1	400
-Cafetière		50	2	100
-Ventilateurs		30	4	120
-Groupe électrogène		300	1	300
-Congélateur		500	1	500
-Frigo		250	2	500
-Consommable du Bureau		500	----	500 10800
-Bâtiment du Projet		3600/ansx3ans		600
-Filets pour pêcheurs		600		54 970
2. Charges salariales				
• Coordonnateur	400/moisx12x3ans	1	14 400	
• Adm. Financier	380/moisx12x3ans	1	13 680	
• Botaniste (senior)	500/moisx3x3ans	1	4500	
• Zoologiste	500/moisx3x3ans	1	4500	
• Cartographe	400/moisx3x3ans	1	3600	
• Dév. Communautaire	380/moisx3x3ans	1	13 680	
• Expert en Environnement	380/moisx12x3ans	6	82 080	
• Guides	100/ansx3x3ans	2	7200	
• Conducteur Hors bord	80/moisx3x3ans	1	2880	
			146 520	
3. Maintenance véhicule				
• Carburant			2000	
• Huile Moteur			300	
• Entretiens			2000	
			4300Euros	
4. Dépenses Relatives au Projet				212 070 Euro
• Location maison à Moanda (logement)	50x1x12x3ans	12pers	1800	
• Restauration	10x12x3ans		4320	
• Petits lits (dortoir)	20x8pièces		160	
			6280Euros	
5. Frais de fonctionnement			159 05,25	
6. Imprévu			113 98,763	
TOTAL GENERAL				**239 374,01**

DJIBOUTI

NAPA PRIORITY PROJECT NO. 7

RESTAURATION DES AIRES PROTÉGÉES À TRAVERS LA PROTECTION DES CORAUX ET DE LA VÉGÉTATION DE LA MANGROVE

BUT DU PROJET

Sauvegarde des écosystèmes côtiers pour réduire la vulnérabilité du site de Doraleh aux changements et variabilité climatiques

DESCRIPTION DE LA SITUATION ACTUELLE DU SITE DU PROJET

Les aires protégées marines sont des zones mises en place pour sauvegarder les écosystèmes côtiers. Cette mesure s'est traduite par l'adoption de textes juridiques qui n'ont jamais pu être effectifs sur le terrain pour des raisons diverses.

Le site de Doraleh où le projet est localisé, se situe sur l'embouchure de l'oued Ambouli qui à cet endroit s'étale sur plusieurs centaines de mètre avant de se jeter à la mer. En dehors des crues normales (3 à 4 fois/an), l'oued connaît des crues exceptionnelles dangereuses pour les hommes, les cheptels et les écosystèmes côtiers.

Le site de Doraleh se situe dans la ville de Djibouti à proximité immédiate des anciennes infrastructures portuaires. Les extensions des équipements de transport en cours dans la zone de Doraleh se traduisent par la construction d'un nouveau complexe portuaire composé d'un terminal pétrolier occupant une superficie de 9 h avec une réserve de 7,5 ha , déjà achevé, un terminal à conteneurs avec un tirant d'eau de 20 mètres et une zone franche industrielle et commerciale d'une surface de 400 ha avec une extension possible de 1 000 ha.

Les communautés locales qui vivent sur le site du projet sont composées essentiellement d'éleveurs semi sédentaires de dromadaires qui approvisionnent en produits laitiers frais la ville de Djibouti. Leurs troupeaux utilisent la zone de mangroves comme espaces de pâturages.

ANALYSE ET JUSTIFICATION AU REGARD DES LIENS AVEC LES CHANGEMENTS CLIMATIQUES ET SECTEURS CONCERNES

Les écosystèmes côtiers du site du projet sont essentiellement composés d mangroves en voie de disparition sous la pression des extensions des équipements portuaires et des constructions urbaines en cours dans la ville de Djibouti. La construction du port de Doraleh a déjà considérablement réduit les surfaces occupées par la mangrove. Les effets néfastes identifiés suite aux changements climatiques dans la zone du site du projet aura pour conséquences une disparition progressive de cette zone humide de mangroves. Or, ces écosystèmes constituent un habitat naturel pour de nombreux poissons dont certaines espèces à haute valeur commerciale comme le mulet. L'élévation des températures conjuguée à la diminution des précipitations entraînera une dégradation des espèces de mangroves qui évoluent déjà actuellement au plus près de leurs limites physiologiques. Par ailleurs, la réduction du couvert végétal suite aux sécheresses récurrentes accentuera la pression des éleveurs de dromadaires sur les mangroves du site du projet.

La situation sans projet entraînera la disparition définitive de la mangrove du site de Doraleh qui aura pour conséquences sur le nombre d'espèces de poissons qui utilisent

cet écosystème comme gîte de reproduction et donc une baisse du stock de ressources halieutiques dont les populations de la capitale tirent sa subsistance.

DESCRIPTION

Objectifs

- Restauration de la mangrove du site de Doraleh;
- Protection des écosystèmes côtiers;
- Application des textes sur les Aires Protégées Marines.

Activités

- Régénération de la mangrove de Doraleh avec activités de replantation de jeunes pouces;
- Mise en place de périmètres de protection de la mangrove;
- Sensibilisation des communautés locales sur la conservation de l'écosystème des mangroves;
- Solutions alternatives pour les pâturages de dromadaires.

Intrants

Le projet requiert des ressources additionnelles humaines, financières et physiques qui seront détaillées dans la proposition de projet finale.

Résultats à court terme

- Ecosystèmes côtiers sauvegardés;
- Habits des poissons conservés;
- Usage de la mangrove comme pâturage évité.

Résultats à long terme

- Ressources halieutiques conservées;
- Extensions des infrastructures et des constructions limitées.

MISE EN OEUVRE

Arrangements institutionnels

Le projet sera piloté par un comité présidé par le Ministère de l'Environnement et comprenant les départements techniques concernés.

Au niveau local il y aura un Comité de gestion composé des services techniques et des Communautés locales. Le projet sera exécuté sur le terrain par des opérateurs privés.

Risques et obstacles

Les risques peuvent venir de l'extension des infrastructures portuaires au détriment des zones de mangroves.

Evaluation et suivi

Le comité de pilotage mettra en place un sous-comité technique de suivi et d'évaluation du projet s'assurera que les résultats escomptés et les délais de mise en oeoeuvre soient respectés. Il fournira régulièrement des rapports détaillés au comité de pilotage.

Ressources financières

Total: USD 529,000

Ligne de base: 0

Total: USD 529,000

(1USD = 170 FD)

Régénération de la mangrove de Doraleh avec activités de replantation de jeunes pouces	30 000 000 Mfd
Mise en place de périmètres de protection de la mangrove	20 000 000 Mfd
Sensibilisation des communautés locales sur la conservation de l'écosystème des mangroves	20 000 000 Mfd
Solutions alternatives pour les pâturages de dromadaires	20 000 000 Mfd
Total	90 000 000 Mfd **USD 529 000**

GAMBIA

NAPA PRIORITY PROJECT 9

RESTORATION/PROTECTION OF COASTAL ENVIRONMENTS

Sector: Coastal Zone
Project Area: Banjul and Kanifing Municipalities
Beneficiaries: Coastal communities, businesses and visitors

RATIONALE

The coastal zone is the most heavily populated part of the country. It also has many ecologically sensitive areas, and contains most of the economic development infrastructure especially in the tourist industry. Coastal squeeze due to sea level rise is expected to have substantial negative impacts on ecosystems and economic activities in this area. Economic losses from a do-nothing standpoint could run into hundreds of millions of US dollars.

DESCRIPTION

Objectives

The overall objective is to strengthen integrated coastal zone management and the protection of physical infrastructure, economic and cultural assets located within the coastal zone

Specific objectives

- Improving coastal defences;
- Improving livelihood security;
- Preserving biological diversity and ecological assets.

Components/Activities

- Topographic survey of the coastal strip and inshore area;
- Bathymetric survey of the coastal strip and foreshore area;
- Beach stabilisation;
- Construction or rehabilitation of groynes;
- Rehabilitation of wetlands;
- Awareness campaign on coastal issues;
- Comprehensive review of legal and policy instrument relating to coastal zone and wetlands;
- Rehabilitation of polder station (aka Pa Bokis) located on Bund Road.

Inputs

- Enhanced skills and adequate equipment and materials to implement coastal protection works;
- Adequate funds to undertake all the envisaged activities.

Short Term outputs

- The Bakau fish landing site and jetty will be protected which will ensure continuity of the livelihood activities carried out in that area;
- Rehabilitation of the Kotu stream will prevent flooding of homes and property in the area and restore rice cultivation;

- Minimise the frequency of dredging in the Banjul Port and ferry terminal areas.

Potential long term outcomes

- A comprehensive legislation on coastal zone management developed;
- Regulatory system for enforcement and control of coastal zone put in place;
- Coastal zone management plan developed;
- Participation of all Stakeholders in the implementation of the plan;
- Improved livelihood security for stakeholders.

IMPLEMENTATION

Institutional arrangements

The project should be implemented by the Coastal Management Unit (CZMU) of the National Environment Agency (NEA) in close collaboration with the Department of Technical Services. The Department of Water Resources (DWR) and Department of Physical Planning and Housing (DPPH) would also be involved in the implementation at the secondary level. The project shall be coordinated by a steering committee comprising Coastal Management Working Group and the National Climate Committee (NCC), Department of Parks and Wildlife Management (DPWM), Kanifing Municipal Council (KMC), Banjul City Council (BCC) and relevant NGOs. It will be implemented by the National Environment Agency (NEA) and monitored by the Department of Water Resources..

Risks and barriers

- The availability of suitable sand for beach nourishment both in terms of quantities and location needs to be established;
- The Gambian coastline is very short compared to its neighbour, Senegal;
- Therefore any long-term coastal protection works will be more effective with the participation of Senegal;
- There are parts of the Kotu stream that are already settled upon with residential properties, the rehabilitation of the stream will displace some people. Therefore the issue of resettlement and compensation will have to be considered;
- Availability of experts to implement proposed activities;
- The availability of adequate funding.

Monitoring and Evaluation

The indicators to be monitored are as follows:

- Beach profile –should indicate erosion or deposition along the coastline;
- Continuity and increase in tourists received in the country;
- Disappearance of destructive anthropogenic activities i.e. Cutting mangroves, sand mining, building on wetlands, littering, unwanted natural resource harvesting.

The National Environment Agency will be responsible for implementation with monitoring undertaken by Departments of Water Resources and Technical Services.

Duration

3 years

COST

Estimated at USD 2,300,000

ACTIVITY	**COST** (USD)
Topographic survey of the coastal strip and inshore area	50 000
Bathymetric survey of the coastal strip and foreshore area	80 000
Beach stabilization	110 000
Construction/Rehabilitation of groynes on the coastal strip from Ball Point to GPA	2 060 000
TOTAL	**2 300 000**

GUINÉE

NAPA PRIORITY PROJECT 13

OPTION V: PROTECTION ET RESTAURATION DES ECOSYSTEMES FRAGILES PROJET 5-1 PROTECTION DES ZONES DE CULTURES EN FRONT DE MER

Localisation: Forécariah, Boffa
Secteur: Zone cotiere

JUSTICATION

Les zones côtières de Forécariah et de Boffa recèlent de vastes plaines estuariennes rizicoles, notamment à Kaback et à Koba qui étaient protégées par des cordons de mangrove très dense contre les assauts des vagues. La surexploitation de ces forêts de mangrove pour l'approvisionnement des populations en bois de chauffe et de construction a amplifié l'érosion côtière et favorisé l'intrusion saline. Il est établi que les plaines de Kaback et de Koba sont les sites où l'érosion est la plus prononcée. Le scénario projeté pour l'année 2050 indique une élévation du niveau de la mer favorisant des actions abrasives des courants résiduels. On doit donc s'attendre à une dégradation importante de ces parties du littoral guinéen. La productivité des sols sera affectée avec pour conséquence une baisse notable des revenus. Malgré quelques efforts de l'État dans la réhabilitation des infrastructures de protection existantes, les plaines sont de plus en plus exposées à l'intrusion saline. La riziculture pratiquée par des milliers de paysans dans ces plaines, faisait d'elles des greniers à riz de la Basse Guinée. Dans la perspective de l'atteinte de l'autosuffisance alimentaire des populations, conformément aux objectifs de la Lettre de Politique Agricole (LPDA) et l'adaptation aux changements climatiques, la restauration des cordons de mangrove est plus que nécessaire.

DESCRIPTION

Objectifs

Global
Limiter l'effet de l'intrusion saline dans les plaines côtières de Koba et de Kaback afin d'améliorer leur productivité

Objectifs spécifiques

- Réhabilitation des ceintures vertes;
- Aménagement de digues de protection.

Activités

- Informations et sensibilisation des populations cibles;
- Reboisement des zones dégradées;
- Endiguement des polders;
- Suivi-évaluation.

Résultats attendus

- Populations cibles informées et sensibilisées;
- Cordons verts de protection rétablis;
- Digues de protection réalisées;

- Suivi-évaluation assuré.

MISE EN OEUVRE

Arrangement institutionnel

Le projet sera exécuté par les communautés locales, les organisations non gouvernementales (ONG), les groupements d'intérêts et les services techniques spécialisées. La coordination sera assurée par l'unité PANA au sein du Conseil National de l'Environnement (CNE).

Agence de mise en oeuvre

PNUD

Risques

Risques climatiques extrêmes

Indicateurs de suivi

- Taux de la population informée et sensibilisée;
- Étendue du cordon vert rétabli;
- Longueur des digues réalisées;
- Nombre de rapports de suivi-évaluation fournis.

Durée

3 ans

COÛT

USD 350,000

GUINÉE

NAPA PRIORITY PROJECT 21

OPTION VIII: PROTECTION DES ZONES DE FRAIE PROJET 8-1: PROTECTION DES ZONES DE FRAIE DANS LES ESTUAIRES DE LA FATALA, DU KONKOURÉ ET DE LA MÉLLACORÉ

Localisation: Boffa, Dubréka et Forécariah
Secteur: zone côtière

JUSTIFICATION

La zone côtière guinéenne recèle d'importants estuaires dont ceux de la Fatala, du Konkouré et de la Méllacouré. Ces estuariennes bordés de forêts de mangrove sont des lieux de reproduction, de nurseries et d'habitat de plusieurs espèces adultes de poissons, de crustacés et de mollusques, mais aussi lieux de refuge pour les alevins. A cet égard, ils sont particulièrement importants pour la régénération du stock halieutique de la zone économique exclusive (ZEE). En Guinée, la pêche artisanale contribue à près de 80 % dans la consommation de protéines animales. La pratique de la pêche anarchique dans les zones de fraie et la coupe abusive de bois de mangrove perturbent la régénération du stock halieutique. L'élévation de la température de surface et du niveau de la mer suite aux changements climatiques entraînera une destruction progressive de la mangrove et une baisse en quantité et en qualité de la production halieutique d'où la nécessité de protéger les estuaires.

DESCRIPTION

Objectifs

Global
Protéger les zones de fraie en vue d'une gestion durable des ressources
Spécifiques

- Identifier et restaurer les zones dégradées dans les estuaires;
- Constituer et former des groupements de bûcherons sur les méthodes de coupe sélective;
- Constituer et former des groupements de pêcheurs sur les techniques appropriées de pêche;
- Information et sensibilisation des différents intervenants dans les zones concernées;
- Identification et délimitation des zones de fraie;
- Reboisement des zones dégradées;
- Constitution et formation de groupements de bûcherons et de pêcheurs;
- Suivi-évaluation.

MISE EN OEUVRE

Arrangement institutionnel

Le projet sera exécuté par les communautés locales, les organisations non gouvernementales (ONG), les groupements d'intérêts et les services techniques spécialisées. La coordination sera assurée par l'unité PANA au sein du Conseil National de l'Environnement (CNE).

Risques

Risques climatiques extrêmes, pollutions côtières

Indicateurs de suivi

- Taux de la population informée et sensibilisée;
- Nombre de zones de fraie identifiées, délimitées et protégées;
- Superficie restaurée;
- Nombre de groupements constitués et formés;
- Rapports suivi-évaluation.

Duree

2ans

COÛT

USD 250,000

GUINEA BISSAU

NAPA PRIORITY PROJECT 4

OBSERVATORY FOR MANGROVE MONITORING AND EVALUATION PROJECT

Location: Costal Areas

JUSTIFICATION

Mangrove is a vegetation formation that is under tides' influence. It is found in coastal areas and is characterised by different species, of which: Rhizophora, tall mangrove, with an average height of 10 m, seen in littoral rims and riverbanks totally submerged by tides - it covers a riverbed of approximately 20-100 m in riverbanks; Avicennia, low mangrove, whose main difference from Rhizophora is its average height of approximately 5 m. This mangrove species is frequently felled and the respective soil is then utilised for rice growing ("Salt-water rice field "). Lagunculária racemosa and Conocarpus erectus (south of the country) are other mangroves-associated species that exist in the country. This type of vegetation covered an overall surface of 287.000 ha in 1978, i.e., 10% of overall national territory, according to SCET. That area decreased to 250,761.1 (7% of the national territory) in 1993, according to GEOSYSTEMES). The functioning of this ecosystem is determined by tides, the water regime (rains in particular), deposit of sediments and temperature.

