REPUBLIC OF VANUATU

# NATIONAL ADAPTATION PROGRAMME FOR ACTION (NAPA)

GEF

UNDP

UNFCCC

National Advisory Committee on Climate Change (NACCC)
Port Vila, Vanuatu

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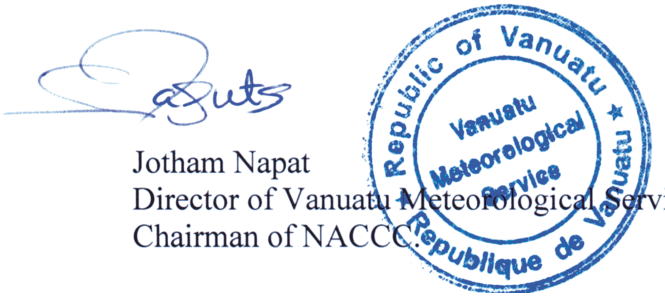


Jotham Napat
Director of Vanuatu Meteorological Services
Chairman of NACCC

# Preface

"By reducing the vulnerability of Vanuatu's vital sectors and communities now to current climate-related risks should place the country in a better position to cope with future climate change and to build sustainable ni-Vanuatu communities. The ideal approach to adaptation in Vanuatu is a pro-active, no-regrets approach which encompasses measures and strategies which can be implemented in the present with the aim of reducing vulnerability in the future. A no-regrets approach is one which would be beneficial to Vanuatu even in the absence of climate and sea-level change." His Excellency the President of the Republic of Vanuatu in opening the first National Conference on National Adaptation Programme of Action in January 2005.

Vanuatu is among countries in the Pacific region that are most vulnerable to the risks of climate change, climate variability and sea level rise. The livelihood of our people and economy which are interwoven, shaped and driven by climate sensitive sectors, the effect of climate and sea level change are already very real and pose a tangible threat to the future socio-economic well-being of Vanuatu.

The very diverse environment that once sustained our forefathers with great abundance and continues to play a central role in the livelihood of ni-Vanuatu has begun to change. Crops in subsistence gardens are showing signs of stress, prolonged and enhanced drought conditions are resulting in water shortages, rising sea levels are slowly eating away our shores, threatening communities and underground water sources, often the only source of water ( apart from rain water) in some of our small islands. Increasing population growth leading to increased pressure on land resources coupled with the shift in social values, land use practices and changing attitudes to the environment, increase the potential vulnerability of Vanuatu to climate change and sea level change.

Climate related disasters are one of the main hindrances to economic development in Vanuatu and this will certainly continue and could predictably be exacerbated by climate change. As expected, the degree and nature of vulnerability varies, in certain degrees between islands but the impacts would certainly be experienced in the livelihood of all people as well as climate sensitive sectors such as agriculture and livestock, coastal zones and reefs, water resources, health, forests and biodiversity.

Adaptation to climate change, variability and sea level change is an urgent need for Vanuatu. This report looks at those vital development sectors of Vanuatu and calls upon the government, communities, provincial authorities, non-government organizations and the private sector to strengthen capacity to deal with climate change, mainstream adaptation in national planning, modify policies and legislations where necessary to become more adaptation friendly, support the capacity for adaptation and implement measures to reduce vulnerability to climate change.

REPUBLIC OF VANUATU
MINISTER OF INFRASTRUCTURE AND PUBLIC UTILITIES
MINISTRE DE L'EQUIPEMENT ET DE L'AMENAGEMENT

**Honorable Edward Nipake Natapei TUTA EANUA' ARIKI**
**Deputy Prime Minister**
**Ministry of Infrastructure and Public Utilities**

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## ACRONYMS

| | |
|---|---|
| ADB | Asian Development Bank |
| APRs | Annual Project Reports |
| BPoA | Barbados Programme of Action for Small Island Developing States |
| CBD | Convention on Biodiversity |
| CBDAMPIC | Capacity Building for Development of Adaptation Measures in Pacific Island Countries |
| CDM | Clean Development Mechanism |
| CHARM | Comprehensive Hazard and Risk Management |
| CCA | Common Country Assessment |
| CC | Climate Change |
| CHARM | Comprehensive Hazard And Risk Management |
| CoP | Conference of the Parties |
| CP | Country Programme |
| DM | Disaster Management |
| DRR | Disaster Risk Reduction |
| EIA | Environmental Impact Assessment |
| ENSO | El Nino-Southern Oscillation |
| EU | European Union |
| EVI | Environmental Vulnerability Index |
| FAD | Fish Aggregating Device |
| FAO | Food and Agriculture Organization |
| GHG | Greenhouse Gases |
| GDP | Gross Domestic Product |
| GNI | Gross National Income |
| ICZM | Integrated Coastal Zone Management |
| INC | Initial National Communication |
| IPCC | Intergovernmental Panel on Climate Change |
| IWP | International Waters Project |
| JPoI | Johannesburg Plan of Implementation |
| LDC | Least Developed Country |
| MCA | Multi-Criteria Analysis |
| MDGs | Millennium Development Goals |
| MEAs | Multilateral Environment Agreements |
| MIPU | Ministry of Infrastructure and Public Utilities |
| MoE | Ministry of Education |
| MoH | Ministry of Health |
| MoIA | Ministry of Internal Affairs |
| MPA | Marine Protected Area |
| NDMO | National Disaster Management Office |
| NAPA | National Adaptation Programme of Action |
| NBSAP | National Biodiversity Strategy and Action plan |
| NACCC | National Advisory Committee on Climate Change |
| NCSA | National Capacity Self Assessment |