Other than its physical function (anti-erosion, protection against storms, etc.) mangrove has an ecological function of extreme importance for Guinea-Bissau's economy. It is considered as a zone for the reproduction and raising of maritime and terrestrial fauna, as well as sea birds (fish-spawning, feeding, growth, rest and refuge, etc.). A large part of molluscs and crustacean there produced constitute the main source of protein for many coastal ethnic groups. As an example, oysters glue themselves to its aerial roots, which normally are submerged at high tide, and many sea herbivorous animals seek its leaves to feed themselves. Its role in shrimps' reproductive cycle should be stressed, bearing in mind that most industrial fishing licences focus on shrimps and they have an important repercussion in the state budget.

However, despite the existence of preliminary information on the diminution or degradation of this vegetation formation, stemming especially from the clearing of mangrove for rice- growing purposes, fish smoking and the construction of roads, and their consequences in terms of rainfall decrease in the north of the country and increase in salinity, additional information and studies are need to document and quantify eventual changes in mangroves in the last decades. Thus a study of the dynamics behind those changes and a monitoring of changes that have occurred become pertinent.

DESCRIPTION

Global objective

- Setting up of a tool for mangrove's monitoring on ecologic and economic grounds;
- To provide a propitious framework for evaluation of projects and actions that have a direct or indirect impact on mangrove, thus setting out a reference

framework on the functioning and ways to utilise this ecosystem in Guinea-Bissau's coastal areas.

Specific objectives

This project aims specifically at:

- Improving scientific knowledge on mangrove's ecosystem and determining monitoring modalities;
- Protecting habitats and ecological processes and stabilising the littoral;
- Contributing towards mangrove organisation through an enhancement of its products;
- Making available technical-scientific bases for evaluation of projects and actions with direct and indirect impact on mangrove and proposing recovery measures for heavily degraded zones.

Expected results

- Stations and Observatory office set up, equipped and endowed with qualified technical staff;
- Monitoring and research programmes are adopted on the basis of a strong institutional and technical cum scientific partnership;
- A manual on mangrove's protection and management measures, ecologic processes and littoral stabilisation is prepared and disseminated;
- Specific legislation and data bank exist;
- Different actors and modus operandi in the production field are identified;
- A manual on techniques and micro-projects aimed at the enhancement of mangrove products is prepared;
- The data bank contains sufficient information for studies on environmental impact (EIA);
- Proposals for the recovery of degraded areas are prepared and presented to decision-making entities.

Beneficiaries

The main beneficiaries of this project are the State, universities, research institutions, entity in charge of coast planning, local government and local population.

IMPLEMENTATION

Institutional Implementation Framework

The National Mangrove Observatory (ONM) will operate with the structures shown in the organisation chart below.
ONM will be placed under the direct supervision of the Coast Planning Office. Its management will have a director, a coordinator for research programmes and monitoring, an administration and financial officer and a secretary. Its executive function will be to ensure the observatory's daily operations and management in its administrative, financial, personnel and programme area, as well as its relations with other peer institutions.
The Inter-institutional Scientific Council is made up of different institutions that develop activities linked to the mangrove ecosystem. Its role consists in taking major decisions on scientific matters (appraisal and approval of research and monitoring programmes, evaluation of scientific performance) and advising management as regards procedures leading to decision taking by public authorities.
The following stations will be set up:

- Cacheu, for the country's northern and central areas
- Iemberem, for the south
- Orango, for the Bijagós archipelago

Each station will be run by a station head with research background and will have a technical staff member, who will report to the ONM director and the programme coordinator.

Monitoring and evaluation

Monitoring of ONM activities will be carried out by: (i) the supervising entity and donors, to whom the observatory will report through regular reports (ii) the scientific council, which, as earlier indicated, will be in charge of, inter alia, the validation of programmes, i.e., proposed actions and outcomes, and (iii) national institutional partners and the population at large, at regular restitution meetings, whose periodicity will be set out by the observatory's management.

Risks and barriers

The observatory's heavy dependence on external funding for the financing of activities, scientific research in particular. The second potential risk could be a conflict in project execution between institutions that work with mangroves, either directly or indirectly.

Duration

2 years

COST

USD 800,000

GUINEA BISSAU

NAPA PRIORITY PROJECT 5

COASTAL-AREAS EROSION MONITORING PROJECT

Location: Coastal Areas

JUSTIFICATION

Guinea-Bissau has a coastal zone of approximately 270Km. That zone is characterised by an intense dynamics marked by accumulation and erosion spots along the coast and in some islands of the Bijagós archipelago. Some palpable examples may be quoted to illustrate this point. There is intense coast erosion in Varela beach, in the northwest, caused in part by direct wave action on the coast and, on the other hand, by rainwater falling out a cliff facing the coast. This phenomenon tends to worsen because of the increasing pressure of urbanization towards the coast. A plantation of ornamentation trees and some infrastructure that exist on the coast have been disappearing gradually.

Another zone with a visible erosion phenomenon is located in the islands of Bubaque and João Vieira, in the Bijagós archipelago. Erosion in Bubaque is linked above all to direct sea action (waves) on the coast and a stream of rainwater and water originating at Hotel Bubaque. This zone has an active escarpment whose erosion tendency is likely to last for many years. It is pertinent to underscore that part of the surrounding vegetation had already disappeared due to this phenomenon. Erosion in João Vieira is linked especially to the impact of waves on the coast and part of the natural vegetation has already disappeared.

There is little systematised information and in-depth studies that explain the causes and consequences of coastal erosion in Guinea-Bissau.

It is in such a perspective that a project for the monitoring (research-action) of coastal erosion should be seen, endeavouring to deepen knowledge about this phenomenon and its negative impact on the littoral in particular, and the environment in general, on Guinea-Bissau's coastal zone.

DESCRIPTION

Global objective

Production of a synthesis of multidisciplinary knowledge on coastal erosion and the workings of the coastal environment with a view to finding a tool meant to help in decision making.

Specific objectives

- Follow up with the aid of modern methods of remote detection and fieldwork of the status of erosion in critical sites on the above-mentioned coastal zone;
- Dissemination of information and knowledge about coast erosion;
- Proposals to minimise the coast-erosion phenomenon in specific critical zones.

Expected results

- An easily accessible and usable data bank for involved local and international partners is set up;

- An institution in charge of coast erosion monitoring and study is set up at a national level, in consensus with other institutions;
- Small-scale works to provide protection against coast erosion are carried out in critical locations.

Beneficiaries

State, universities, research institutions, entity responsible for coast planning, local government and local population;

IMPLEMENTATION

Institutional Implementation Framework

The Ministry of Agriculture and Rural Development will be in charge of this project's supervision and the Coast Planning Office will ensure its technical execution, in partnership with universities and research centres from countries in the North, the Directorate of Geology and Mines and the Ministry of Public Works. In his context, universities, making use of students in training schemes or working on their thesis, will be in charge of the scientific monitoring of coast erosion developments in predefined critical sites.

The Directorate of Geology and Mines and the Ministry of Public Works will provide technical assistance, particularly as regards the proposal for the execution of small works that minimize the negative impact of erosion on the coast.

Monitoring and evaluation

The project will be subject to regular multidisciplinary and inter-ministerial evaluation in accordance with policies and procedures set out by donors for the project's supervision and execution. Different reports will be prepared as per requirements set out by donors and the execution agency.

External auditing will be done regularly.

Risks and barriers

The project's reliance on external funding constitutes the main risk facing the project. Another risk relates to national universities; none of the two universities has hitherto curricula and courses on natural sciences and the environment. Such a fact may affect the scientific monitoring of activities and the setting up of a data bank as well as a knowledge base on erosion and coast dynamics.

Duration

3 years

COST

USD 400,000

GUINEA BISSAU

NAPA PRIORITY PROJECT 9

PROTECTION, CONSERVATION AND ENHACEMENENT OF FISHING AND COASTAL RESOURCES PROJECT

Location: Nationwide

JUSTIFICATION

Guinea-Bissau has one of the broader continental platforms in West Africa, with an approximate surface of 53 000 Km2. Its maritime part, including the Bijagós archipelago is characterised by the existence of sand banks and shallow canals that may go 20 metres deep, thus making difficult navigation by large vessels. This zone is considered as one of reproduction, growth and feeding to various sea species. This is justified by the quantity and diversity of fishing and coastal resources found in the Guinean coast, without forgetting the contribution of the resurgence phenomenon that brings with it a large quantity of nutrients to feed sea fauna.

This riches in fishing resources attracts fishermen from sub-region countries namely: Senegal, Guinea-Conakry, Sierra Leone and Ghana, who set themselves up in illegal fishing camps in the islands or along the coast where they freely carry out their fishing activities. Fishing arts and types practised in many of these camps are inappropriate: they range from the use of forbidden nets to the cutting of sharks' fins to the clearing of mangrove for fish smoking.

This situation goes on at a time when Guinea-Bissau authorities lack means under a coherent surveillance policy for the artisan fishing carried out by foreign fishermen. Various conflicts have taken place between local populations and foreign fishermen. This project is part of the aim to ensure a participatory management of fishing resources to the benefit of Guinea-Bissau coastal communities through the appropriation of their water space and resources.

Special attention will be paid to local development initiatives, placing emphasis on a rational exploitation of coastal fishing resources, the processing of fishing resources and their commercialisation with economic advantages for the local population.

DESCRIPTION

Global objective

The project's overall objective is to ensure the sustainable co-management and exploitation of fishing resources in coastal areas to the benefit of local populations.

Specific objectives

- To seek viable solutions, in collaboration with all stakeholders in this production field, for a responsible management of sea and coastal resources and environment;
- To foster the sector's sustainable development through catch enhancement, mangrove and sea products, thus contributing to the fight against poverty affecting involved communities;
- Setting up of a durable institutional mechanism aiming at mediating conflicts around the utilisation of coastal fishing resources between users;

Expected results

- Fishing resources are well managed and a monitoring system makes available data discussed with partners (fishermen, managers and economic interest groups) to manage and regulate annual exploitation of resources;
- Living conditions of fishing communities and other stakeholders are improved through fish processing, conservation, and commercialisation activities;
- An effective fishing-surveillance system is set, implemented and appropriated by fishermen residing in pilot villages;

Beneficiaries

Local communities living in the coastal area, and those population segments that depend directly on fishing for their living are the main beneficiaries.

IMPLEMENTATION

Institutional Implementation Framework

The Ministry of Fishing and Sea Economy is the supervising agency and technical execution will be placed under the Directorate General of Artisan Fishing in partnership with local NGOs and grassroots associations;

Monitoring and evaluation

The project will be subject to regular evaluation in accordance with the policy and procedures set out by donors and the government for the project's supervision and execution. The project head will submit a half-yearly report and a yearly synthesis report each year. He will also present a final report at the end of the project. The different reports will be sent to the government, finding agencies and execution agency.

Risks and Barriers

The project's main risk lies in the State dependence towards projects funded from abroad. The lack of commitment by local population towards the project may constitute an important risk since Guineans are not traditional fishermen but rather farmers. Benefits may go towards foreign fishermen.

Duration

2 years

COST

USD 450,000

HAÏTI

NAPA PRIORITY PROJECT 006

RÉAMÉNAGEMENT ET PROTECTION DES ZONES CÔTIÈRES DU NORD-OUEST ET DU NORD-EST

Localisation: Anse-à Foleur (Nord-Ouest), Fort-Liberté, Caracol, Terrier-Rouge et Ferrier, (Nord-Est)
Secteur: Zones Côtières
Option dominante: Gestion zones côtières (Option 2)
Durée: 4 ans

JUSTIFICATION

Les communes de l'Anse-à-Foleur, Fort-Liberté, Caracol, Terrier-Rouge et Ferrier, toutes des zones côtières sont enclavées entre des montagnes de pentes variables et la mer, deux barrières relativement infranchissables constituant un frein à l'étalement des communautés. L'on comprend donc que la majorité des maisons, surtout celles appartenant à la fraction la plus pauvre de la population, soient construites tout au long du littoral. Au fur et à mesure, les mangroves disparaissent, rendant les côtes encore plus vulnérables face aux intempéries et aux cataclysmes naturels et particulièrement les inondations. Zone de grande diversité biologique, les côtes du Nord-Est sont mis en péril car depuis de nombreuses années, on assiste à une élévation du niveau de la mer. En effet, les averses entraînant souvent des inondations charriant elles mêmes non seulement les eaux de ruissellement mais aussi les déchets importants produits par les populations, causent beaucoup de pertes en vies humaines et de dégâts matériels et détruisent l'écosystème marin.

Compte tenu du cadre naturel, du relief de la zone, de la dégradation des zones côtières et de la disparition progressive de la biodiversité, des actions concrètes et immédiates doivent être prises en vue d'éviter l'anéantissement total d'un milieu naturel aussi vital et d'atténuer les effets pervers des changements climatiques sur la population.

DESCRIPTION

Objectifs

Les objectifs poursuivis dans le cadre de ce projet sont de:

- Protéger de façon durable l'écosystème marin et côtier, par des structures (mécaniques et biologiques) afin de réduire les dégâts causés par les vagues;
- Conserver la biodiversité biologique du littoral;
- Améliorer le niveau de protection des populations contre les inondations, les vagues et l'intrusion marine;
- Assurer un certain niveau de salubrité sur la côte.

Activités

- Rencontre d'information et de mobilisation avec les autorités locales, les membres de la société civile et les représentants de tous les groupes organisés oeuvrant dans la zone;
- Détermination avec les concernés des responsabilités de chacun par rapport au projet;

- Formation et éducation de la population sur l'importance du littoral, la gestion des déchets et les changements climatiques;
- Construction de 5 km de mur le long de la côte à Anse à Foleur;
- Mise en terre de 120,000 plantules de mangliers le long de la côte;
- Aménagement de 3 plages à Fort-Liberté et d'un bosquet dans chacune des autres communes;
- Nettoyage de la côte et surveillance du littoral.

Intrants

- Semences, matériels mécaniques et biologiques;
- Ressources humaines;
- Matériels de formation.
- Extrants à court terme
- Les ordures qui jonchaient le sol au large de la côte sont été éliminées;
- 5 km de mur sont construits le long de la côte (contrôle de vagues);
- 120,000 plantules de manglier sont mises en terre le long de la côte (contrôle des vagues);
- 3,000 personnes habitant la côte sont formés en environnement et en gestion des déchets solides;
- Les zones de construction et d'habitation sont délimités;
- 3 plages et 5 bosquets sont aménagés;
- 10 comités de surveillance du littoral sont constitués.

Résultats potentiels à long terme

- Du point de vue socio-organisationnel les liens sociaux entre les habitants seront plus serrés compte tenu de l'expérience participative qui s'est développée au cours de l'exécution du projet. Ce resserrement des liens crée de nouvelles possibilités pour résoudre des problèmes communs;
- Prise de conscience de la population sur les changements climatiques et l'adaptation et manifestation de nouveaux comportements face à l'environnement;
- Amélioration des conditions de la pêche;
- Diminution des dégâts enregistrés à chaque période pluvieuse;
- Amélioration des revenus des familles;
- Plus grande fréquentation des plages par de visiteurs haïtiens et étrangers;
- Plus grande capacité de production mellifère de la zone.

MISE EN OEUVRE

Risques et obstacles

- Problème dans la persuasion des habitants de la côte à bâtir sur un certain périmètre du littoral;
- Manifestation d'une catastrophe naturelle pendant le déroulement des travaux.

RESSOURCES FINANCIÈRES

Le côut prévisionnel du projet est de:

USD 3,004,466

	Cash (USD)	Nature (USD)
1- Coût Total Projet	3 004 466	
2- GEF	2 004 466	
3- Co-financement / Partenaires potentiels	600 000	
Gvt. Haïtien / MDE/PIP		50 000
Fonds Assistance Economique et Social (FAES)		
Diocèse Port-de-Paix, Eglise Catholique Romaine		250 000
Participation communautaire		100 000

HAÏTI

NAPA PRIORITY PROJECT 007

RÉAMÉNAGEMENT ET PROTECTION DES ZONES CÔTIÈRES DU DÉPARTEMENT DE L'OUEST

Localisation: Port-au-Prince (Ouest), La Gonâve (Ouest)
Secteur: Zones Côtières
Option dominante: Gestion zones côtières (Option 2)
Durée: 4 ans

JUSTIFICATION

Port-au-Prince, la capitale d'Haïti connaît une pression démographique élevée résultant non seulement d'un fort taux de croissance de la population mais aussi de la migration de nombre de personnes qui, fuyant la pauvreté, sont venus s'installer, faute de moyens pour se loger dans un habitat décent, dans des zones déjà vulnérables comme le lit des ravins, les versants escarpés des rivières, les zones du littoral. Il en résulte la formation de bidonvilles géants à Port-au-Prince (comme Cité Soleil, Cité de Dieu) ou à Carrefour, etc. dont la construction a contribué à la disparition des mangroves et leur remplacement par des structures en ciment. Dès lors, les inondations deviennent plus fréquentes, causant de nombreuses pertes en vies humaines. Et c'est la dégradation progressive du littoral, la pollution des eaux marines par les déchets de toute sorte charriés par les eaux de ruissellement et la réduction de la diversité biologique marine.

D'autre part, les membres des communautés côtières de la partie orientale de l'île de la Gonâve se situant en face de la Baie de Port-au-Prince, se trouvent entre un bassin versant en grande partie dégradé et un domaine marin immédiat en phase de surexploitation. L'érosion des reliefs avoisinants diminue sérieusement leur capacité de rétention des eaux de pluie. Ce qui favorise un régime torrentiel des eaux de ruissellement et une faible réalimentation des nappes phréatiques, phénomène accentué par le déboisement. Ce qui rend l'eau de plus en plus rare dans cette région. Les réserves de mangroves sont sérieusement entamées.

Tous ces facteurs liés aux mécanismes grandissants de pauvreté sont autant de facteurs négatifs ayant un impact direct sur la protection des vies et des biens et la préservation de la diversité biologique au niveau des zones côtières. Aussi des actions concrètes et immédiates doivent- elles être prises en vue d'éviter l'anéantissement total du milieu marin et côtier et d'atténuer les effets pervers des changements climatiques sur la population.

DESCRIPTION

Objectifs

Les objectifs poursuivis dans le cadre de ce projet sont de:

- Protéger de façon durable l'écosystème marin et côtier, par des structures (mécaniques et biologiques) afin de réduire les dégâts causés par les vagues;
- Conserver la biodiversité biologique du littoral;
- Améliorer le niveau de protection des populations contre les inondations, les vagues et l'intrusion marine;
- Assurer un certain niveau de salubrité sur la côte.

Activités

- Rencontre d'information et de mobilisation avec les autorités locales, les membres de la société civile et les représentants de tous les groupes organisés oeuvrant dans la zone;
- Détermination avec les concernés des responsabilités de chacun par rapport au projet;
- Formation et éducation des jeunes sur l'importance du littoral, la gestion des déchets et les changements climatiques;
- Construire 2500 mètres linéaires de structures de protection des berges des rivières et des ravines;
- Construire 2500 mètres linéaires de structures de protection des ravines;
- Mise en terre de 100,000 plantules de mangliers le long de la côte;
- Aménagement de 2 places et de deux plages à Port-au-Prince et à La Gonâve;
- Nettoyage de la côte et surveillance du littoral;
- Installation de 500 poubelles au niveau du littoral des zones ciblées.

Intrants

- Matériels mécaniques et biologiques;
- Ressources humaines;
- Activités de formation;
- Ressources financières.

Extrants à court terme

- Les ordures qui jonchaient le sol au large de la côte sont été éliminées;
- 5000 m de structures de protection de berges et de rivières sont construits;
- 100,000 plantules de manglier sont mises en terre le long de la côte (contrôle des vagues);
- 1,200 personnes habitant la côte sont formées en environnement et en gestion des déchets solides;
- Les zones de construction et d'habitation sont délimitées;
- 2 plages et 2 places sont aménagées;
- 10 comités de surveillance du littoral sont constitués.

Résultats potentiels à long terme

- Du point de vue socio organisationnel les liens sociaux entre les habitants seront plus serrés compte tenu de l'expérience participative qui s'est développée au cours de l'exécution du projet. Ce resserrement des liens crée de nouvelles possibilités pour résoudre des problèmes communs;
- Prise de conscience de la population sur les changements climatiques et l'adaptation et manifestation de nouveaux comportements face à l'environnement;
- Amélioration des conditions de la pêche;
- Diminution des dégâts enregistrés à chaque période pluvieuse;
- Amélioration des revenus des familles;
- Plus grande fréquentation des plages par de visiteurs haïtiens et étrangers.

MISE EN OEUVRE

Risques et obstacles

- Problème dans la persuasion des habitants de la côte à bâtir sur un certain périmètre du littoral;
- Manifestation d'une catastrophe naturelle pendant le déroulement des travaux.

RESSOURCES FINANCIÈRES

Le coût prévisionnel du projet est de:

USD 2,775,960

	Cash (USD)	**Nature (USD)**
1- Coût Total Projet	2 775 960	
2- GEF	1 550 960	
3- Co-financement / Partenaires potentiels	1 150 000	
Gvt. Haïtien / MDE/PIP		75 000
Fonds Assistance Economique et Social (FAES)		
Catholic Relief Services (CRS)		

HAÏTI

NAPA PRIORITY PROJECT 008

RÉAMÉNAGEMENT ET PROTECTION DES ZONES CÔTIÈRES DES DÉPARTEMENTS DU SUD ET DE LA GRAND-ANSE

Localisation: Baradères, Dame Marie, Anse d'Hainault, Les Irois
Secteur: Zones Côtières
Option dominante: Gestion zones côtières (Option 2)
Durée: 3 ans

JUSTIFICATION

Les Départements du Sud et de la Grand'Anse restent l'une des régions les plus vulnérables d'Haïti aux cyclones. Étant sur la trajectoire de ces derniers, cette région n'est souvent pas épargnée des grandes dépressions tropicales qui secouent le pays et y causent des dommages incommensurables tant en pertes en vies humaines qu'en pertes matérielles. Des nombreux dégâts enregistrés dans ces zones, la situation de la zone côtière demeure préoccupante. Les inondations causées par les cyclones Alpha et Yvan ont emporté tout le matériel des communautés de pêcheurs évoluant dans ces zones. Privée de ces matériels élémentaires, la majorité de la population n'a pu reprendre ses activités et devient de plus en plus vulnérable puisque dépourvue de sa principale source de revenus. D'autre part, ces inondations, charrient de nombreux matériaux qui sédimentent les rivières à leurs embouchures d'autant plus que les mangroves qui constituaient autrefois une barrière de protection pour ces espaces côtiers ont disparu presque complètement. Quand on connaît l'importance des mangroves dans la protection des zones côtières et de la pêche dans l'économie des communautés côtières, des actions urgentes et immédiates doivent être prises non seulement pour réhabiliter les mangroves mais aussi pour soulager le sort de ces populations, renforcer leur capacité économique et par suite leur capacité à faire face aux effets adverses des changements climatiques.

DESCRIPTION

Objectifs

Les objectifs poursuivis dans le cadre de ce projet sont de:

- Protéger de façon durable l'écosystème marin et côtier, par des structures (mécaniques et biologiques) afin de réduire les dégâts causés par les vagues;
- Conserver la biodiversité biologique du littoral;
- Améliorer le niveau de protection des populations contre les inondations, les vagues et l'intrusion marine;
- Assurer un certain niveau de salubrité sur la côte;
- Doter les pêcheurs de matériels de pêche appropriés;
- Sensibiliser la population cotière sur la nécessité de pêcher selon des périodes et des normes appropriées.

Activités

- Rencontre d'information et de mobilisation avec les autorités locales, les membres de la société civile et les représentants de tous les groupes organisés oeuvrant dans la zone;

- Détermination avec les concernés des responsabilités de chacun par rapport au projet;
- Formation et éducation des jeunes sur l'importance du littoral, la gestion des déchets et les changements climatiques;
- Construire 1250 mètres linéaires de structures de protection des berges des rivières et des ravines;
- Construire 1250 mètres linéaires de structures de protection des ravines;
- Mise en terre de 50,000 plantules de mangliers le long de la côte;
- Aménagement de 2 mini forêts et d'une plage dans la baie des Baradères;
- Nettoyage de la côte et surveillance du littoral;
- Installation de 100 poubelles au niveau du littoral;
- Construction de 300 bateaux de pêche;
- Fabrication de 1500 filets, de 1500 nasses, de 1000 cordes lailone;
- Fabrication de gilets de sauvetage à partir de boites de tampico usagées;
- Achat de filets 3 nappes (150); lignes DPC (150); boots (30), canots (100), Fly boat/moteur (30); batteries (30); zinc.

Intrants

- Matériels mécaniques et biologiques;
- Ressources humaines;
- Activités de formation;
- Ressources financières.
- 2.4. Extrants à court terme
- Les ordures qui jonchaient le sol au large de la côte sont été éliminées;
- 2500 m de structures de protection de berges et de rivières sont construits;
- 50,000 plantules de manglier sont mises en terre le long de la côte (contrôle des vagues);
- 500 personnes habitant la côte sont formées en environnement et en gestion des déchets solides;
- Les zones de construction et d'habitation sont délimitées;
- 2 mini forêts et 1 plage sont aménagées;
- 6 comités de surveillance du littoral sont constitués;
- 300 bateaux de pêche sont construits;
- 1500 filets, de 1500 nasses, de 1000 cordes lailone sont fabriqués;
- Des gilets de sauvetage à partir de boites de tampico usagées sont fabriqués.

Résultats potentiels à long terme

- Du point de vue socio organisationnel les liens sociaux entre les habitants seront plus serrés compte tenu de l'expérience participative qui s'est développée au cours de l'exécution du projet. Ce resserrement des liens crée de nouvelles possibilités pour résoudre des problèmes communs;
- Prise de conscience de la population sur les changements climatiques et l'adaptation et manifestation de nouveaux comportements face à l'environnement;
- Amélioration des conditions de la pêche;
- Diminution des dégâts enregistrés à chaque période pluvieuse;
- Amélioration des revenus des familles;
- Plus grande fréquentation des plages par de visiteurs haïtiens et étrangers.

MISE EN OEUVRE

Risques et obstacles

Problème dans la persuasion des habitants de la côte à bâtir sur un certain périmètre du littoral;
Manifestation d'une catastrophe naturelle pendant le déroulement des travaux.

RESSOURCES FINANCIÈRES

Le coût prévisionnel du projet est de:

USD 2,123,500

	Cash (USD)	**Nature (USD)**
1- Coût Total Projet	2 123 500	
2- GEF	1 118 500	
3- Co-financement / Partenaires potentiels	850 000	
Gvt. Haïtien / MDE/ PIP		100 000
Fonds Assistance Economique et Social (FAES)		
Participation communautaire		55 000
Autre		

KIRIBATI

NAPA PRIORITY PROJECT 2

KIRIBATI NAPA SECTION 6.2.3

COASTAL ZONE MANAGEMENT FOR ADAPTATION

RATIONALE

In the late 1970s and early 1980s most, if not all, Island Councils had included the construction of seawalls to address coastal erosion amongst their rural development projects. Extensive, unabated and progressive coastal erosion has been experienced throughout the Gilbert Group. The social assessment report on the vulnerability of the communities lists "coastal erosion" among the most obvious changes (MacKenzie, 2004). During the national consultations under KAP I to identify adaptation coping strategies participants ranked coping strategies related to coastal erosion from 12 to 19. These rankings came after the top priorities which were given to general awareness raising about climate change, and to strategies to cope with the vulnerability of water resources.

In its final ranking, the CCST lowered the national consultation rankings for most of the coping strategies except those strategies that regulate activities that destroy the coastal environment. These coping strategies relate to the need to carry out EIA on any coastal development and the prohibition of reef blasting.

Institutional arrangements to control development on coastal areas exist but they are ineffective.

DESCRIPTION

Objectives

1. To improve public awareness of the coastal processes and climate change impacts;
2. To develop and pilot community-based coastal management regime by establishing community groups (essentially villages);
3. To encourage communities to participate in coastal-ecosystem enhancement projects and to develop their own small scale projects with similar purposes;
4. To streamline regulatory controls and conditions so as to ensure the resilience of the coastal areas and to ensure the sustainable use of coastal resources is enhanced.

Activities

Coastal zone management for adaptation has four components: awareness raising; protecting and enhancing resilience of coastal assets; information and data; and institutional strengthening. Awareness raising aims to make and empower the communities to recognize and minimize risks that can arise from climate related hazards and the dynamic nature of the coastal area. Appropriate coastal resilience enhancement project such as mangrove replanting will be initiated with the communities. The communities will also participate in a vulnerability mapping of their respect areas so that they are better informed about aspects of their livelihood that are vulnerable to climate change. In addition local experience will be a major

influence on the island vulnerability profiles. Finally, the communities will be mobilized and empowered to be able to manage their own respective areas of the coastal zone.

At a national level the various committees on coastal zone management need to be supported and strengthened, including through review of relevant regulations with the aim to streamline procedural and institutional aspects.

Outputs

- Awareness leaflets in Kiribati language, explaining how climate change and extreme weather can affect the shoreline and adjoining land;
- Manual outlining CHARM, vulnerability assessment, and adaptation "soft options";
- Radio programmes;
- Workshops;
- A design of model sea wall (to be done under KAPII);
- Expanded, documented mangrove planting;
- Pilot groups established to manage their village coastal areas;
- Streamlined permitting system for coastal development;
- Committees on aspects of coastal zone management function more effectively;
- Relevant laws are reviewed, providing information for further coastal use and policy development.

COST

AUD 1,937,280 (+10% contingency cost)

Indicative costs (AUD)	**Local annual budget** (AUD)	**Total NAPA Costs Over 3 yrs**	**Responsible Ministry**
1 312 910	624 370	1 937 280	MELAD, MPWU, MFMRD.

KIRIBATI

NAPA PRIORITY PROJECT 7

KIRIBATI NAPA SECTION 6.2.8

CORAL MONITORING, RESTORATION AND STOCK ENHANCEMENT

RATIONALE

The state of health of coral reefs and coral patches, is adversely sensitive to the increase in sea temperature. Conversely coral reefs are rejuvenated by sea level rise. Coral reefs are intimately associated with the productivity of the subsistence and artisanal fisheries that are the main life supporting activities of the people of Kiribati. Increases of sea temperature and sea level rise are expected to occur as a result of climate change.

Already coral bleaching has been observed among some pristine coral patches, and village communities identify diminishing fish resources as one of the major changes in their environment (McKenzie, 2004). It is therefore important to monitor the conditions of the coral reefs and coral patches in order to have up-to-date information on the extent and trends of any observed bleaching. From this information an explanation of coral bleaching can be developed and appropriate response measures can be designed. For extensively bleached coral patches initiatives may be able to be undertaken to restore their conditions. Certain fish species are depleting, and enhancement program for these will restore their abundance.

DESCRIPTION

Objectives

1. To gain more detailed information on observed coral bleaching, including factors causing health problems to the corals and ciguatera fish poisoning;
2. To establish, implement a sustainable monitoring programme to cover two atolls;
3. To pilot a restoration scheme for coral species in areas of low growth;
4. To establish marine protected areas.
5. To establish a project where stock enhancement contributes in maintaining a vigorous coral reef.

Activities

A core group of trained divers from the Ministries of Fisheries and Marine Resources, and Environment, Lands and Agriculture will be formed with responsibility to establish, monitor, analyse influencing factors on, and project the condition of the coral reefs around selected islands. Particular attention will be paid to coral bleaching and ciguatera poisoning incidences. The group will also develop and implement plans for restoring the health of coral where it is observed to be deteriorating within areas that are considered to be critical for maintaining fisheries productivity. Technical assistance will be required.

Outputs

- Baseline data on general conditions of selected sites;
- Analysis of first available data and, with existing data carry out trend analysis;
- Assessment of causes or stress factors affecting coral health;

- Design management response measures such as awareness raising, protected marine areas, artificial reef, and transplanting of corals;
- Coral Monitoring Institution formalized and strengthened.

COST

AUD 586,750 (+10% contingency cost)

Indicative costs (AUD)	**Local annual budget** (AUD)	**Total NAPA Costs Over 3 yrs**	**Responsible Ministry**
499 000	87 750	586 750	MFMRD, MHMS

KIRIBATI

NAPA PRIORITY PROJECT 8

KIRIBATI NAPA SECTION 6.2.9

UPGRADING OF COASTAL DEFENSES AND CAUSEWAYS

RATIONALE

Various designed seawalls and remnants of those that were destroyed can be found along the shorelines of South Tarawa and outer islands. There does not appear to be a sufficiently strong design and construction against destructive forces of the occasional sudden storms. In all cases these seawalls require regular maintenance against the natural deterioration under the dynamic equilibrium of wind, current, and wave forces at the shoreline.

Causeways joining islands of South Tarawa, and similarly for outer islands were constructed in the 60s and their designs have proven inadequate. They are flooded during exceptionally high spring tides and storms (technically persistent winds of gale force). Causeways on South Tarawa have occasionally been built up, and this will continue to be needed. Causeways on outer islands will similarly require upgrading.

DESCRIPTION

Objectives

1. To prevent encroaching coastal erosion from affecting public infrastructure such as roads, airfields and community public assets by upgrading existing seawalls;
2. To improve accessibility within the atolls which has been facilitated by causeways. Accessibility is, in a few cases, threatened by the inadequacy of causeway designs and/or change in the environment;
3. To minimize potential risks to assets from climate-related disasters.