| | |
|---|---|
| NGO | Non-Governmental Organization |
| NIPS | National Implementation Plan for the Management of POPs |
| PAA | Priority Action Agenda for the Vanuatu Government |
| PACC | Pacific Adaptation to Climate Change |
| PICCAP | Pacific Islands Climate Change Assistance Project |
| PIGGAREP | Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project |
| PICs | Pacific Island Countries |
| PIREP | Pacific Islands Renewable Energy Project |
| POPACA | Project d'Organisation des Producteurs Agricoles pour la Commercialisation Associative |
| POPs | Persistent Organic Pollutants |
| R&D | Research and Development |
| REDI | Rural Economic Development Initiative |
| SIDS | Small Island Developing States |
| SLR | Sea Level Rise |
| SNC | Second National Communication |
| SPC | Secretariat for the Pacific Community |
| SPREP | Secretariat of Pacific Regional Environment Programme |
| TWGs | Thematic Working Groups |
| UNCCD | United Nations Convention on Combating Desertification |
| UNDAF | United Nations Development Assistance Framework |
| UNDP | United Nations Development Program |
| UNFCCC | United Nations Framework Convention on Climate Change |
| WSSD | World Summit on Sustainable Development |
| VMS | Vanuatu Meteorological Services |
| V&A | Vulnerability and Adaptation assessment |
| VCCAP | Vanuatu Climate Change Adaptation Project |

## EXECUTIVE SUMMARY

The Republic of Vanuatu ratified the UN Framework Convention on Climate Change (UNFCCC) on 09 March 1993, and submitted its Initial National Communication (INC) to the UNFCCC on 30 October 1999. Following the preparation of its INC, Vanuatu has initiated efforts to create an institutional set-up that seeks to mainstream climate change issues into the national legal frameworks. Moreover, its INC provides compelling evidence that, by global standards, Vanuatu is one of the nations most vulnerable to climate change and sea-level rise.

Ratification of the UNFCCC is one step forward in terms of commitment to addressing climate change and related issues. Vanuatu is also a Party to many other UN conventions, such as those, among others: biological diversity, biosafety, persistent organic pollutants, and combating desertification. The country has also ratified the Kyoto Protocol on 17 July 2001.

The Seventh Conference of the Parties (COP 7) to the United Nations Framework Convention on Climate Change (UNFCCC) resolved to support the work programme for least developed countries (LDCs) to prepare and implement national adaptation programmes of action (NAPAs), including meeting the agreed full cost of preparing the NAPAs. The NAPAs were designed to communicate priority activities (including projects, integration into other activities, capacity building and policy reform) and address the urgent and immediate needs and concerns of LDCs relating to the adverse effects of climate change. The rationale for developing NAPAs was the low adaptive capacity of LDCs, which renders them in need of immediate and urgent support to help face the current and projected adverse effects of climate change. Activities proposed through NAPAs are those whose further delay could increase vulnerability, or lead to increased costs at a later stage. Vanuatu as an LDC was eligible for funding under this initiative.

The objective of the NAPA project for Vanuatu was to develop a country-wide programme of immediate and urgent project-based adaptation activities in priority sectors, in order to address the current and anticipated adverse effects of climate change, including extreme events. The project provided an opportunity to facilitate dialogue and consultations designed to identify and elaborate the immediate and urgent adaptation issues and appropriate activities, by conducting a comprehensive assessment of the available and necessary information on Vanuatu's vulnerability to climate change and of the response measures and other activities needed to enhance the resilience of the most threatened parts of Vanuatu's natural heritage, society and economy.

Given Vanuatu's vulnerability status with regards to climate change and sea-level rise, the NAPA also served as an avenue to raise awareness and understanding at all levels in society, with respect to vulnerability and adaptation issues of greatest significance to the country. The initiatives that were undertaken to identify and implement appropriate activities to be implemented in priority sectors, in order to enhance the resilience of Vanuatu to climate change (including extreme events), through adaptation, were identified and documented.

The project was executed by the Vanuatu National Meteorological Services (VNMS) and was overseen by the National Advisory Committee on Climate Change (NACCC). The NACCC is mandated by the Government to oversee the coordination of all climate change initiatives or programmes emanating from the UNFCCC processes including projects such as the Second National Communication, CBDAMPIC, the proposed PACC project and activities relating to the UNCCD and UNCBD,. This ensured the desired synergies with the NAPA project.

The prioritized project concepts under NAPA takes careful account of these ongoing and proposed activities, and ensures complementarity. In particular, sectors such as agriculture and forestry where there are ongoing activities by FAO, SPC,and other regional and international organizations, the proposed activities are designed to add on to the work, and essentially climate proof the development policies and plans.

The project was completed in 4 stages:

| | |
|---|---|
| Stage 1: | Implementation and Institutional Arrangements for the NAPA Process |
| Stage 2: | Adaptation Assessments through stakeholder consultations at provincial level |
| Stage 3: | Prioritization of Urgent and Immediate Adaptation Activities |
| Stage 4: | Preparation and Endorsement of the National Adaptation Programme of Action |

Upon approval for implementation, the NAPA project commenced activities on October 2004. Following provincial consultations via three national conferences, visits were undertaken to the six provinces to ascertain information on vulnerabilities that were presented during the consultations. This enabled the verification of specific information relating to the localities and the relevant sectors.

Existing information including data collected from NAPA rapid Vulnerability and Assessments (V&A) and information generated from three national climate change conferences were utilized to carry out further consultations in order to enable the completion of the NAPA document.