Activities

The local government council will be responsible for upgrading public seawalls and causeways within its area of responsibility. Construction teams will be set up by the council. Technical information for upgrading work will be provided by the WEU through the rural development unit of the MISA. The MISA will be responsible for implementing the project. An officer in rural development unit of the MISA who is a member of the CCST will assume a major role in the project. An assistant will be required for monitoring and reporting on all coastal upgrading work on existing sea defences and causeways.

Visits by technical personnel of the MISA and MWPU to local councils and work sites will be initiated and maintained. Regular reporting on the types of sea defences at which upgrading works are being carried out, their locations, and general description of the immediate environment will be provided by the MISA through its official representative, to the CCST.

This project will further be monitored through the normal government project management system. Funds made available will form part of the MISA MOPs and the normal reporting requirements to the NEPO will be followed.

Outputs

- The design and construction of the seawalls and causeways is improved;
- Specific arrangement for the upgrading of causeways and seawalls is initiated;
- Causeways are upgraded where there is need, and seawalls protecting infrastructure are upgraded;
- Local government councils and communities are involved.

COST

AUD 5,670,750 (+10% contingency cost)

Indicative costs (AUD)	**Local annual budget** (AUD)	**Total NAPA Costs Over 3 yrs**	**Responsible Ministry**
5 102 870	567 880	5 670 750	MISA, MWPU

LIBERIA

NAPA PRIORITY PROJECT 3

COASTAL DEFENSE SYSTEM FOR THE CITIES OF BUCHANAN AND MONROVIA

BACKGROUND

Coastal and marine ecosystems in Liberia have been subjected to rapid deterioration due to a combination of factors including anthropogenic as well as natural. As a consequence, flooding, erosion, siltation of seaports and major water bodies are on the increase. It has affected human settlements and livelihood.

JUSTIFICATION

The coastal ecosystem consists of mangrove related vegetation, which serves as nurseries for fisheries and sanctuaries for many marine reptiles, mammals and migratory birds. Also common in the coastal zone are oil palms, raphia, mango and other fruit and ornamental plants. The areas along the coast where erosion is most severe are Monrovia City, (Bushrod Island), Buchanan and Cestos Cities. The development of seaports and the sand spits along the coast give rise to coastal cities being sand starved. Actions to control beach erosion around seaports and costal settlements in Liberia are therefore critically important to maintaining their viability as sites for potential tourism, recreation and commercial activities. Initiatives to reverse negative economic and ecological consequences to achieve sustainable use of coastal and marine resources cannot be overemphasized.

DESCRIPTION

Overall Objectives

The main objective is to strengthen national capacities in reducing the incidence of floods, erosion, siltation and degraded landscape in the cities of Monrovia and Buchanan.

Goals

The major goals of the project are as follows:

- To restore and maintain the viability of the coastal areas (Monrovia and Buchanan) as sites for potential tourism, recreation and commercial activities;
- To check the alteration of the natural river systems which is caused by harbor construction in Monrovia and Buchanan;
- To control beach erosion around seaports in Monrovia and Buchanan.

Expected Results

The major results expected from the implementation of the project are as follows:

- Provide immediate shoreline hardening and stabilization techniques to protect the beaches from erosion;
- Increased socio-economic potentials of the coastal areas;
- Improve utilization of coastal resources such as sand and gravels;
- Establish coastal and urban growth planning schemes.

Activities

The major activities of the project are as follows:

- Construction of a Groyne System in Monrovia (Mamba Point, West Point and New Kru Town);
- Construction of Break Water System in Buchanan (Walvis Bay, Robert Street and Port of Buchanan).

Indicators

The major indicators that will be reviewed to assess the efficacy of the project are as follows:

- Coastal Land reclaimed in Monrovia (West Point, New Kru Town and Banjor);
- Coastal Land reclaimed in Buchannan (Walvis Bay, Robert Street and Port of Buchanan);
- Increased protection of coastal infrastructures;
- Threats to human settlements and livelihood reduced.

Risks

There are two major risks associated with the implementation of the project, namely the security situation of the country the fulfillment of co-funding commitments. Institutional Arrangement: The key national institutions that would be involved in the process are the Climate Change Coordination Unit of the Environmental Protection Agency, the Ministry of Lands, Mines and Energy, the Ministry of Public Works, and the NPA

Duration

The duration of the project is set for thirty-six (36) months

COST

A total budget of USD 60 million is needed.

MADAGASCAR

NAPA PRIORITY PROJECT 007

REMISE EN ÉTAT DES SECTEURS DÉGRADÉS PAR LA DÉFLATION AU REPROFILAGE DU BOURRELET LITTORAL, POSE DE BRISE VENT PAR LES REBOISEMENTS DES FILAOS, DES PLANTATIONS DES MANGROVES, ENROCHEMENT DES BORDS DE LA MER/ FAÇADE DE LA CÔTE ET INSTALLATION DES BRISES VAGUES

DESCRIPTION

A l'échelle nationale et de façon globale, la zone côtière et le milieu marin malgache sont relativement préservés car plusieurs milliers de kilomètres de côte ne sont ni habités, ni exploités. Seules les zones proches des agglomérations côtières sont les plus touchées par une dégradation suite au caractère démographique et au développement économique de ces zones, à la considération socio-économique et culturelle attribuée par la population à la zone côtière et au milieu marin,

En 1997 le recul des côtes de Madagascar a été estimé entre 5,71 m et 6,54 m. Les mesures urgentes à entreprendre sont donc la réparation des dommages et la protection des cotes endommagées

Objectif

Gestion durable du milieu marin et côtier de Madagascar.

Activités

Remise en état des secteurs dégradés par la déflation au reprofilage du bourrelet littoral, pose de brise vent par les reboisements des filaos, des plantations des mangroves.

Intrants

Moyens financiers pour la remise état des secteurs dégradés, les matériels requis, les entrepreneurs Maître d'oeuvre du chantier.

Résultats attendus à court terme

- Cotes réparées et protection du milieu par l'application de la stratégie nationale, régionale et locale pour la préservation de la zone côtière;
- Population locale sensibilisée aux causes et aux techniques de protection du milieu marin.

Résultats potentiels à long terme

Gestion rationnelle du milieu marin et côtier par les communautés locales

MISE EN OEUVRE

Arrangements institutionnels

Ministère de l'environnement des eaux et forets; Ministère de TP; Autorités régionales et locales, Population locale et tous les bénéficiaires dans la zone de réalisation de projet.

Risques et obstacles

Faiblesse des moyens financiers;
Efficacité des techniques utilisées pour la remise en état des secteurs dégradés.

EVALUATION, SUIVI ET RESSOURCES FINANCIÈRES

Total: USD 32 500

Indicateur objectivement vérifiable (IOV)	Montant (USD)		
	ANNEE 1	**ANNEE 2**	**ANNEE 2**
Nombre des pieds plantés Longueur des côtes protégées	32 500	0	0
TOTAL			**32 500**

MALDIVES

NAPA PRIORITY PROJECT 2

COASTAL PROTECTION OF SAFER ISLANDS TO REDUCE THE RISK FROM SEA INDUCED FLOODING AND PREDICTED SEA LEVEL RISE

RATIONALE

The small size of the islands and their low elevation makes the Maldives one of the most vulnerable countries to the predicted climate change and impacts such as sea level rise, extreme weather events and storm surges. The Maldives NAPA process has identified strengthening coastal zone management and improving coastal protection of islands as urgent and immediate adaptation measures. This project is aimed to develop and implement demonstration coastal protection measures suitable for small islands, ensuring that risks from climate change impacts are addressed in the design of the coastal protection. The location for implementing this project is to be selected from the islands identified to be developed as a safer island under the Safer Island Strategy (SIS) developed by the Government of the Maldives. The SIS was developed following the Indian Ocean Tsunami of 2004, to resettle communities from the smaller, more vulnerable islands onto larger, better protected ones. The concept of the ìsafer islandî is to extend the population consolidation strategy to incorporate the aspect of extreme vulnerability and develop measures to mitigate ecological disasters and enable the communities to sustain social and economic development in times of emergencies and disasters. Initial risk assessment of 9 of the selected safer islands have highlighted the need to do more detailed analysis on aspects of coastal engineering and adaptation measures on all the selected islands. This project seeks funding to conduct such a detailed analysis on 5 of the safer islands where initial risk assessments have been undertaken.

DESCRIPTION

Goal

Reduce vulnerability of the developed safer islands to current climate risks and future climate change risks.

Objective

Demonstrate innovative coastal protection measures suitable for small islands

Activities

1. Undertake detailed technical and engineering studies for coastal protection options and adaptation measures for 5 safer islands
2. Implement demonstration coastal protection measure for 1 selected safer island.

Short-term outputs

- Climate change concerns addressed in the design and engineering for coastal protection of safer islands;
- Appropriate coastal protection for demonstrated safer island.

Potential long-term outputs

Increased resilience of safer islands and the consolidated population to current climate risks and risks from predicted climate change

IMPLEMENTATION

Institutional arrangements

Lead agency
Ministry of Construction and Public Infrastructure

Project Partners
National Disaster Management Centre; Ministry of Planning and National Development; Ministry of Housing and Urban Development; Ministry of Environment, Energy and Water

Risks and Barriers

High capital investment cost

Evaluation and monitoring

The project will be monitored according to the national M&E standards set by President's Office and MPND. Quarterly progress reports, expenditure reports, annual monitoring reports will be submitted to MPND. In addition, any donor finance agency requirements on M&E will be fulfilled.

FINANCIAL RESOURCES

The total project cost is USD 3,055,000

An activities based budget for the project is given below.

Activity	Cost (USD)
1. Undertake detailed technical and engineering studies for coastal protection options and adaptation measures for 5 safer islands	344 000
2. Implement coastal protection measure at selected safer island	2 711 000
Total	**3 055 000**

MALDIVES

NAPA PRIORITY PROJECT 11

INCREASE RESILIENCE OF CORAL REEFS TO REDUCE THE VULNERABILITY OF ISLANDS, COMMUNITIES AND REEF DEPENDANT ECONOMIC ACTIVITIES TO PREDICTED CLIMATE CHANGE

RATIONALE

Maldives is a nation with coral reefs as its geologic setting. The low elevation, small size and unconsolidated nature of coral islands makes the islands highly reliant on the biological and geomorphologic functioning of the reef environment for their stability. Much of the economic base such as tourism and fisheries, and livelihood of most Maldivians are directly linked to the coral reefs. The stability and survival of coral reefs has been questioned with the predicted climate change, particularly the risks associated with the Sea Surface Temperature (SST) rise and Sea level rise (SLR). Not only does the SST and SLR threaten physical survival of islands, but also could lead to the loss of major industries such as tourism and fisheries industry. The risks linked to climate change are further exacerbated due to non-climate related human activities such as sand and coral mining, snorkeller damage, anchor damage, inappropriate designs and methods used in coastal modifications, improper sewage disposal and overexploitation of reef fish.

There are a currently a number of hindrances to protect the reef from what now appears to be an obvious onset of climate change. The coral reef and coral island environment of Maldives is poorly understood and there are considerable gaps in scientific research. Research is required on coral reefs, coral islands and how they naturally adapt to climate change so that appropriate adaptation measure could be devised. The regulatory framework and management of human induced stress on coral reefs and islands are weak. Capacity to undertake coral reef protection and minimise human induce stress is limited. Finally there is an apparent lack of awareness amongst the public, community groups and even decision makers.

This project aims to overcome some of the gaps in scientific research, to pave way for climate risk adaptation programme for coral reefs. It is intended that the project will develop needed research capacity in coral reef management for the Maldives.

DESCRIPTION

Goal

Minimize human stress on coral reefs of Maldives to facilitate natural adaptation of reefs and islands in the face of predicted climate change.

Objective

Increase the knowledge base and understanding of the natural adaptation process in coral reefs.

Activities

1. Conduct research to understand how coral reefs and islands adapt to climate change and identify ways and measures required to enhance the natural adaptation process;
2. Conduct research on how human induced stresses such as reef fishery, tourism, land reclamation and other developmental activities affect growth and

functioning of coral reefs to facilitate informed decision-making on coral reef management.

Short-term outputs

- Research report on how coral reefs and islands adapt to climate change and recommendations on measures to enhance the natural adaptation process;
- Research report on influence of human induced stresses on coral reef and recommendations on mitigating such stresses.

Potential long-term outputs

- Knowledge gap on coral reefs and coral island adaptation to climate change reduced.
- Increased national capacity for coral reef research and management.

IMPLEMENTATION

Institutional arrangements

Lead agency
Marine Research Centre/ Ministry of Fisheries Agriculture and Marine Resources

Project Partners
Ministry of Environment, Energy and Water; Ministry of Tourism and Civil Aviation; Ministry of Atolls Development; Ministry of Planning and National Development; Ministry of Construction and Public Infrastructure

Risks and Barriers

Lack of capacity in coral reef research and management

Evaluation and monitoring

The project will be monitored according to the national M&E standards set by President's Office and MPND. Quarterly progress reports, expenditure reports, annual monitoring reports will be submitted to MPND. In addition, any donor finance agency requirements on M&E will be fulfilled.

FINANCIAL RESOURCES

The total project cost is USD 1,062,000

An activities based budget for the project is given below.

Activity	**Cost (USD)**
Conduct research to understand how coral reefs and islands adapt to climate change	354 000
Conduct research on how human induced stresses affect growth and functioning of coral reefs.	708 000
Total	**1 062 000**

MAURITANIA

NAPA PRIORITY PROJECT 14

MAURITANIA NAPA SECTION 7.6 MARINE AND COASTAL ECOSYSTEMS

PROTECTION OF THE DIVERSITY OF THE FISH POPULATION AND PREVENTION OF OVER-FISHING WITH A VIEW TO SUSTAINABLE DEVELOPMENT

Locality	The project is located in Nouadhibou
Sector	Coastal ecosystems
Field	Fishing
Type	Productive and social project
PIP Reference	Support for fishing research

RATIONALE

Fish resources are facing increasing difficulties, especially the degradation of part of the marine and coastal ecosystems, the over-fishing of a few of the main species in demand, illegal incursions of the fishing fleet into prohibited zones, the use of prohibited fishing equipment or which are not sufficiently selective, intensification of the competition between traditional, and industrial fishery.

As a result of climate change, the alterations in the characteristics of the marine currents (temperature, salinity, etc.) and of the general movement of the oceans, the rising of the sea level, etc, will certainly have an effect on the productivity of these ecosystems, the marine and coastal habitat and the diversity of the resource.

DESCRIPTION

Objectives

- To ensure the establishment of rules and norms taking into consideration the requirements of the fish habitat in the planning of coastal development;
- To extend monitoring of the resource which is currently limited to the whole EEZ;
- To promote through targeted programmes the genetic diversity of fish populations by fish farming;
- To create awareness among the various stakeholders on innovative fishing techniques.

Activities

Section 1: Technical aspects

- To integrate by 2009, the aspect of climate change into coastal planning in order to take account of the requirements for the fish habitat;
- Studies for the implementation of development plans for fisheries, particularly with a view to prohibiting the fishing of certain species very susceptible to the effects of climate change;
- Introduction of the CC dimension into all the programmes and projects in the fishing sector;
- Equipping the Department of Surveillance of Fisheries and Marine Control (DSFSC) with effective means to make possible the Exclusive Economic Zone

(EEZ) surveillance by the provision of buying patrol boats, radar equipment, human resources, etc.
- The development of simple techniques adapted to climate change contexts in the field of fish farming to preserve genetic diversity.

Section 2: Aspect of creating awareness
- Drafting of an IEC strategy adapted to the needs of the fishing sector regarding climate change and the risk of exhaustion of fishing resources;
- Implementation of the IEC strategy through the various channels of communication (radio, TV, press, etc.);
- Monitoring and assessment of the communication strategy.

Expected outcomes

Section 1: Technical aspects
- Technical tools are created;
- Regulations prohibiting over-fishing of rare species are drafted, adopted and enforced;
- Aspect of climate change is taken into account in fishing sector programmes;
- DSFSC is equipped with effective means to carry out EEZ surveillance;
- Fish farming methods are implemented in a significant way to preserve the genetic diversity of the fish populations.

Section 2: Creation of awareness
- An adapted and operational IEC strategy is implemented through the various communication channels (radio, TV, press) and is monitored.

IMPLEMENTATION

Administrative arrangements

The project will be steered by a small multi-sectoral structure led by a committee bringing together all the sectors involved in the implementation of the project.

Risks and obstacles

The monitoring process will have the following characteristics:
- Monitoring of the implementation of the project by the coordination and the multi-sectoral committee;
- Monitoring of activities;
- Monitoring midway through the project involving all the stakeholders.