The final list of projects for Vanuatu were determined as follows

- Agriculture & food security (preservation/processing/marketing, modern & traditional practices, bartering)
- Water management policies/programmes (including rainwater harvesting)
- Sustainable tourism
- Community based marine resource management programmes (modern & traditional, aqua-culture)

- Sustainable forestry management

Some of the project concepts are less detailed at this stage, but this is some thing that can be overcome during the active development of the project proposal.

The report however does justice in reflecting the urgent and immediate concerns of Vanuatu in relation to adaptation to climate change for Vanuatu and is a solid basis for further work.

## Background and setting

1. Vanuatu is an archipelago of volcanic islands and submarine volcanoes located between latitude 12$^{o}$ and 23$^{o}$ south and longitude 166$^{o}$ to 173$^{o}$ east, some 1,300 km from north to south in the Western Pacific Ocean (Figure 1). It comprises over 80 islands with land area of 12,336 km$^{-2}$ and a maritime exclusive economic zone of 680,000 km$^{-2}$. The two largest islands, Espiritu Santo and Malekula comprise nearly 50% of the total land mass. The total coastline is about 2,528 km long.

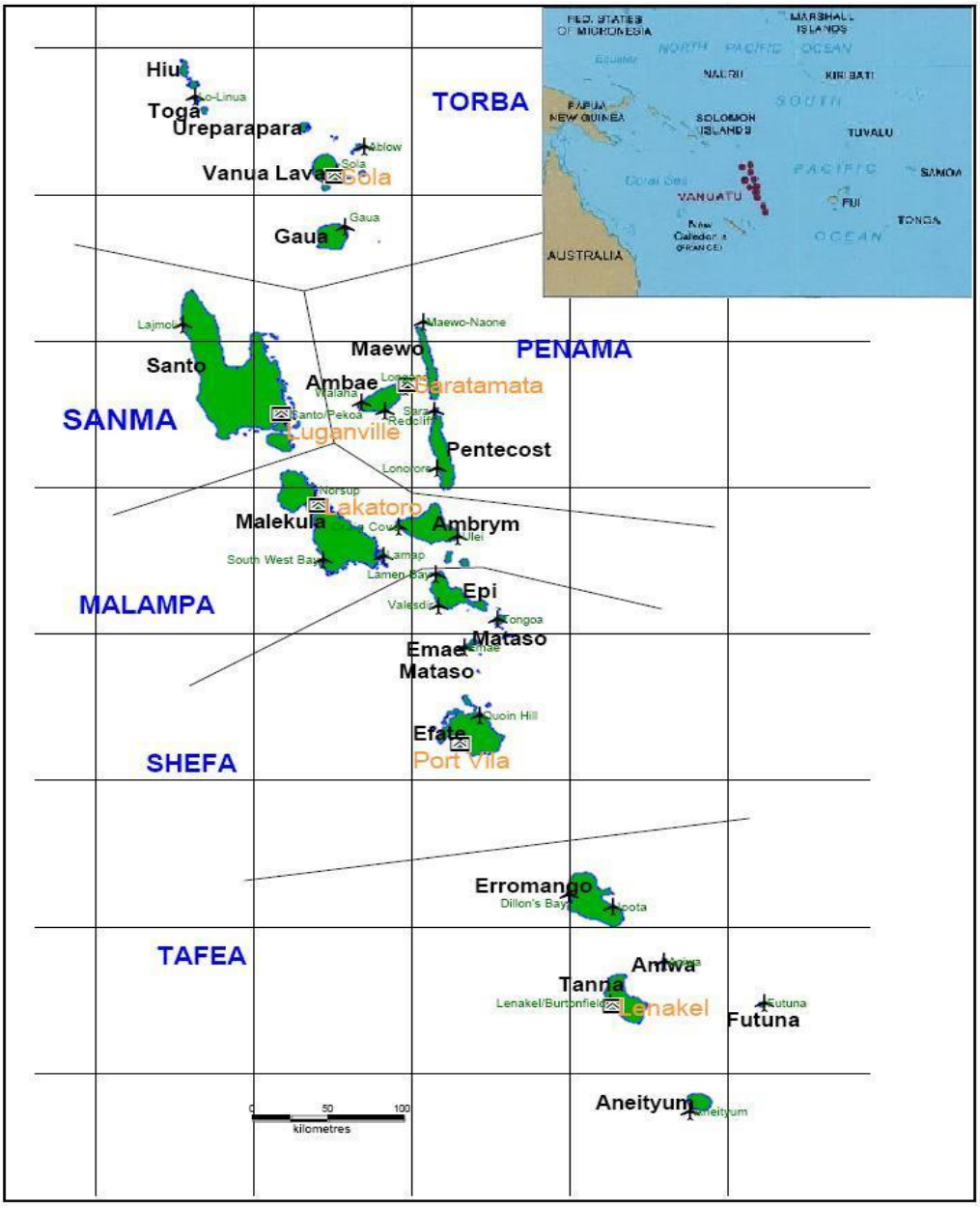



Figure1. Map of Vanuatu

2. The estimated population of Vanuatu is 209,920 (Agricultural census, 2006), with an annual population growth rate of 2.6% distributed amongst 36,415 households. This represents an increase of 6897 households, in 1999, when the national population was 186,678. The distribution of the population and households in terms of the various provinces is given in the table below:

| **Province** | **Number of households** | | **Population** | |
|---|---|---|---|---|
| | **2006** | **1999** | **2006** | **1999** |
| **Shefa** | 12,870 | 10,888 | 68,706 | 54,439 |
| **Sanma** | 8,272 | 6,970 | 41,596 | 36,084 |
| **Malampa** | 7,348 | 6,483 | 34,925 | 32,705 |
| **Penama** | 6,447 | 5,371 | 26,676 | 26,646 |
| **Tafea** | 6,577 | 5,364 | 29,398 | 29,047 |
| **Torba** | 1,798 | 1,339 | 8,620 | 7,757 |
| | | | | |
| **Vanuatu** | 43,312 | 36,415 | 209,920 | 186,678 |

*Source: Population and Housing Census 1999 and Agricultural Census 2006*

This represents approximately 16% of the population in Port Vila and 6% on Luganville, the two main urban centres. This means about 80% of the population live in other provinces and islands, and can be classified as rural.

Inter-island and intra-island travel and communications is difficult and expensive. The large volcanic islands with its rugged terrain and tropical forest means that villages tend to be scattered and separated over large distances. The number of telecomunication facilities is often very limited on islands with national radio reception lacking in many areas

3. The limited road networks are confined to the larger islands, mainly around the major population centers situated on the coasts. There are regular shipping services to the central islands, but the outer islands are serviced very irregularly. Air Vanuatu, a locally owned company which operates domestic and international flights, provides daily passenger and cargo flights between Efate, Tanna, Malekula and Santo, but many of the smaller, more remote islands are served only 2 or 3 times per week. Many of the smaller islands do not even have airstrips. In terms of infrastructure, Vanuatu has 29 airports (5 paved and 24 unpaved) and approximately 1,894 km of roadways (. 111 km paved and 1,783 km unpaved), and two main ports and terminals, , Port Vila and Santo.

4. The climate in Vanuatu varies from wet tropical in the northern islands to dryer sub-tropical in the south of the archipelago. Average temperatures range between 21$^{o}$C and 27$^{o}$C and average humidity ranges between 75% and 80%. Average annual rainfall declines from over 4000mm in the north to less than 1500mm in the south.(Mourgues,2005) The country is prone to cyclones during the warmer months from November to April, although cyclones have recently shown signs of development outside this season (Cyclone Rita May 1991 & Cyclone Gina, June 2002). Vanuatu is also vulnerable respectively to anomalously long dry spells and prolonged wet conditions associated with the El Nino (warm phase) and La Nina (cool phase) of the El Nino-Southern Oscillation (ENSO) phenomenon. It is also highly vulnerable to other extreme climate events including, storm surges, coastal,, river flooding, land-slides and hailstorms.

6. Vanuatu is vulnerable to a broad range of natural disasters. Earthquakes are frequent and they often originate at considerable depth and are therefore not too destructive (large magnitude but low density). Nevertheless, some earthquakes have caused extended damages in the past. Some fault movements have in the past produced changes in shoreline elevations of up to two meters as islands have titled. Destructive tidal waves (tsunami) occur occasionally as the result of earthquakes.(Mourgues,2005)

7. In a report for the International Decade for Natural Disaster Reduction for the Pacific Island Countries, Vanuatu was classified as highly vulnerable to all natural hazards: tropical cyclone, storm surge, coastal flood, river flood, drought, earthquake, land-slide, tsunami and volcanic eruption. (UNFPA,1996)

8. Vanuatu was admitted to the group of Least Developed Countries (LDCs) in 1995.Today it is still part of this group although its per-capita GDP exceeds the LDC threshold. This situation has occurred due to the adjustment based on the 'vulnerability index' which takes into account the vulnerability of Vanuatu's economy to natural disasters.(Mourgues,2005)

- **Gross National Income per capita:** The threshold for inclusion was calculated at $745, a three-year (2002-2004) average Gross National Income (GNI) per capita of the low-income threshold established by the World Bank, based on the World Bank Atlas method[1]
- **A Human Assets Index (HAI)**: The HAI used is a combination of four indicators, two for health and nutrition and two for education: (a) the percentage of population and undernourished; (b) the mortality rate for children aged five years or under; (c) the gross secondary school enrolment ration; and (d) the adult literacy rate. The HAI for LDCs is generally between 58 and 64.
- **Economic Vulnerability Index (EVI)**: The EVI reflects the risk posed to a country's development by exogenous shocks, the impact of which depends on the magnitude of the shocks and on structural characteristics that determine the extent to which the country would be affected by such shocks. The EVI is a combination of seven indicators: (a) population size; (b) remoteness; (c) merchandise export concentration; (d) share of agriculture, forestry and fisheries in gross domestic product; (e) homelessness owing to natural disasters; (f) instability of agricultural production; and (g) instability of exports of goods and services.

9 The key economic indicators for Vanuatu is summarized in the table below:

| Item | 2000 | 2004 |
|---|---|---|
| 1. Economic growth | | |
| GDP growth rate in real terms (% pa) | 2.7 | 3.7 |
| GDP growth in nominal terms (% pa) | 3.9 | 5.2 |
| Consumer prices – rate of change (% pa) | 2.5 | 0.8 |
| 2. Personal Incomes | | |
| Income per person in purchasing power terms (US$) | 787-13 | 796-83 |
| 3. External Debt | | |
| External debt as proportion of GDP (%) | 28.2 | 26.9 |
| External debt servicing as a proportion of GDP (%) | 0.9 | 1.7 |
| 4. Exports | | |
| Principal exports as a proportion of GDP (%) | 9.5 | 9.3 |

10. According to the 'Priorities and Action Agenda for Vanuatu 2006 – 2015', the country's economic performance has been characterized by generally low rates of economic growth, although there has been an upturn in the last three years. This has been compounded by rapid population growth, leading to a decline in per capita income by 18% between 1994 and 2003. There seems to be increasing unemployment leading to increasing levels of hardship and poverty.