Expected Outcomes

- Sustainable exploitation of the fishing resource, particularly that which is susceptible to climate change;
- Habitats are preserved;
- The fishing population carry out their activities in accordance with the standards of sustainable use;
- Diversification and increase in income for fishermen.
- Strong involvement of the population;
- Climate change taken into consideration in fishing sector policy;
- IEC programme carried out;
- DSFSC equipped with human and material resources;
- All the project activities carried out in the required time;
- The expected results achieved.

Duration

Five Years (2005-2009)

COST

USD 1,337,000

MAURITANIA

NAPA PRIORITY PROJECT 16

MAURITANIA NAPA SECTION 7.6 MARINE AND COASTAL ECOSYSTEMS

THE PROTECTION AND REINFORCEMENT OF THE DUNE BAR ALONG THE COASTLINE IN NOUAKCHOTT

Locality	The project is located in Nouakchott
Sector	Coastal ecosystems
Field	Coastal
Type	Social project
PIP Reference	Urban development programme

RATIONALE

In Nouakchott the sands of the coastal bar, the town's only natural protection against marine incursions during heavy storms, are currently over-exploited and the dune bar has been weakened in various places. This bar is also subjected to almost uncontrolled developments which have strongly contributed to weakening it. The frequency and intensity of these storms will certainly increase as a result of climate change. In particular, they will result in heavy Flooding affecting most districts of the town. Nouakchott accommodates over 25% of the country's population, much of industry (fish processing, tourism, construction...etc), commerce and other socio-economic infrastructures.

DESCRIPTION

Objectives

- To institute and make operational by 2006 a supervisory structure for the protection of the coastline bar;
- To reconstruct and cover in vegetation over 80% of the weakened structures of the coastline dunes by 2009;
- To create awareness among, and inform, 80% of the population of Nouakchottt on the dangers and means of protection if the dune bar gives way.

Activities

Section: Institutional aspects

- Establishment of a multi-sectoral committee to consider a supervisory structure for the protection of the dune bar;
- Drafting and adopting of laws by the relevant authorities;
- Establishment of the supervisory structure (headquarters, staff, equipment, etc).

Section 2: Technical aspects

- Financial and technical study of the feasibility of dredging and reshaping the dune;
- Implementation of the study results;
- Monitoring of the work;
- Protection and reforestation by adapted species along 20 km of coastline;
- Technical studies on the problems of erosion in the south of the harbour;
- Implementation of the study results.

Section 3: Creation of awareness

- Elaboration of an IEC strategy adapted to the needs of Nouakchott on the aspect of climate change and the risks of the dune bar giving way;
- Implementation of IEC strategy through the various communication channels (radio, TV, press etc);
- Monitoring and assessment of the communication strategy.

Expected outcomes

Section 1:

- An operational supervisory structure is set up;
- Laws are drafted and adopted.

Section 2:

- The dune bar is dredged and reshaped;
- The protection and reforestation of the bar for 20km are carried out;
- The work is supervised.

Section 3:

- An adapted and operational IEC strategy is implemented through the various communication channels (radio, TV, press, etc) and is monitored.

IMPLEMENTATION

Administrative arrangements

The project will be steered by a small multi-sectoral structure led by a committee bringing together all the sectors involved in the implementation of the project

Risks and obstacles

The fixation of the sands of the bar might stop the sedimentary exchanges between the dune and the beach and the foreshore

Monitoring and assessment indicators

- Technical risk related to the choice of sedimentary material for reinforcing the bar;
- Difficulty in obtaining funding;.
- Monitoring of the implementation of the project by the coordinators and the multi-sectoral committee.
- Monitoring of activities;
- Review midway through the process involving all the stakeholders;
- The coastal bar in Nouakchott has been reinforced and its ecosystem restored;
- Integrated management of the coastal dune;
- Supervisory structure is established;
- Laws taking into account climate change are drafted and adopted;
- IEC strategy is implemented;
- Strong community involvement;
- All the project activities have been achieved in the specified time;
- The expected results have been achieved.

Duration

Five Years (2005-2009)

COST

USD 1,018,000

MAURITANIA

NAPA PRIORITY PROJECT 24

MAURITANIA NAPA SECTION 7.6 MARINE AND COASTAL ECOSYSTEMS

THE IMPLEMENTATION OF A SAFEGUARD PLAN FOR THE TOWN OF NOUAKCHOTT AND ITS INFRASTRUCTURES

Locality	The project is located in Nouakchott
Sector	Coastal ecosystems
Field	Infrastructure and housing
Type	Investment project
PIP Reference	Urban development programme

RATIONALE

In recent decades, the Nouakchott coastline has seen accelerated urbanization resulting from the deteriorating climate and the crisis in the rural environment. Nouakchott currently accommodates over 25% of the country's population, a great part of industry (fish processing, tourism, construction, etc.), of commerce and of other socio-economic infrastructures. Most of the town's suburbs as well as numerous socio-economic infrastructure, some of which are vital to the development of the country, are in the low areas susceptible to Flooding (Sebkha and Aftouts).

With the effects of climate change, it is the communities, accommodation, socio-economic infrastructures and the economy of the region or even of the country which will be affected in a general way.

DESCRIPTION

Objectives

- To institute and make compulsory the enforcement of standards for town planning taking into consideration climate change by revising, for example, the SDAU in relation to the various scenarios of a rising sea level;
- To carry out by 2006 a development plan for the coastline in Nouakchott;
- To ensure security for over 80% of the inhabitants of Nouakchott located in the areas at risk consequent upon climate change by building a breakwater 1.5m to 2m high and 5 to 6m wide along the whole west front of Nouakchott by 2009;
- To relocate by 2009 over 60% of the infrastructures established on the dunes and to orchestrate a planned removal of all the infrastructures established in the sectors susceptible to the effects of climate change;
- To create awareness by 2009 in over 70% of the contractors and the subcontractors of the appropriate construction methods for areas at risk.

Activities

Section 1: Institutional aspects

- To carry out town planning and development studies taking into account climate change;
- To draw up regulations to get them adopted them by the relevant authorities.

Section 2: Technical aspects

- Financial and technical study for the building of a breakwater for the protection of Nouakchott;
- Building of the breakwater;
- Studies of the various scenarios for strategic withdrawal of the infrastructures established in the areas at risk.

Stage 3: Creation of awareness

- Drafting an Information, Education, communication (IEC) strategy adapted to the needs of contractors and subcontractors on the appropriate construction methods for areas at risk;
- Implementation of the IEC strategy through the various channels of communication (radio, TV, Press, etc);
- Monitoring and assessment of the communication strategy.

Expected outcomes

Section 1: Institutional

- A plan for urban development and laws are written and adopted.

Section 2: Technical

- A 20km breakwater built on the west Nouakchott front;
- A strategic withdrawal programme of the infrastructures established in the areas at risk is drafted and implemented.

Stage 3: Creation of awareness

- An adapted and operational IEC strategy implemented through various means of communication (radio, TV, press, etc) and followed up.

IMPLEMENTATION

Administrative arrangements

The project will be steered by a small multi-sectoral structure which will be led by a committee bringing together all the sectors involved in the implementation of the project.

Risks and obstacles

- Techniques in terms of the adaptation of building and equipment methods to climate change;
- Raising of funds for the project.

Monitoring and assessment indicators

- Monitoring of the implementation of the project by the coordination and multi-sectoral committee;
- Monitoring of activities;
- Monitoring of the project midway, involving all the stakeholders;
- A plan for urban development taking into account the climate change drafted and adopted;
- Regulations drafted and adopted;
- A bypass built for the protection of the town;
- Strategies for withdrawal set up for the areas at risk;
- Strong involvement on the part of communities;
- IEC programme carried out;
- All the activities of the project carried out within the specified time.;
- Expected results achieved.

Duration

Five (5) Years (2005-2009)

FUNDING

USD 2,091,000

MOZAMBIQUE

NAPA PRIORITY PROJECT 3

THIRD ACTIVITY: REDUCTION OF THE IMPACT OF CLIMATE CHANGE IN COASTAL ZONES

INTRODUCTION

Mozambique has the third longest maritime coast in the African continent extending for about 2,700 square kilometres in straight line, characterized by a vast variety of eco-systems such as estuaries, dunes, mangrove forestry, coastal lakes, banks and coral reefs, marine weed and swamps. These eco-systems represent critical habitats for various species of ecological and economic value, among others.
The social and economic activities being developed along the coast such as fisheries, port exploitation, tourism and sports as well as the mining of heavy sands, gas and other potential hydrocarbons still under prospect ion represent a significant value to sustain over 60% of the people residing in the first 50 kilometres of the country's continental coastal zone.

On the other hand, the land based activities such as the establishment of industries to transform raw-material in the coastal cities, including the industrial development of those adjoining regional rivers, the repressing of water and consequently the sediment, contribute significantly for the reduction of the quality and quantity of available water for the maintenance of regular processes, transport and deposition of sediments which influence the erosion tax of various areas, as well as the productivity of areas to grow marine invertebrates, influencing negatively the availability of fisheries resources and to ecological tourism. These problems are yet exacerbated by the lack or inefficient treatment of the industrial and domestic residues, often discharged into rivers and seas, without any previous treatment.

Many marine and coastal ecosystems do not bear the level of human interference in particular have a low resilience and can result in a progressive and irreversible degradation of the coast, because in addition to above mentioned factors, a substantial part of the fisheries resources are heavily or over exploited by men.

The coastal line is doubtlessly one of the most dynamic features of the planet. Its position in the space changes constantly in various time scales (daily, seasonal, decadal, secular and millenary). The position of the Mozambican coast line is affected by a considerable number of factors, some of natural origin and intrinsically related with the coastal dynamic (like the action of waves, dispersion of sediments, winds, tides, currents and tropical cyclones) others related to human intervention in the coastal zone with practices of agriculture, deranged constructions of buildings along the seafront, port activities, repressing of rivers, mining of sand and other activities.

The action of extreme climate events such as tropical cyclones and heavy rains occurring frequently along our country's coast are natural phenomena responsible for significant changes of the coast line as a result of a strong erosive action that they are characterised by.

As a result of the interaction between these various factors, the coast line has been suffering from the erosion phenomenon. This phenomenon resulting from the dynamic of Mozambique coastal systems is due to natural causes in more than 90% of the coast line extension, because the area of the seafront occupied by coastal cities

constitutes about 10% . However, the areas occupied by the cities and concomitant adjoining suburban areas are those which show more critical situations of erosion both in the coastal zone and in the country's interior.

In the coastal region of southern Mozambique, the average setback rate of the coast line is in the 0.11 and 1.10 metres per year between 1971-1975 and 1999-2004, in sheltered beaches and exposed to undulation of oceans respectively. However, in certain areas the anthropogenic causes of these processes have been the dominant ones and include, among others, urban and port expansion and more recently the deranged expansion of tourism. For example, the Ponta d'Ouro beach shows a reverse of 0.95 to 1.75 metres/year.

Most of Mozambique's cities and towns are vulnerable to environmental incidents due to its population growth combined with inefficient planning of its land use and settlement which have led to erosion brought about winds of heavy rains, forming very deep ravines in certain cases and causing the collapse of earth in other cases. On the other hand, various cases of floods partially reaching cities and towns have been reported mainly in the southern region.

The centre of vulnerability to erosion in the country's coastal zone spreads particularly on latitude 20º. This region is characterized by a delta and mangrove zone in the north and high vegetated dunes in the south. Its interior is characterized by plain area often prone to floods in case of extreme climate events. These are extremely fragile systems in which the deranged action of men speeds up erosion substantially. In the particular case of coastal dunes, this suffers a big pressure resulting from the development of tourism and urban expansion. In the area between Save and Zambezi rivers, erosion has been aggravated in the past years by the growing cut of mangroves and the reduction in the volume of sediments from the Zambezi river after the construction of the Cahora Bassa Hydro-electric Dam.

There's no intense erosion in the northern region of Mozambique because it has a protected coast by coral reefs which form an almost continuous fringe. However, these are under a strong threat of an intense extractive activity, over-fishing and the global phenomenon of increasing the medium level of sea waters.

RATIONALE OF THE PROJECT

Mozambique is a country where about 60% of the population lives in the coastal zone, and on it the population develops the main economic and subsistence activities, with the growth of the leisure, mining, petroleum and gas industry and aquaculture projects which turn it extremely vulnerable to any disturbances. The cut of vegetation and mangrove, the destruction of dunes, the destabilization of the coastal sand and islands, contribute significantly for the advancement of erosion. This fact is noticed chiefly in the big urban centres and surrounding area which are mostly coastal, with a rapid growth of its population and a defective planning of land use whose response – both technical and scientific and strategic have been sporadic and often with inadequate finance resulting from inadequate interventions. Therefore, the control of the use of land in the coastal zone and the development of strategies for the protection against erosion are becoming urgent. The country is still defective in policies to control and regulate coastal erosion caused by anthropogenic factors. In addition, few studies related with adaptations to the impacts of climate change have been carried out. Therefore, the task of integrating adaptation strategies to climate change and the reduction of the impact of disasters must go through the restructuring of the current practices of land use, elaboration of programmes to develop scientific knowledge of

phenomena associated with erosion, the policies and strategies that must be incorporated in sector plans for the implementation, well so, of the regulation and inspection of social and economic development.

Strategic integration

The (2005-2009) PARPA says that the improvement of the environmental condition depends on adequate planning measures, or urban prequalification measures, namely the elaboration of the land registry and soil ordaining, correct adoption of access infrastructures, drainage and water supply; it also considers that the big environmental priorities in Mozambique focus on the following areas: (a) sanitation; (ii) territorial ordination; (iii) prevention of soil degradation; It's also considered that issues related to environmental governance as well as the recognition of the relation between environment and poverty must be paid attention, with focus on environment education, tourism, mining, fisheries, management of coastal and marine areas, technology, vulnerability and natural disasters, among others.

The government 2005-2009 five year programme considers research and testing of appropriate practices and technologies for the fight against erosion, drought and conservation of bio-diversity, among others, as one of the strategic objectives.

General objectives

Contribute for the sustainable development of the coastal area through the reduction of social and economic impacts derived from climate changes introducing coastal integrated management systems based on the community and elevating the consciousness of state and community institutions on the vulnerability of the coastal zone.

The following are specific objectives:

1. to identify, characterize and map out the eroded land units and the coastal vegetation;
2. to identify rehabilitation techniques of dunes and mangroves to mitigate the effects of erosion;
3. to identify participative actions to illustrate the mitigation of erosion;
4. to evaluate the legal and institutional framework to control and mitigate erosion;
5. To develop strategic actions to sensitize and disseminate the results and good practices in the coastal communities.

Expected Results

1. Systematized and mapped knowledge on eroded areas and those prone to coastal erosion, identified causes and evaluated social and economic impact of the problem;
2. Elaborated technical and scientific measures for the fight and/or mitigation and the respective chronogram of activities as well as the preliminary evaluation of the intervention costs;
3. Identified adequate techniques of small, medium and long term intervention, including participative mechanisms to solve and or mitigate problems erosion;
4. Transmitted practical knowledge and techniques for the fight/mitigation of erosion to affected communities shown;
5. Identified main gaps of the legal and institutional framework on erosion and proposed scenarios of institutional arrangement appropriate to the current

reality and, recommended amendments and contribution to on-going legislation;
6. Identified and tested the effective methodology for the transmission of knowledge on erosion and ways to prevent, mitigate and fight and the community adoptable processes.

Long term results I

Adaptation measures to climate change adopted in the local strategic and development plans, minimizing or eliminating the effects of coastal erosion in the region's social and economic development and with positive social impacts on agriculture, water availability, sanitation, human settlement, protection of the coast line as well as in the bio-diversity.

Adequate adaptation technologies to climate change and the reduction of risks of disasters under application and documented to allow its extension;

Short term results I

Eroded areas and coastal vegetation identified and dunes and mangroves reforested.

Activities to develop

1. Prepare maps of eroded areas;
2. Evaluate the state of erosion and identify the causes and consequences;
3. Prepare recommendations on mitigation intervention to be introduced;
4. Prepare maps on coastal vegetation;
5. Inventory and describe the type of vegetation, species, its distribution and abundance as well as its exploitation status;
6. Estimate the deforested areas, identify the causes and consequences;
7. Prepare recommendations on mitigation interventions to be introduced;
8. Planting of (native) trees in the mangrove zones which were deforested;
9. Evaluate the level of damages and the establishment of goals to rehabilitate dunes and degraded mangroves;
10. Establish a morfo-dynamic monitoring system of dunes, beaches and mangroves through the collection of different types of data such as topographic, oceanographic and chemical and biological indicators;
11. Characterize the function of water changes and erosion phenomena in the regions of the estuaries, caused mainly by the blockage of rivers;
12. Describe the changes of the coast line, of the vegetation and of the land use through the material interpretation of the remote sensory in the cities of Maputo, Beira and Nacala.
13. Propose and list environmental social and economic models for the treatment of impacts caused by the change of the coast line.

Long term results II

Development and establishment of social and economic infrastructures based on ecological zoning and, local sector plans and projects aimed at tackling short, medium and long term demonstrative actions to combat and/or mitigate erosion for an effective adaptation to climate change with the involvement of the local communities and the private sector in particular, in implementing the various critical points.