11 The principal development constraints facing Vanuatu can be summarized as:

- Widely scattered islands and mountainous terrain
- Vulnerability to natural disasters
- Small domestic market with little potential for economies of scale
- Increasingly competitive international markets for tourism and investment
- Social and cultural system with limited understanding and experience with business concepts and practices

12. Notwithstanding the relatively small, open economy with many development and structural constraints, the nation possesses important advantages such as:

- Strong traditional culture that promotes social stability and family values
- Fertile, natural resources and unspoilt environment.

**Key sectors and vulnerabilities**

13. The economy of the country comprises a large smallholder subsistence agricultural sector and a small monetized sector. Small-scale agriculture provides for over 65% of the population while fishing, offshore financial services and tourism also contribute to the government revenues. The main agricultural products are copra, kava *(Piper methysticum)*, cocoa, coffee, taro, yams, fruits and vegetables, beef and fish. In 2003, the national gross domestic product (GDP) was estimated at US$580 million with per capita GDP at US$2,900. As a proportion of GDP, agriculture accounts for 14.9% industry 8.5% and service sector 76.6% Real GDP per capita is still lower than in the early 1980s, due largely to the lack of long-term growth in agriculture and fisheries. Since 2003, the agriculture sector has grown at an annual rate of 3.3% compared to the 2.8% growth for the economy and average population growth rate of 2.6% pa.

.14.The domestic market for agricultural products is limited. While approximately 80% of the population reside in rural areas and depend on agriculture for their livelihood, productivity, particularly in the traditional crops sector is quite low. The challenge in agriculture is to increase production and productivity and improve marketing systems and market access for both traditional food crops and high value specialty commodities.

15.The fisheries sector contributes approximately 1% to the overall GDP and makes up only 5.5% of the primary production sector.(Statistics Office,2000) Although the fisheries sector has a good potential for exploitation it is not being properly exploited. The reef fisheries are over-fished in some areas, notably in the vicinity of Efate, but are generally under–exploited near the outer islands. The Fisheries Department does not have the sufficient resources to monitor the tuna catch in Vanuatu waters. Improvements in catching, handling and marketing systems and commercialization of the domestic sector are badly needed. However, it is unlikely that the fisheries resources are sufficient to supply the demands of the rapidly growing population from local fish stocks. The coastal fisheries sector, which contributes significantly to the rural income, nutrition and self reliance, is particularly vulnerable to the impacts of climate change due to the enhanced coastal erosion, sedimentation and over exploitation. There is a perceived threat to the biodiversity given the demands from the growing coastal population. In addition to the need for awareness raising, education and capacity building, there is a pressing need to promote conservation and sustainable fisheries programmes, in conjunction with local communities.

16. Some 36% of the total land in Vanuatu is forested. The loggable forest area is about 27% of the total forest area. This is mainly due to the poor quality of timber and difficulty in assessing the sites.(Department of Forests,1999) Nevertheless, the forestry sector presents considerable opportunities: Vanuatu possesses excellent soils and climate that are conducive to timber production. The challenges for this sector include replanting, at least at a rate that replenishes the harvested amount, utilization of additional species and development of value-added processing. Development of a sustainable forestry management plan is imperative for the significant forestry resources. Several innovations such as commercial tree plantations, expansion of agro-forestry and increased use of non-wood forest products have been undertaken. There is no mechanism currently for identifying and promoting conservation areas The Code of Logging Practice 1999 sets minimum standards which will allow selected forest areas in Vanuatu to be harvested with minimum adverse impact. It balances the need

for protection of environmental values with safety and commercial considerations. The Forestry Act 2001 makes provision for the protection, development and sustainable management of forests and regulations of the forestry industry in Vanuatu. (Department of Forests, 1999) Concerns are essentially related to climate change which will be an added stress to the sector, and if not addressed adequately, will have a significant impact on livelihoods and the economy.

17. Soil degradation is an important issue affecting agriculture. The traditional practice of shifting cultivation that allowed the soil to go through a process of regeneration by being left idle for extended periods ranging from 5-10 years is no longer possible. With the increasing population, the fallow periods are being shortened, adding to the soil degradation. Climate variability and extreme events such as droughts and floods will exacerbate the impact on the land, and in turn on the agricultural productivity. Agro-forestry and improved farming systems are being promoted as means to reduce soil degradation.

18. With the added stress due to climate and soil, there is an urgent need to look at alternative species to be able to sustain the livelihoods of people directly dependent on this sector. A lack of research in this area is a critical issue for Vanuatu. And there is a need to maintain and promote some of the traditional food crops that have sustained the Ni-Vanuatu people over generations, and may prove a reliable alternative in the face of impacts due to the added stress from extreme events.

19. Vanuatu has one of the most conducive environments for raising beef cattle. The production of beef, pork, poultry and sheep and goat for local consumption forms an essential part of the rural economy. Any improvement in the capacity to produce, process and market these products will have a positive impact on the livelihoods and economy. The increased demand for land, and its enhanced degradation due to climate extremes and other hazards have added to the challenges of this sector. Whilst there are several policies put in place by the Government to increase the productivity from this sector, this will not be realized if the anticipated impacts of climate change and variability are not considered.

20. The primary sector – agriculture, forestry and fisheries- accounts for 14.9% of total GDP. Agriculture and tourism are the principal productive sectors and nearly all domestic exports are primary goods such as copra (26% in 2003) and cocoa (11%). Cocoa exports however declined from 7% in 2003 to 3% in 2004 due to the damage caused by Cyclone Ivy in early 2004. Tourism is expanding as tourist arrivals increased by 25% in 2003 compared to 1997 levels. It is an important source of revenue for Vanuatu and it accounted for 40% of the GDP in 2000 (Statistics Office,2000)

21. Whilst Vanuatu offers great potential in terms of harnessing its natural resources, thereby raising incomes, providing employment and strengthening food security, there is a recognition for the need to strengthen existing customary measures to sustain the environment. This also underscores the central role of land and environment to the ni-Vanuatu culture. Given the vulnerability of Vanuatu to almost all climatic hazards, including cyclones, droughts, floods and coastal erosion, the sustainability of the environment is of paramount importance.

**Vanuatu's Vulnerability**

23. Climate-related disasters have had huge impacts on the economic growth and national development. Tropical cyclones Uma, Anne and Bola that hit Vanuatu during 1987 – 88, were the cause of significant economic and social costs. Approximately 50 deaths were reported, a number of inter-island coastal trading vessels were lost, and massive damages sustained by the agriculture and tourism industries. The total destruction of property was valued at over US$152 million In 1999, heavy rain associated with tropical cyclone Dani caused serious damage, estimated at US$8m to infrastructure.

24. A vulnerability and adaptation assessment was done as part of Vanuatu's Initial National Communication (INC) . However, these were first order assessments, without the necessary rigour and scientific analysis. This was largely due to the small amount of resources allocated to this sector, as well as the lack of expertise to carry out detailed analysis.

25. The SCENGEN scenario generator was used to generate climatic scenarios for the country. The results using the Global Circulation Models: HADCM2 and CSIRO9M2. were compared with analogue predictions based on observation of past trends. The two climate change scenarios predict increases in temperature of between one and two degrees up to the year 2050. However, the scenarios with respect to rainfall are quite different. The sea-level increase of 50 cm over the next 100 years is well within the predictions by the IPCC Third Assessment Report (TAR).

26. Observational records for Vanuatu's two main urban centres began in 1949 for Port Vila and 1973 for Luganville. The trends suggest a gradual increase in temperature which becomes more marked in the south. Records from both centres suggest a gradual decline in rainfall.

27. There has been a significant increase in the frequency of tropical cyclones in the country as a whole over the record period. A total of 124 tropical cyclones had affected Vanuatu since 1939. Forty-five (36%) of these were categorized as having hurricane force winds (>64 knots), twenty-six (21%) were of storm force winds (48 - 63 Knots) and twenty-five (20%) were of gale force winds (34 - 47 knots). An additional 28 tropical cyclones were not categorized.

28. The results of the climate scenario models and historical/observational trends point to warmer and drier conditions in much of Vanuatu. The magnitude of the expected change is likely to increase away from the equator. However, it is likely that some parts of the country may receive increased rainfall, due largely to the frequent tropical depressions and storms that are likely to develop around Vanuatu waters .It is also likely that the cyclones will become more intense and more frequent. The HADCM2 model indicates there may be more frequent El Nino type conditions associated with prolonged dry seasons.

29. Climate change is likely to impact on all sectors that are pertinent to the sustainable development of Vanuatu. As an LDC, the country will be severely constrained financially and in terms of human and institutional capacity, to meet the challenges of this additional stress. For the Ni-Vanuatu, their livelihood and social structure are inextricably linked to the natural environment and its resource base. Any perturbations to this availability of natural

resources will have a direct bearing on the poverty levels and the very survival of the people. Changes to the traditional social system, coupled with any decrease in food security and water availability, could lead to deterioration of social systems and law and order.

The following paragraphs describe the importance of some of the key sectors to the economy and the sustainable livelihood of the communities.

30. Agriculture often relies on rain-fed agricultural production systems. Any changes in rainfall distribution, both in terms of the amounts of rain and its spatial as well as temporal distribution , could have severe impacts on agricultural production. Intense and prolonged rainfall in planting seasons could damage seedlings, reduce growth and provide conditions that promote plant pests and diseases. Moreover this could lead to greater frequency and intensity of flash floods leading to soil erosion and flooding of agricultural land. Drought combined with higher temperatures would lead to greater evaporation, reduced availability of water for agriculture and added thermal stress on plant. These characteristics, often associated with the El Nino phase, was experienced during the late 1990's.

31. Most of Vanuatu's urban centres and outer islands are dependent on ground water for drinking, given the limited surface water. Increased temperatures are likely to increase the demand for potable water. Increased radiative load, greater run-off from high intensity rainfall events, decreased rainfall and associated increase in evaporation could reduce the rate of ground water recharge. Water shortages are already apparent in dry seasons in many areas. These would become more pronounced and require more sophisticated technology to provide for drinking water of the populations. Higher intensity rainfall could lead to erosion, and greater sedimentation and contamination of drinking water.

32. Increase in sea level could cause salt-water intrusion into the shallow ground water lens in coastal areas. This would impact on both the agriculture sector in these areas as well as the availability of potable water. This effect would be most pronounced in small low-lying islands that are dependent on shallow ground water aquifers.

33. Much of the infrastructure, including the main commercial centres of Port Vila and Luganville, is located on the perimeter of the major islands. These centres are only a few metres above sea level. Moreover, much of the road network is also situated on the perimeter of the islands. The infrastructure and other fixed assets are extremely vulnerable to cyclone and, storm surges. These areas will be affected by even small increases in sea levels due to the larger surges associated with increased frequency and intensity of tropical cyclones. Enhanced human activities in the coastal areas, including sand extraction and mangrove and other coastal vegetation removal has increased the sensitivity of these important coastal buffers to climate and sea level variations. This is due to either a lack of enforcement of existing legislations or because of ignorance and the lack of proper management systems.