Short Term Results II

Directives on the methodologies for the fight against erosion and its mitigation through tested and documented participative actions.

Activities to develop

1. Zone areas according to its present use, potential and ecological value (and defined conservation/reforest value, cutting of firewood and charcoal, agriculture, livestock, etc.)
2. Establish general norms to be observed in micro-zones
3. Identify and implement participative alternatives to exploit coastal natural resources;
4. Construction of protection barriers in densely populated areas with erosion problems;

Long term results III

Adequate legal and institutional framework for climate change adopted to tackle issues on coastal erosion and under implementation.

Short term results III

A new legal and institutional arrangement model has been developed to regulate coastal erosion.

Activities to develop

1. Evaluate the legal and institutional framework on erosion and the elaboration of specific recommendations on it including specific recommendations for areas regarded as critical;
2. Develop an national policy that involves actions to restrict development or prohibits the re-development in areas of sensible dunes and beaches;
3. Create laws that contemplate the analysis of alternatives of demographic growth, the evolution of productive activities and the planning of land use in coastal zones.
4. Review the criteria for the establishment of the setbacks zone, in critical areas along the coastal zone and, the development of specific legislation for them;

Long term results IV

Elevate the consciousness of the local communities, the private sector and other intervenient on the effects of coastal erosion and its social and economic impact.

Short term results IV

Endow the community with theoretical and practical knowledge on coastal erosion and common ways of combating/ mitigating it.

Activities to develop

1. Elevate the sensibility of communities and users of the coastal zone on the integrated management role of coastal natural resources in the mitigation of impacts of climate change;
2. Increase the encouragement of the communities and involved parts in the use of coastal zones on the impact of erosion and deforestation in micro-climate change in the region.
3. Involve the local communities in the discussion of the good practices in fighting and preventing erosion.

4. Encourage the population to abandon fisheries techniques that contribute for the destruction of sensible eco-systems such as weed, coral reefs, etc.
5. Evaluate abilities to be implemented by communities and recommend improvements.

Risks and Barriers

The population's habits and the inertia for change of attitude in view of emerging problems can constitute a bottleneck for the positive implementation of activities of the project. The emergence of extreme adverse climatic events during the construction of protection barriers. The loss of access to beaches on the part of local communities and the tourists themselves. They can also be barriers for the implementation of the project.

The implementation of a policy of setbacks zones to face the problem certainly will face great acceptance difficulties for the part of owners and the population, since it implicates the 'misappropriation' of property part of some critical zones.

IMPLEMENTATION

The implementation of activities listed in this project will be of the responsibility of MICOA, through the Sustainable Development Centre for Coastal Zones and the National Directorate for Environmental Coordination in partnership with fisheries and higher education institutions.

BUDGET

Table 1: Proposed budget (USD 2,000,000) by project expected result (USD).

ITEM	Expected Result	Expenses with the personnel	Goods	Services	Capital expenses	Total result
1.1	Systematized and mapped knowledge on eroded and erosion prone areas, causes identified and social and economic impact of the problem evaluated;	67 000	251 250	125 000	42 000	**485 250**
1.2	Elaborated Technical and Scientific framework of measures for the fight and/or mitigation and the respective chronogram of activities as well as a preliminary evaluation of the intervention costs;	52 720	131 800	125 000	19 000	**328 520**
2.0	Identified appropriate small, medium and long scale intervention techniques, including participative mechanisms in the solution and or mitigation of erosion problems;	52 720	263 600	250 000	14 000	**580 320**
3.0	Practical knowledge conveyed and techniques for the fight/mitigation of erosion shown to affected communities;	82 480	41 240	25 000	6 000	**214 720**
4.0	Identified main gaps of the legal and institutional framework on erosion and proposed sceneries of appropriate institutional arrangement for the present reality and, amendment and contributions recommended for the current legislation	52 720	39 540	25 000	14 000	**131 260**
5.0	Identified and tested effective methodology for the transmission of knowledge on erosion and ways to prevent, mitigate and combat and community adoptable processes.	102 720	77 040	25 000	56 000	**260 760**
	Total Group	**410 360**	**804 470**	**575 000**	**211 000**	**2 000 830**

Table 2: Proposed annual budget per project expected results (USD).

ITEM	Expected Result	Year 1	Year 2	Year 3	Year 4	Year 5
1.1	Knowledge on eroded and coastal erosion prone areas systematized and mapped, causes identified and problems of social and economic impact evaluated	145 575	109 181	84 919	72 788	72 788
1.2	Elaborated Technical and Scientific framework of measures for the fight and/or mitigation and the respective chronogram of activities as well as a preliminary evaluation of the intervention costs;	98 556	73 917	57 491	49 278	49 278
2.0	Identified appropriate small, medium and long scale intervention techniques, including participative mechanisms in the solution and or mitigation of erosion problems;	174 096	130 572	101 556	87 048	87 048
3.0	Practical knowledge conveyed and techniques for the fight/mitigation of erosion shown to affected communities;	64 416	48 312	37 576	32 208	32 208
4.0	Identified main gaps of the legal and institutional framework on erosion and proposed sceneries of appropriate institutional arrangement for the present reality and, amendment and contributions recommended for the current legislation.	39 378	29 534	22 971	19 689	19 689
5.0	Identified and tested effective methodology for the transmission of knowledge on erosion and ways to prevent, mitigate and combat and community adoptable processes.	78 228	58 671	45 633	39 114	39 114
	Total Year	**600 249**	**450 187**	**350 145**	**300 125**	**300 125**

SÉNÉGAL

NAPA PRIORITY PROGRAMME 3: PROTECTION DU LITTORAL

CONTEXTE

Les côtes sénégalaises sont dans l'ensemble soumises à des phénomènes d'érosion côtière qui se traduisent essentiellement par des destructions des habitations et des infrastructures. Les taux de recul de la ligne de rivage observés varient selon les situations et les processus en jeu, ils se situent en général entre 1 et 2 m par an pour les plages sableuses. S'il n'est pas possible de réduire les causes naturelles (élévation du niveau marin, houles fortes), il est nécessaire de réduire les causes humaines et de prévenir certaines conséquences des causes naturelles.

DESCRIPTION DES ACTIVITÉS

A) RÉGION DU NORD

La zone du Nord avec un peu plus de 3 kilomètres de littoral est extrêmement dépendante de sa zone côtière parce que celle-ci abrite des écosystèmes particuliers, très productifs et des activités économiques qui contribuent pour une part importante à la formation du produit national brut.

Cependant, malgré son importance, en raison de son position basse, le littoral de la zone Nord, notamment vers la zone de Saint-Louis, connaît des problèmes environnementaux directement liés aux CC et qui ont pour conséquence des taux moyens de 1 à 3 m par an d'érosion côtière.

Comme solution à ce phénomène, les actions suivantes sont envisageables:

- l'aménagement du trait de côtes vers le niveau de la langue de Barbarie, (quartiers de Ghoxou mbath, Guet Ndar, hydrobase de Saint Louis). L'ouvrage technique de type « champs épis»: 2 800 000 FCFA/m linéaire, couplé avec une plantation de filaos pour plus de durabilité est préconisé à ce niveau.
- l'exploitation des sables du plateau continental (0 à 200 m de profondeur de la mer). Ce sable pourrait être utilisé à des fins de construction, de nourrissement artificiel des plages en particulier à vocation touristique. Les zones d'extraction potentielles devront être étudié ainsi que les modalités de prélèvements du sable, notamment pour le sable en mer.

B) RÉGION DU BASSIN ARACHIDIER

La zone est caractérisée par la présence d'écosystèmes importants et de zones protégées (mangroves, parc du delta du Saloum). D'importantes activités économiques: pêche, agriculture, tourisme, exploitation du sel y sont menées.

Les problèmes notés sont les inondations au niveau des zones basses comme à Kaolack. Le taux moyen d'érosion côtière est de 1 à 2 m par an. Toutefois des taux de recul du rivage très importants ont été enregistrés lors de l'ouverture de la brèche du Lagoba dans la flèche de Sangomar (taux de 137 m/an) du fait de houles très fortes. Ces dégâts ont entraînés des relocalisations (déplacement du village de Palmarin, du campement de Djiffere).

Une dégradation de la mangrove, corrélée à une extension des tannes et une salinisation des sols et des eaux sont également une autre cause des modifications climatiques.

Les actions suivantes sont à mener pour atténuer les problèmes d'érosion:

Activité 1: Réduction de l'érosion au niveau de la flèche de Sangomar

- une plantation de filaos sur le cordon littoral, ceci sur une longueur de 10 km (entre Djifère et Palmarin) et une largeur moyenne de 100 m.
- des ouvrages d'aménagement accompagnant ce mur de filao. Des études de faisabilité devront être faites pour permettre de connaître les transits sédimentaires, les courants, afin de déterminer les paramètres de conception des ouvrages.

Les ouvrages de protection identifiés sont de deux types:

- Champs épis: 2 800 000 FCFA/m linéaire;
- Digue de protection: 3 200 000 FCFA/m linéaire.

Activité 2: Restauration de la mangrove

La crise climatique caractérisée par une forte réduction des précipitations a entraîné la salinisation des sols et des eaux et elle fut accompagnée dans tous les estuaires d'une dégradation de l'écosystème de mangrove (diminution de la taille des palétuviers et /ou disparition totale), remplacé progressivement par des tannes à sols sulfatés acides (Niang-Diop *et al.*, 2001). Dans l'estuaire du Saloum, un tel phénomène s'observe à partir de 40 km en amont de l'embouchure alors qu'au delà de Foundiougne, il n'y a plus de mangroves (Diouf, 1996).

La mangrove est certes menacée dans la zone du Bassin arachidier, par les aléas du climat, dont l'avancée de la mer et le déficit pluviométrie, mais également par la pression anthropique. Il s'agira avec les populations de mener des actions de restauration de la mangrove, soit un reboisement de 500 ha de mangrove par an durant une période de cinq (5) ans.

Pour mener à bien ces actions, il sera mis à la disposition des populations des communautés rurales riveraines des mangroves, notamment au niveau des aires Fimela, de Niodor, de Palmarin et de Sokone des pirogues motorisées ou des charrettes pour le ramassage des propagules ainsi qu'un fond d'assistance pour la prise en compte des charges de fonctionnements au démarrage du projet.

Les populations auront par la suite à travers l'utilisation des pirogues comme moyen de transport et de pêche à générer les fonds nécessaires pour la poursuite et la pérennisation des actions.

Activité 3: Promotion des techniques économes en bois énergie

En raison de la pression sur le bois de mangroves pour satisfaire aux besoins en bois énergie des populations, les actions suivantes sont également identifiées par les populations:

- Promotion des foyers améliorés pour réduire la pression sur les mangroves et;
- Promotion des claie à énergie solaire pour le fumage du poisson;
- Organisation des circuits d'approvisionner en bois pour éviter les coupes abusives dans la mangrove.

COÛT: RESTAURATION DE LA MANGROVE

Total: USD 86,000

		Année 1	Année 2	Année 3	Année 4	Année 5	Total (FCFA)	Total USD
Restauration de la mangrove	Achats de pirogues	3 000 000	3 000 000	3 000 000	3 000 000	0	12 000 000	24 000
	Plantation	1 000 000	1 000 000	1 000 000	1 000 000	0	4 000 000	8 000
	Fonctionnement pirogues	2 000 000	0	0	0	0	2 000 000	4 000
	Promotion des techniques économes en bois énergie	5 000 000	500 0000	5 000 000	5 000 000	5 000 000	25 000 000	50 000
Total (FCFA)		11 000 000	9 000 000	9 000 000	9 000 000	5 000 000	**43 000 000**	
Total USD		22 000	18 000	18 000	18 000	10 000		**86 000**

C)RÉGIONS DES NIAYES

Sa côte nord est matérialisée par un système dunaire important, les Niayes et des points de débarquements comme Kayar, Yoff. Le maraîchage est florissant le long de la côte, plus exactement u niveau des Niayes.

La côte rocheuse au niveau de la ville de Dakar est surplombée de falaises. C'est une zone très urbanisée avec des implantations croissantes près du rebord des falaises (Yoff, Ngor, Almadies).

Quand à la Petite Côte, faite de succession de caps rocheux et de baies sableuses, elle présente une grande importance touristique, en plus des nombreuses villes côtières (Rufisque, Bargny, Mbour, Joal) et des Importantes infrastructures de pêche qu'elle abrite.

Cette région est confrontée à des taux moyens d'érosion côtière de 1 à 2 m par an (Rufisque, Bargny, Saly, Joal) à une surexploitation des ressources et à une dégradation des écosystèmes.

Les actions suivantes sont retenues comme prioritaires:

Activité 1: fixation des dunes

Cette méthode de fixation a pour objet de stabiliser les dunes côtières de manière à préserver un stock sédimentaire mobilisable en cas d'érosion côtière. Il existe différentes méthodes et notamment celles consistant à utiliser soit des panneaux de bois, soit la végétation, ces deux techniques ayant pour but de fixer les sables.

A Mboro: il s'agirait d'une part de planter des brise-vent autour des cuvettes maraîchères individuelles en utilisant les espèces suivantes: *Leucaena leucocephala*, le *Parkinsonia sp.* et le filao.

Ceci nécessiterait 300 000 plants soit un coût total de 15 000 000 Fcfa. D'autre part, on procèdera à la plantation en plein de 20 hectares des zones vulnérables avec diverses espèces comme l'eucalyptus, le filao, le niaouli et le *Leucaena sp.* Il faudrait pour cela 22 000 plants pour un coût total de 1 430 000 Fcfa.

Dans le secteur de Kayar, il est proposé une protection mécanique de la dune de Thieudème, dune ravivée par 70700 mètres des fascines, accompagnée d'une plantation de filaos sur les dunes et d'eucalyptus dans les bas-fonds.

Le coût estimé de ces travaux de protection est de 30 000 000 Fcfa.

Pour la zone du lac Ourouaye dont les peuplements de filaos ont été fortement dégradés, suite à l'urbanisation sauvage, il est proposé une plantation d'eucalyptus, ce qui représenterait un coût total de protection de 2 165 800 Fcfa.

Le reboisement a non seulement de protéger les côtes contre l'érosion côtière mais il permet, en particulier dans la zone des Niayes de protéger les cuvettes maraîchères des processus d'ensablement.

Activité 2: Restauration des mangroves

Il faudra procéder à la restauration des mangroves sur une superficie **de 500 ha de mangrove par an durant une période de cinq (5) ans** au niveau de la petite Côte et promouvoir les techniques économes en bois énergie.

Activité 3: Réalisation des ouvrages de protection

La réalisation d'études montrant les zones prioritaires pour la réalisation d'ouvrages d'enrochements des bas de falaise et les types d'ouvrages à installer seront à mener.

Activité 4: lutte contre l'extraction de sable marin

Une urbanisation galopante est notée dans la zone et le développement des infrastructures immobilières requiert des matériaux de base dont le sable marin très prisé par les entreprises du bâtiment. Ainsi, des quantités importantes de sable marin sont prélevées sans contrôle sur les côtes, fragilisant le littoral et exacerbant le processus d'érosion côtière.

Pour limiter cette dégradation, Il s'agira de mettre en oeuvre:

- une campagne de sensibilisation et d'information sur les problèmes engendrés par l'extraction non maîtrisée de sable marin et sur la possibilité d'utiliser d'autres types de sables, notamment le sable continental comme alternative dans la construction;
- un fonds d'appui à la reconversion des extracteurs frauduleux de sable de plage et pour la surveillance de l'exploitation frauduleuse du sable marin;

D) RÉGION DU SUD

L'estuaire de Casamance présente des zones basses, des écosystèmes de mangroves et de zones protégées (Kalissaye, Parc National de Basse Casamance). Le tourisme balnéaire y est également pratiqué. Peu de prospections ont été menées pour mesurer les niveaux d'érosion de la Côte casamançaise. Toutefois, la mangrove connaît un état de dégradation continue.

En effet, selon les auteurs, les réductions de superficie des mangroves varient: 70 à 80% depuis 1979 selon Marius (1985); 69% depuis 1970 selon Badiane (1987) et on

observe le remplacement des *Rhizophora* par les *Avicennia* qui sont plus résistantes au sel.

Activité 1: Restauration des mangroves

Il s'agira avec les populations, notamment les femmes qui travaillent au niveau de la cueillette des huîtres de mener des actions de restauration de la mangrove, soit un reboisement de 500 ha de mangrove par an durant une période de cinq (5) ans.

E) AUTRES ACTIONS DANS TOUTES LES RÉGIONS

Les options technologiques ne suffisent pas et dans certains cas ne sont pas appropriées. Certaines mesures légales et institutionnelles s'avèrent donc indispensables et parmi elles:

- **La redéfinition de la notion de domaine public maritime**, de son extension et des activités pouvant y être autorisées. La définition de zones de retrait et/ou d'un zonage dans l'occupation de la zone côtière;
- **L'application des réglementations en vigueur et leur renforcement:** il s'agit en particulier des mesures vis à vis des prélèvements de sables de plage, celles relatives à l'occupation du domaine public, à l'attribution de permis de construire ou aux études d'impact environnemental (intégrer la question des changements climatiques);
- **La réalisation de plans directeurs des villes côtières** qui prennent en compte les modalités d'évolution des zones côtières afin de définir les plans d'occupation des sols.