34. Forests have always been an integral part of lives of the people of Vanuatu and have played an important role in the general welfare of local communities. Within the household, the forests have always provided timber, posts, thatch, food, fuel-wood and traditional medicine. Environmentally, forests and trees act as soil and water protectors, and shelter from sun, rain and wind – all crucial to the sustainable livelihoods of the people in this island nation . Notwithstanding the fact that the forestry sector earns around 13% of the total export revenue for Vanuatu, the total value of the forests cannot be measured purely in economic

terms. The forests are a vital part of the country's cultural heritage and contribute to the welfare and economic development of the people. The effect of climate change on this important sector remains largely unknown, although the effects of rainfall distribution, temperature and other climate stresses are likely to impact negatively on many species and the rich forest biodiversity. The increased demand for agricultural land, and indiscriminate logging are causes of enhanced deforestation, something that is likely to be exacerbated due to climate change.

35. Vanuatu is experiencing increased population pressures due to the high rate of population growth. This is clearly impacting on the availability of land for agriculture and sustenance, and has serious implications for food security, nutrition and health. Population growth, particularly in urban areas, has already placed pressure on water resources and supply services. Climate change is likely to increase demand for water while impacting on the quality and availability of water resources.

36. The health sector in Vanuatu is likely to be severely impacted due to the projected climate changes. Malaria is already endemic to certain areas of Vanuatu and there is some evidence to suggest that these areas are extending southwards. Other tropical and vector borne disease such as dengue, and water related diseases such as dysentery and diarrhoea are also likely to increase. Other problems associated with the increased temperature, such as contamination of food and heat stress are likely to be exacerbated.

37. Tourism is increasing in importance as one of the key foreign exchange earner for Vanuatu. Much of the infrastructure, infrastructure support services and the attractive features, for the tourist is situated in the costal sector. Increased sea level rise and coastal degradation is likely to impact severely on this sector. There is an urgent need to implement existing policies and strategies and where necessary, put in place mechanisms, that will not only prevent the effects on the coastal areas but will also encourage the sustainability of the tourism sector.

38. As for most small islands, the sea, oceans and the coastal areas play an important part in the lives of the people, as a source of food, transport and livelihood. Most coastal people rely on fishing as an important source of protein and income. Climate change is likely to impact directly on marine resources through its effect on marine ecosystems such as mangroves and reefs. Furthermore, enhanced sedimentation due to soil erosion from agricultural and forestry practices will have a profound effect on the availability of marine resources. There is some concern about the possible increase in ciguatera poisoning due to the increased temperatures of the oceans ,marine pollution from land-based activities and sedimentation of coastal areas and water run off.

39. The effects of climate change on agriculture production, human health and well being will have the consequences of decreasing national income while increasing key social and infrastructure costs. This negative economic impact will affect all levels: individual, household, community, private and government sector.

## Framework for Adaptation Program

### NAPA process

40. In 1989 Vanuatu established a National Advisory Committee on Climate Change (NACCC), a multi-disciplinary team that draws its membership from different government agencies, civil society and other relevant stakeholder., Its terms of reference include:

    (i) Provision of operational directives to the NACCC Secretariat,
    (ii) Make informed consensus decisions on issues arising from the Climate Change Convention, Kyoto Protocol and any future Plans for Action as decided by the Conferences of the Parties,
    (iii) Facilitating political inclusion in the national climate change process, particularly to encourage appropriate policy development to enable effective national responses to climate change.
    (iv) Coordinate International Climate Change negotiations, ensuring consistency, relevancy and real benefits to Vanuatu in participation,
    (v) Inform respective departments on Climate Change issues, particularly consideration of climate change issues in sectoral policies and other department plans,
    (vi) Monitor and facilitate the work of the Greenhouse Gas Inventory Network, detailed in Chapter 6 of the National Climate Change Policy, and including any relevant data collection and information systems.
    (vii) Ensure that the Department responsible for settling the financial contributions of Vanuatu to the UNFCCC is accorded.
    (viii) Recognize and encourage human resource development in the field of scientific research and development, including the formulations of projects and joint projects, particularly in the context of Climate Change,
    (ix) Establish and coordinate the work of the National Group of Experts.
    (x) Ensure appropriate climate change act/legislation is enacted.
    (xi) Facilitate access to funding for the national climate change effort.

41. The NACCC has overseen the implementation of several major projects including:

- Completion of the Initial National Communications as part of the PICCAP, as part of Vanuatu's commitment under the UNFCCC. Vanuatu was amongst the first LDCs to submit its INC in 1999.

- Capacity Building for the Development of Adaptation Measures Project (CBDAMPIC) is at the final stage. The objective of the CBDAMPIC project is to demonstrate mainstreaming of adaptation measures as a practical means toward protecting, building and maintaining sustainable ni-Vanuatu communities and values in the face of present and future climate change and other human induced, and natural global change. The projects goal is to enable Vanuatu protect its environment through enhancement of national and community level capacity in

pursuance of sustainable development and achievement of improved livelihoods. The project has seen the implementation of the first ever-global climate change adaptation project in Vanuatu. This was the relocation of a settlement Lateau on Tegua, an island in Torba province in the Northern part of Vanuatu. This relocation was possible after vulnerability and adaptation assessment, community education and awareness were carried with the participation of the community. The community had faced regular inundation due to rising sea levels; water scarcity due to limited rainwater catchments and storage capacity; and as result serious health issues. With technical assistance of the NACCC, the entire settlement was relocated with the provision of the following basic amenities: five rainwater catchment facilities, an aid post, 6 rainwater storage tank and catchments, a church and capacity to access communication through MW radio frequencies.

- Pacific Islands Renewable Energy Programme (PIREP) under which an assessment of the key energy issues, barriers to the development of renewable energy to mitigate climate change, and capacity development needs for removing the barriers was undertaken.