Il s'agira par conséquent de procéder à une campagne de sensibilisation sur les effets du non respect des lois sur les côtes. En effet, au niveau de la Corniche dans la Région de Dakar le problème présent lié à l'érosion côtière est d'ordre institutionnel à savoir, le non respect du domaine maritime.

Ces mesures institutionnelles et de gestion des zones côtières devront permettre l'intégration des lignes de retrait dans les plans de développement des zones côtières non encore occupées, faciliter le respect de la loi sur le domaine maritime et l'introduction de contraintes pour les autorisations de construire.

Des campagnes de sensibilisation et d'information relatives à l'occupation des côtes se feront au niveau de chaque région concernée. Les acteurs principaux seront les occupants et les utilisateurs de ces milieux.

MISE EN OEUVRE

COÛTS

Activités	Reboisement des côtes	Ouvrage technique	Restauration de la mangrove	Alternatives à l'extraction de sable	Mesures institutionnelles
Coût par type d'action en FCFA	58 millions	8 milliards à 32 milliards	104 millions	120 millions	160 millions
Coût par type d'action en USD	116 000	16 millions à 64 millions	208 000	240 000	60 000

Source de financement

FEM, Etat du Sénégal, Autres Organismes

Intervenants

- Direction chargée des Mines;
- Chercheurs Universitaires;
- Collectivités locales;
- ONGs;
- Associations et groupements appropriés;
- Direction chargée de l'Urbanisme;
- Direction chargée du domaine public;
- Direction de l'Environnement et des Etablissements Classés;
- Direction des Travaux Publics;
- Ministère chargé du Tourisme;
- Ministère chargé de la Pêche.

SIERRA LEONE

NAPA PRIORITY PROJECT NO 17

DEVELOPMENT OF AN INTEGRATED COASTAL ZONE MANAGEMENT PLAN FOR SIERRA LEONE.

RATIONALE/JUSTIFICATION

Coastal zones are among the most resourceful areas on earth as regards production both from human and from natural biological activity. However, human activities and natural processes also exert major pressures. These zones provide a home to a large and increasing part of the global population. This gives rise to a deterioration of ecosystems, e.g. by pollution or infrastructural changes. On the other hand, natural physical factors such as waves, currents and floods put these areas under continuous pressure. An increase of this pressure as a result of global climate change has a huge potential impact.

In order to cope with these pressures, Sound Coastal Zone Management Planning, which takes full account of long term developments, is indispensable. The many issues involved and the complex links demand an integrated approach. This is the only way to ensure that the coastal zone will sustain both the economic development of the population and the preservation of ecosystems.

Institutional arrangements are of particular importance to the achievement of integrated coastal zone managements. Not only must the coordination of all agencies concerned be organized, it is also for vital importance to ensure that the local population is involved. In addition, a proper financing structure has to be established, particularly in those cases where costs are large compared to national regionally generated income.

Integrated Coastal Zone Management (ICZM) has been identified as the most appropriate approach to managing the resources and their coastal environment.

DESCRIPTION

Objectives

To develop an Integrated Coastal Zone Management Plan for Sierra Leone.

Activities

The most important issues to be addressed in the management of the coastal zone in Sierra Leone are presented below as well as recommendations for addressing these issues. The issues involve

- Delineation of flood and erosion hazard areas;
- Improvement of the quality of topographic data;
- Identify and assemble stakeholders;
- Assemble data and information on current understanding of coastal processes in the country;
- Assemble data and information on current understanding of institutional arrangements for coastal zone management in the country;
- Hold stakeholder consultative meetings;
- Conduct inception to establish institutional arrangements;
- Conduct workshop on ICZM plan development;

- Conduct regional stakeholders workshops;
- Conduct national validation workshop;
- Carryout print and electronic media aided public education and sensitization;
- Report writing and production.

Inputs

Human, financial and physical resources will be required

Short term outputs

- Institutional framework for ICZM established;
- Stakeholders sensitized.

IMPLEMENTATION

Institutional Arrangements

An interdisciplinary approach will be adopted.
Research, Collection and analysis of data and information on coastal processes and institutional arrangement will be undertaken by the Institute of Marine Biology and Oceanography (IMBO).
National Project Steering Committee will oversee the project. A project coordinator will be appointed to guide and implement the project. A project Director from government implementing agency will also be appointed to ensure government's commitment and mainstreaming activities. A project consultant will be appointed to provide technical guidance to the project.

Risks and Barriers

- Funds are expected to be adequate and released in timely manner.

Monitoring and Evaluation

Monitoring and evaluation will be carried out by the National Focal Point of the Interim Guinea current Commission, National Focal Point Institution or any other competent independent agency.

COST

The estimated cost of the project is *USD 90,000*

Budget Breakdown

	Year 1	Year 2	Year 3
Delineation of flood and erosion hazard areas	10 000	-	-
Update of topographic data	20 000	-	-
Assemble data and information on coastal processes in the country	10 000	-	-
Assemble information on current coastal zone management practices and institutional arrangements nationally.	10 000	-	-
Sensitization and Awareness raising	10 000	-	-
Technical workshops/meetings	20 000	-	-
Reporting	10 000	-	-

SIERRA LEONE

NAPA PRIORITY PROJECT NO 18

REHABILITATION OF DEGRADED COASTAL HABITATS IN THE NORTHERN REGION OF SIERRA LEONE.

RATIONALE/JUSTIFICATION

Physical alteration of the coastal and marine environments can lead to changes in the ecosystem and hence the community structure. In some cases some species may be eliminated. Activities such as logging and construction of facilities and agriculture may affect the ecosystem.

Removing mangroves for fuel, salt rice production particularly in the Northern Region of the country makes the coast more vulnerable to erosion leading to siltation. FAO tree planting exercise at Orugu bridge in 1988 is an attempt to redress that situation. Sustainable utilization of mangrove swamps is possible up to 50% of the original area (Fomba, Pers. Com) (Plate Fig. 4.6)

In Sierra Leone, and elsewhere, shoreline structures are often constructed out of necessity without reference to current flow patterns, erosion and siltation. Shoreline structures may alter flow patterns of currents and may cause sediment accumulation. Both the Queen Elizabeth II Quay and Nitti harbours have to be constantly dredged to minimize siltation. At Bonthe navigation is only possible at hightide. Siltation can affect ecological productivity of the environment and foul the filtration systems of sessile organism including bivalves thereby causing mass mortalities among the latter.

Sand mining resuspends sediments and stresses the ecosystem. Digging deep holes on the beach can alter patterns of wave refraction thus contributing toward erosion. Some of the organism get dislodged or buried. Indiscriminate sand mining at Lakka and Hamilton has been of grave concern to Government. Dredging destroys both topography and the biota especially of suspension feeders and fish.

DESCRIPTION

Objectives

- Restore the ecological integrity and productivity of Coastal habitants;
- Restore source of livelihood for coastal dwellers;
- Ensure proper management of coastal habitats.

Activities

- Identify degraded sites;
- Map degraded coastal habitat sites;
- Conduct a survey on livelihoods activities of coastal dwellers;
- Conduct a survey on the environmental and socio-economic;
- Impacts of degraded habitats;
- Creation of tree nurseries;
- Train youth from the local communities in tree nursery development and management;
- Carryout restorative activities in partnership with local communities;
- Review government plans and policies on restorative activities;

- Investigate the role of central, local and traditional governments in the management of coastal habitats.

Inputs

The project will require human, financial and physical resources.

Short term outputs

- Youths trained in the creation and maintenance of tree nurseries;
- Degraded coastal habitat sites identified and mapped. ;
- Survey on livelihood activities conducted;
- Survey on the environmental and socio-economic impacts of coastal habitat degradation conducted;
- Some degraded coastal habitats rehabilitated;
- Livelihood for coastal communities restored;

IMPLEMENTATION

Institutional arrangements

The project will be executed by the various stakeholders with government playing a leading role (National Coastal Area Management Board).

Risks and Barriers

- Inadequate financial resources;
- Inadequate trained personnel;
- Inadequate institutional capacity.

Monitoring and evaluation

Monitoring will be done by private institutions or by NGOs

COST

The project is estimated to cost *USD 317,000*

Budget Breakdown

	Year 1	**Year 2**	**Year 3**
Mapping of degraded coastal sites	100 000	50 000	50 000
Training on tree nurseries development	20 000	10 000	10 000
Creation of tree nurseries	10 000	10 000	10 000
Conduct survey on the environmental and socioeconomic impacts of degraded coastal habitats.	10 000	5 000	5 000
Technical workshops/Presentations on results	5 000	5 000	5 000
Reporting	4 000	4 000	4 000

SOLOMON ISLANDS

NAPA PRIORITY PROJECT NO 4: COASTAL PROTECTION

Goal

The main goal of this project is to increase the resilience and enhance adaptive capacity of coastal communities, socio-economic activities and infrastructure

Rationale

A major find of the first national communication is that coastal environments and systems are at risk from sea level rise and warmer sea temperatures. Areas most vulnerable to flooding and inundation as a result of sea level rise, with the combined effects of seasonal storms, high tides and storm surges associated with tropical cyclones, are the populated coastal lowlands and low-lying islands and atolls. Coastal erosion is already evident in many parts of the country.

Additionally, coral bleaching has occurred during El Nino events. Corals are highly sensitive temperature changes therefore a slight increase in water temperature causes bleaching.

Mangroves and Reefs ecosystems are breeding grounds for commercially important species of fish and shellfish located on shallow coastal waters. Mangroves in particular are an important breeding grounds and habitats for crabs prawns and important food species. Therefore change in water temperature or sea level rise threatens such breeding grounds, and other coastal habitats.

Changes in weather and ocean temperature can affect fish behavior and migration patterns. The NCSA stock take report highlighted that Solomon Islands Tuna industry could be affected with changes to ocean temperature. El-Nino could affect fishing industry terms of quantities and species composition. This could lead to a decline in fisheries productivity and earning in exports

Huge populations of Solomon Islands reside along low lying coastal areas and therefore heavily rely on marine and fisheries resources. Climatic factors such as sea level rise rainfall, strong winds, storm frequency, salinity, unusual tides, salinity and groundwater level could affect the productivity of marine and fisheries resources.

Coral reefs and Mangroves acts as buffer barriers zones protecting coastal communities and low lying areas from storms, tides, cyclones and storm surges and have important social and cultural importance.

There is a need for proper assessment has been done on the impacts of climate change on the coastal environments in the Solomon Islands. However increased erosion rate has been experienced from climatic conditions associated with human induced factors.

Description

The implementation of integrated coastal zone management (ICZM) will entail the implementation of sustainable projects that will create coastal sanctuaries and ecological parks that will act as buffers to extreme climate-related events, protect the environment and promote sustainable coastal development. Adaptation interventions will include (soft) non-structural and structural (hard) options that compliment each other. The listed activities below indicate community efforts to improve communities' resilience to natural hazards and for conservation and protection from further degradation.

Activities could include improving and rehabilitating coastal land, construction of coastal/flood protection systems, gravelling and upgrading/construction of seawall/access roads and regeneration and restoration of mangrove areas.

Objective 1: Integrate climate change adaptation (climate proofing) into construction of a roads and other infrastructure.

Outcome 1: Construction and climate-proofing of engineered coastal roads, bridges and other key infrastructure.

Outputs:

1.1 Construction of coastal/flood protection systems
1.2 Gravelling and upgrading of seawall/access roads
1.3 Construction of culverts, drainage, and outlets

Outcome 2: Integrated coastal zone management

Outputs:

2.1 Replanting of foreshore vegetation
2.2 Protection of lagoon and fringing reefs coral reefs
2.3 Establish set-back zones

2.4 Construct seawalls or other protective measures in built-up areas or critical socio-economic infrastructure and activities
2.5 Prevent land-based pollution
2.6 Institute and administer appropriate/relevant traditional resource management systems
2.7 Promote education, awareness and information on impacts of climate change on coral reefs and other sensitive marine ecosystems.
2.8 Protect and where relevant rehabilitate coral reefs and mangroves in build-up coastal areas.
2.9 Promote coastal zone management (ICZM) and integrate climate change adaptation into sustainable coastal development.
2.10 Produce country-driven guidelines/manuals for managing coastal and marine resources.
2.11 Promote and enhance income-generating opportunities in coastal communities
2.12 Establish monitoring and evaluation of coastal zone management
2.13 Protection of forests and littoral vegetation

Outcome 3: Enhanced self-reliance and food security preparedness

Outputs:

3.1 Improve access to income generation and markets
3.2 Encourage small-scale income generation activities (e.g. retail and wholesale business)
3.3 Provide information on other business opportunities and income-generating activities
3.4 Provide training/support to and up-skill small-scale entrepreneurs

Implementation – See Chapter VII.

Sustainability of the programme

The CNURA policy document has been very clear on its intent in the issues addressing environment issues and climate change. Ministry of Environment, Conservation and Meteorology, established by CNURA government is committed to e*nsure the sustainable utilization and conservation of the natural resources and environment* and successful adaptation to climate change. MECM will work in partnership with other line ministries, provincial governments, non-government organisations and communities in ensuring that coastal management will be sustainable over the long term.

Budget

The total cost of this project is estimated at US$1,750,000 which will be sought from the least developed countries fund through the GEF. Co-financing of the project will be provided by the national government, bilateral development

partners and other multilateral agencies working on coastal issues, problems and areas.

SOLOMON ISLANDS

NAPA PRIORITY PROJECT 5: FISHERIES AND MARINE RESOURCES

Goal

To improve the understanding of the effects of climate change and climate variability including El Nino-Southern Oscillation on the inshore and tuna fishery resources

Rationale

The Solomon Islands has a rich and varied marine sector that is vitally important to the Solomon Islands people as a major food source, and to the economy for its export earnings. Marine resources also offer the potential for further commercial development, in ways that can be sustainably managed. The result would be a reliable and strong economic base for the nation well into the future. The ability to manage sustainably and the size of the resource makes the marine sector one of the most valuable long-term assets in the Solomon Islands.

Description

The health of the marine ecosystems is a major concern because of the potential impact on the health of the people, the availability of food, and the importance of the marine environment in attracting tourists to the Solomon Islands. Monitoring programs need to be put in place in sensitive areas so that the agencies and the local people can measure the changes that are taking place, and act before there is a degraded fishery. The formulation and adoption of lagoon management plans will be one component of a total solution. However ownership of the solution by the community, and the integration of the efforts of all the relevant agencies is seen as essential to being able to write comprehensive and relevant management plans, and ensuring that they are put into practice.

Objective 1: To improve the capacity to protect inshore fisheries and marine resources.

Outcome 1: Promote education, awareness and information on the impacts of climate change on fisheries and marine resources.

Outputs:

1.1 Stock assessment of near-shore fisheries and marine resources conducted.
1.2 Locally-driven indicators for monitoring of the coastal resources developed.

1.3 A guidebook on effects of climate change and variability on inshore marine resources prepared and disseminated.

Outcome 2: Protect and monitor coral reef bleaching.

Outputs:

2.1 Sensitive marine habitats protected.
2.2 Damaged reef areas rehabilitated.
2.3 Locally-driven monitoring system for inshore fisheries and marine resources developed.
2.4 Sustainable fishing techniques promoted.

Outcome 3: Establish coastal buffer zones and rehabilitate mangrove forests.

Outputs:

MANGROVE REPLANTING ENCOURAGED AND PROMOTED.

3.2 Guidelines for mangrove replanting developed and disseminated.
3.3 Set-back zones established.
3.4 Monitoring system for mangrove encroachment established.

Implementation: See Chapter VII.

Sustainability of the programme

Exploitation of fisheries and marine resources provides a sustainable livelihood for many communities and/or villages on all islands. However, this livelihood will be seriously affected by climate change and sea-level rise while demand for fish for food will continue to increase putting additional pressure on the resources. The Ministry of Fisheries and Marine Resources will need to conduct public awareness campaigns on the effects of climate change and variability on inshore and tuna fisheries.

Budget

It is expected that an amount of USD1, 500, 000 will be sought from the LDCF to support this project. Co-financing will come from the government's budgetary allocation for MFMR, bilateral donors in the fisheries sector and other multilateral sources.

TUVALU

NAPA PRIORITY PROJECT 1

INCREASING RESILIENCE OF COASTAL AREAS AND COMMUNITY SETTLEMENT TO CLIMATE CHANGE

RATIONALE

The vulnerable physiographic condition of the Islands of Tuvalu is seen in Figures 2 and 3 of the NAPA document, which clearly show the vulnerability of the island's western coastal areas to erosion due to climate change and sea level rise. Severity of Coastal Erosion depends on the strength of coastal currents and sediments at the sea/land interface; the coastal currents are normally strong between islets. The narrowing of channels between islets due to erosion on atoll Islets further increases the channel's coastal current force flow, thus, leading to more erosion on adjacent islets and islets and lands. Figure 7 (of NAPA) concludes that even without human interference in the coastal areas, erosion persists. Therefore, sea level rise due to climate change plays a role in coastal erosion in Tuvalu. Coastal Erosion is severe as stated in section 2.2.1 (of NAPA) where some infrastructural buildings were at the point of collapsing as a result. Coastal areas and human settlements are exposed to coastal current force and prone to natural tragedies like strong force winds from storms, cyclones and tidal surges due to climate change. Frequency of tropical storms and associated surges are projected to increase as a consequence of climate change as highlighted in Graph 2 and Table 11 (of NAPA).

Placement of channel current breaker structures within the channels between islets and other locations of strong coastal current flow will dissipate coastal current force and this will decrease erosion on coastal areas of islets. In addition, the construction of coastal defenses and the planting of a green belt along the coastline, plays a vital role in stabilizing shorelines and protection to coastal communities against cyclones and tidal surges. Recent experiences with coastal erosion have strengthened the theoretical basis that local deep-rooted, salt-tolerant tree species reduce coastal erosion on stony coastlines. Therefore, a community based afforestation program with deep-rooted, salt-tolerant species was suggested.

DESCRIPTION

Goal

Increasing resilience of Coastal Areas and Community Settlement to climate change.

Objectives

There are two objectives for this project as follows:

- Increased protection of Coastal Areas from Erosion;
- Increased protection of Coastal Communities from natural phenomenon.

Outcomes:	**Activities:**
1. Coastal Areas Protected	**Activities will include:** • Training of local Kaupule/Government personnel on construction of: Coastal defenses; and Channel Breakers structures.

	• Construction of coastal defenses; • Construction of channel current breakers.
2. Coastal communities protection enhanced.	**Activities will include:** • Development of nursery; • Planting of a green-belt; • Public awareness.

Short-term outputs

- Severely eroded areas rehabilitated;
- Community Awareness enhanced.

Potential long-term outcomes

- Coastal erosion controlled;
- Community settlement protection enhanced;
- Decreased coral reef buried by coastal sediments;
- Coastal resources enhanced;
- Communities easily access coastal resources.

IMPLEMENTATION

Institutional arrangement

The Primary implementing agencies: Department of Lands (DOLS), Public Works Department (PWD) and Island Kaupule.
Secondary implementing agencies: Department of Agriculture (DOA) and the Department of Environment (DOE) and NGOs and CBOs.

Risks and barriers

- No practical experience with current breakers;
- Distance between the Coastal Area and Settlement is so small for a successful greenbelt to be planted;
- Fund availability.

Evaluation and monitoring

- Infrastructures risks from coastal erosion reduced;
- Coastal erosion inclusive in annual Kaupule development plans;
- Community participation on coastal erosion control practices increased.

COST

The total cost for this project is:

USD 1,906,500

Budget Breakdown

An indicative and tentative financial resource estimate for the activities is provided below:

Activities	**Year 1** (USD)	**Year 2** (USD)	**Year 3** (USD)
Training of local Kaupule and Government on coastal defense and channel current	50 000	0	0

breakers construction:			
• Island Construction of Coastal defenses	600 000	600 000	400 000
• Island Construction of Channel Current Breakers	40 000	40 000	30 000
Development of Greenbelt Nursery	15 000	15 000	15 000
Planting of Greenbelt	30 000	30 000	25 000
Public Awareness	5 000	5 000	5 000
Contingencies	500	500	500
Sub-Total	**740 500**	**690 500**	**475 500**
Gross Total			**1 906 500**

TUVALU

NAPA PRIORITY PROJECT 5

STRENGTHENING OF COMMUNITY BASED CONSERVATION PROGRAMMES ON HIGHLY VULNERABLE NEAR-SHORE MARINE ECOSYSTEMS

Type of project: Intervention (with community focus)

RATIONALE

Some islands have already instituted conservation areas. The biodiversity of Tuvalu's marine resources is vulnerable to alteration of marine habitats due to sea level rise and sea surface temperature change (Section 2.2.3 of NAPA). The sea surface temperature in Tuvalu is at the upper limit of the tolerance range for most tropical marine species, therefore, future increases in sea surface temperature due to climate change including other stresses (highlighted in sections 2.2 and 3.3.6 and Table 6 of NAPA) on marine resources will exacerbate coral bleaching and species extirpation. Coastal Marine Resources are more vulnerable to sea surface temperature change as compared to Oceanic Marine Resources. Coastal communities easily access coastal marine resources, therefore, these resources are also exposed to over-harvesting (as highlighted in Table 10 of NAPA). Coastal Erosion exacerbates the degradation of coastal ecosystems due to the deposition of sand on coral reefs. These stresses need to be minimized through instituting community based conservation programmes on highly vulnerable marine ecosystems to ensure increasing productivity of coastal marine resources. Therefore, identification of community conservation areas in highly vulnerable marine ecosystems is urgent and must be addressed immediately.

DESCRIPTION

Goal

To Develop and Strengthen Community Based Conservation Programmes on Highly Vulnerable Marine Ecosystems.

Objectives

There are four objectives for this project as follows:

- Increased protection of Coastal Marine Biological Diversity;
- Develop and Strengthen Community Sustainable biodiversity conservation programme;
- Increased productivity of Coastal Marine Biological Communities;
- Develop a Stakeholders awareness programme that will enhance traditional and modern conservation practices.

Outcomes:	Activities:
1. Community sustainable marine management plan completed	Activities will include: • Developing a sustainable community-based coastal marine biodiversity management plan; • Increase local capacity in execution of the management plan.
2. Priority Conservation Area	Activities will include: • Identification and implementation of priority

identified per Island	Conservation areas per Islands; • Develop a Marine resources inventory for community.
3. Improved Community knowledge, skills, and commitment to marine resource conservation	Activities will include: • Integration of traditional and modern conservation practices; • Awareness and Capacity building for communities on conservation areas.

Short-term outputs

- Marine Resources Productivity increased;
- Community Awareness enhanced.

Potential long-term outcomes

- Coastal Marine Biological Diversity protected;
- Community understanding and commitment to conservation areas increased;
- Community based income increased;
- Community access to Coastal resources enhanced.

IMPLEMENTATION

Institutional arrangement

Primary executing agencies: Department of Fisheries (DOF), DOE and Kaupule.
Secondary executing agencies: NGOs and CBOs.

Risks and barriers

- Lack of coastal resources information;
- Lack of legal framework on resources conservation at community;
- Lack of coastal Management Systems on islands;
- Fund availability.

Evaluation and monitoring

- Bi-annual update of community marine resources inventory;
- Existence of Sustainable marine resources management plan;
- Boundaries of conservation areas marked and public informed.

COST

The total cost for this project is:

USD 636,500

Budget Breakdown

An indicative and tentative financial resource estimate for the activities is provided below:

Activities	**Year 1**	**Year 2**	**Year 3**
Develop a Sustainable community-based coastal marine biodiversity management plan	20 000	15 000	15 000
Identification and implementation of priority Conservation areas per Islands	130 000	130 000	125 000

Develop a Marine resources inventory for community	60 000	30 000	20 000
Integration of traditional and modern conservation practices			20 000
Awareness and Capacity building for communities on conservation areas	15 000	40 000	15 000
Contingencies	500	500	500
Sub-Total	**225 500**	**215 500**	**195 500**
Total Cost			**636 500**

TUVALU

NAPA PRIORITY PROJECT 7

ADAPTATION TO COASTAL SHELLFISH FISHERIES RESOURCES PRODUCTIVITY

RATIONALE

The increase in surface air temperature as a result of climate change will lead to an increase in the sea surface temperature as well. The sea surface temperature in Tuvalu is approximately 29°C; and most coral reef shellfish species in Tuvalu are living at the upper end of their respective tolerance range, and therefore are vulnerable to a slight increase in sea surface temperature. A slight increase in the sea surface temperature will have a detrimental affect on all marine organisms whether active or sedentary (more vulnerable) (as highlighted in section 3.3.6 and 3.3.6.1 of NAPA). Human harvesting of shellfish resources is also a contributing factor to the decreasing trend in shellfisheries population (as seen in table 10 of NAPA). However, in the past, human harvesting of shellfish resources has not been reported to adversely affect shellfisheries population as reported in the recent NAPA stakeholders' consultation.

The Atoll Islands comprising large areas of shallow reefs are vulnerable. Furthermore, the Fisheries department recently reported a decrease in abundance of major coastal coral fish population on Funafuti. The urgency to address this problem is immediate since coral reef resources are the most easily accessible and main protein source of food for low-income and the majority of subsistence families on all islands of Tuvalu.

Coastal Fisheries Resources is a delicacy. However, a recent experience shows that sedentary marine resources such as shellfishes, clams and others are becoming endangered due to low population regeneration and destruction to their habitats resulting in low breeding rates also attributed to increasing sea temperature due to climate change.

Shifting these vulnerable populations of shellfishes to suitable sites and the implementation of breeding programmes onshore or within the marine environment will result in the natural breeding of shellfish and regeneration of shellfish population. Furthermore, protection of these delicate breeding cultures is vital and will be ensured through the institution of conservation breeding sites. The success of this project will enhance community livelihood in Tuvalu. Community awareness is a vital component for the sustainability of this project. Furthermore, current level of scientific knowledge should be integrated with the traditional knowledge.

DESCRIPTION

Goal

Adaptation to Near-Shore Coastal Shellfish Resources and Coral Reef Ecosystem Productivity.

Objectives

There are three objectives for this project as follows:

- Increased protection of Shellfish population;
- Increased protection of Coral Reef Ecosystems Productivity;
- Increased Public Awareness and Livelihood.

Outcomes	Activities	Inputs
1. Shellfish Breeding Programme (Marine and On-shore) Established	Activities will include: • Training and Establishment of shellfish breeding programme Team for Islands; • Training of Island experts; • Dissemination of shellfish cultures; • Training of locals.	Human labour Financial resources Shellfisheries expert Tool and equipment
2. National Shellfish and Coral Reef Ecosystems Conservation Plan Drafted and Enforced	Activities will include: • Drafting of By-Laws and penalties for poachers at each participating Island; • Drafting of the National Shellfish and Coral Reef Ecosystems Conservation Plan; • Development of a conservation shellfish breeding area; • Training of locals.	Conservation expert Financial resources
3. Marine Resources Public Understanding Enhanced	Activities will include: • Public Awareness; • Radio; • Leaflets; • Others.	Financial Resources

Short-term outputs

- Protection to vulnerable coral reef shellfish enforced;
- Coral Shellfisheries over-harvesting reduced.

Potential long-term outcomes

- Socio-economic condition of low-income families will be improved with increased private sector contribution to GDP;
- Increased shellfish and coral reef ecosystems productivity of internal lagoons (atolls) and internal semisaline surface water bodies (Nanumaga, Niutao and Niulakita);
- Enhanced coral reef fisheries biodiversity;
- Communities understanding on marine resources enhanced;
- Communities will easily access protein food from coral reef fisheries resources;
- Adaptation to coral reef shellfisheries population achieved.

IMPLEMENTATION

Institutional arrangement

Primary implementing agency: DOF, DOE and Kaupule.
Secondary implementing agencies: NGOs/CBOs.

Risks and barriers

- Cost-effectiveness may determine the adoption of the practice to use;

- Replication of the practice would depend on the outcomes of the project and Government/ Falekaupule commitment;
- Fund availability.

Evaluation and monitoring

- Sustainable exploitation of coral reef fisheries resources especially those species that are most vulnerable to climate change;
- Conservation Areas established and community compliance;
- Near-shore Marine Habitats and Resources protected;
- Increase in coral reef shellfish productivity;
- Climate change impacts inclusive in fisheries policy.

COST

The total cost for this project is:

USD 388,500

Budget Breakdown

An indicative and tentative financial resource estimate for the activities is provided below:

Activities	**Year 1**	**Year 2**	**Year 3**
Establishment of shellfish breeding programme	125 000	0	0
Training of shellfish expert	20 000	20 000	20 000
Dissemination of shellfish cultures to Falekaupule/stakeholders	15 000	15 000	15 000
Training of Kaupule/Falekaupule expert	30 000	15 000	15 000
Drafting of the National Shellfish and coral Reef ecosystems conservation plan	15 000	3 000	0
Drafting of byelaws and penalties for Islands	5 000	2 000	0
Development of *in situ* shellfish breeding areas	15 000	15 000	15 000
Development of public awareness media	7 000	7 000	7 000
Training of Kaupule/Falekaupule experts.	9 000	4 000	3 000
Contingencies	500	500	500
Sub-Total	**241 500**	**81 500**	**75 500**
Total Cost			**398 500**

VANUATU

NAPA PRIORITY PROJECT 3

PROJECT CONCEPT 3: COMMUNITY BASED MARINE RESOURCE MANAGEMENT PROGRAMMES

DESCRIPTION

Project Goal

Enhance adaptive capacity and resilience of vulnerable communities to the impacts of climate change.

Project Objective

To develop community based marine resource programmes, embracing both traditional and modern practices.

RATIONALE

According to the Third National Development Plan, the main objectives underlying fisheries development and management in Vanuatu are:

- To maximize the economic returns and other benefits from the exploitation of marine resources to the people of Vanuatu, particularly the indigenous population;
- To promote the rational exploitation of marine resources while ensuring that they can be exploited in a sustainable manner over the long-term;
- To promote and encourage the growth of the private sector;
- To avoid development activities that imply an ongoing, recurrent cost to Government;

The following fisheries development and management objectives are taken from the Department of Fisheries' 1997 draft Policy Statement;

- To manage, develop and protect the nation's fisheries resources and its marine, coastal and aquatic environments in such a way as to conserve and replenish them as an asset for future generations;
- To utilize the nation's fisheries resources in support of economic growth, social betterment, human resource development, employment creation and a sound ecological balance;
- To pursue effective strategies, including the continued improvement of administrative and legal machinery, for managing fisheries resources and their exploitation;
- To rationalize national planning, research, education, extension and monitoring capacity in regard to fisheries;
- To increase access by fishing communities to the cash economy;
- To improve Vanuatu's nutritional standards by encouraging and managing subsistence and small-scale fisheries production;
- To provide technical support to provincial and local government bodies, to the private sector, and to other agencies in the execution of fisheries projects.

The government's management strategy nominally consists of two major elements:

1. For the commercial fisheries – the use of formal fisheries management plans;

2. For the subsistence and village based fisheries – devolution of management responsibility to local communities.

With respect to the existing status of fisheries management and development plans, the 2000 ADB fisheries sector review states: "To date, no fishery in the country has operated under a formal management plan."

According to the 1999 Annual Report of the Fisheries Division, the direction being taken by the Department, "…….away from relentless pursuit of a narrow set economic development opportunities, and towards a broader range of both development and management activities". The report suggests that the broader range of activities should include greater emphasis on management of reef resources, rather than on commercial finfish fisheries.

The impact of climate change on fisheries, especially coastal fisheries is not conclusive. But all evidence point to a likely negative on both the quantity and quality of the resources due to the impact of temperature on the ecosystem. Fisheries will be affected through the degradation/loss of ecosystems such as mangroves which act as spawning, breeding and nursing grounds for a number of fish species, and through changes in sea surface temperature and also the intensity and location of upwellings that will modify species distribution;

Given the huge reliance of this sector on the mainly rural communities, any effects on the distribution and availability of this vital resource will have a direct bearing on the protein supply to the communities. It is important therefore that through education and awareness programmes, the possible negative impact on the fisheries sector is highlighted. This should form the basis of conservation and management strategies that will prepare communities for the worst possible scenarios. Some of the successful coping mechanisms can be adopted alongside any modern technological solutions.

Project Objectives/outcomes/outputs

Outcome 1

Implemented pilot activities to increase the adaptive capacity of coastal communities in the participating countries

Output 1.1: Pilot projects implemented on identified sites on particular islands.
Output 2.2: Communities embark on sustainable livelihood activities.

Outcome 2

Mainstreaming of adaptation into policies and programmes.
Output 2.1: Coastal management activities integrated across sectors, programmes and at various levels of society in the programme sites.

Outcome 3

Building capacity to increase the ability to plan for and respond to climate and coastal change**.**

Output 3.1 Improved capacity of institutions and human resources to develop and implement adaptation strategies and measures in coastal environment; development of expertise in application of climate and ocean models to forecast impacts and vulnerability; improved managerial skills for decision-makers and coastal stakeholders.

IMPLEMENTATION ARRANGEMENTS

The project will be executed by the Department of Fisheries in close consultation with other departments and ministries engaged in activities related to the coastal zones and marine issues.

BUDGET

A proposal for **USD 1m** will be developed for GEF funding, and will be allocated according to the activities and outcomes, to be determined during the project development phase.