- Pacific Islands Energy Policies and Strategic Action Planning (PIEPSAP) Project which aims to assist with the development of national energy policies and action plans to implement these policies.

- Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project (PIGGAREP) which aims at reducing growth of GHG emissions from fossil fuel use in the PICs through widespread and cost-effective use of renewable energy resources.

42. In addition to the National Advisory Committee on Climate Change (NACCC), there are a number of other committees that have been established to coordinate and facilitate the implementation of various agreements, and to ensure an integrated contribution to the sustainable development of Vanuatu. These include:

- The National Biodiversity Advisory Committee (responsible for the implementing the National Biodiversity Strategy Action Plan and the newly funded Landowners Conservation Initiative);
- The International Waters Project (IWP) Task Force (responsible for implementing the Vanuatu Strategic Action Programme for IWP;
- The National Water Committee (for implementing and developing best practices in watershed and catchments e.g. Tagabe Catchments Protection Initiative); and
- The Persistent Organic Pollutants (POPs) Project Advisory Committee

In respect of Projects, Vanuatu is currently implementing several GEF projects that would reduce its vulnerability to climate change, while at the same time contribute to the country's wider sustainable development goals. The projects include:

- Pacific Islands Global Climate Observing System (PIGCOS) that is designed to enhance observations of climate and provide a more comprehensive data base for more accurate predictions and decision making.
- Promotion of Renewable Energy Efficiency and Greenhouse Gas Abatement- a project designed to promote investment in renewable energy, energy efficiency and greenhouse gas abatement technologies, in order to increase access to energy services by the least advantaged, realize other development objectives and help reduce greenhouse gas emissions;
- Pacific Islands Renewable Energy Project (PIREP)-a project that is designed to facilitate the promotion of the widespread implementation and ultimately, commercialization of renewable energy technologies, through the establishment of a suitable enabling environment.
- Persistent Organic Pollutants (POPs) Project-with financial assistance from GEF and UNEP, Vanuatu is currently developing its National Implementation Plan (NIP) through the enabling activities of the Stockholm Convention. The NIP seeks to control the importation, use and releases of POPs.
- National Biodiversity Strategy Action Plan (NBSAP) Project- this project has now been completed, though a newly funded initiative to build capacity at the community level-Landowners Conservation Initiative Project has just got off the ground. Nonetheless through the CBD, UNDP/GEF funded biodiversity enabling activities that resulted in other tangible outputs including the new project namely; the First, Second and Third National Reports to the COP, the National Biodiversity Strategy Action Plan (NBSAP), technical reports and information materials.
- Vanuatu Strategic Action Programme for International Waters Project (IWP) - International Waters. The Vanuatu project is currently implementing a pilot project on Crab Bay, Malekula, in the focal area of inshore fisheries resources management in collaboration with the MALAMPA Provincial Authority and the Crab Bay Community to identify the root causes of problems affecting inshore fisheries resources in the area, identify practical solutions to develop future mitigating measures for wider application in coastal communities not only in Vanuatu but the region as a whole.
- World Summit on Sustainable Development (WSSD) Report-Vanuatu produced a National Assessment Report, whereby stakeholders including civil society organizations, contributed to its preparation through a participatory process. One of the priority issues identified by the WSSD National Assessment Report is the country's vulnerability and adaptation to climate change and the need to fully integrate climate change adaptation and sea level rise into national and sectoral development policies.

This important report also notes that ni-Vanuatu have an in-depth knowledge of their environment and are familiar with subtle changes in climate, resource stocks and environmental conditions e.g. poor root crops harvest especially yams. Adaptation to these changes is deemed crucial and critical to the well being of the communities especially as the environment is their source and means for livelihood through

subsistence farming, fishing and other agricultural practices. The WSSD report calls for more inter-sectoral and multi-sectoral collaboration and cooperation to sustainable development initiatives that recognize, appreciate and incorporate traditional knowledge, approaches and practices to ensure true sustainability.

- The government is promoting CHARM, Disaster Risk Reduction (DRR) and Disaster Management (DM) through the National Disaster Management Office (NDMO) with the overall objective that communities at all levels are aware of the hazards that exist and the level of risk to a vulnerable group as well as identifying adaptive or mitigation measures to reduce the impact on lives, property and socio-economic development.

  The NDMO under the Ministry of Internal Affairs (MoIA) is mandated under the National Disaster Act No.1 of 2000 to: develop strategies for the prevention of, preparation for, response to and recover from a natural disaster and ensure that strategies are implemented to counter the effects of a disaster.

  To date there is a National Disaster Plan and only the Ministry of Health (MoH) has developed its Disaster Plan to operationalise the national plan. The MoH Disaster Plan has been very useful as it identifies the major risks that any health facility throughout Vanuatu could be faced with such as earthquakes, droughts, and tropical cyclones and also identifies climate change and sea level rise as a pre-requisite for sitting any health facility.

43. These reports formed the basis for identifying the 'urgent and immediate' adaptation needs for Vanuatu. Using the assessments from these reports, and the current understanding of the science, the NACCC carried out detailed provincial consultations.

**Potential NAPA interventions**

44. During the provincial NAPA consultations, significant input by relevant government agencies and Provincial Governments, NGOs and communities identified that water, coastal zone resources, agriculture and health sectors were those that are already affected under current climatic conditions. Any future climate change will further aggravate impacts currently being observed or experienced by those sectors.

45. Water scarce areas including rain-shadow areas and small islands that depend entirely on rainwater and groundwater experience severe water shortage in the events of droughts and El Nino events. Often such communities are isolated with limited economic opportunities hence lack the capacity to afford water harvesting, storage facilities and distribution facilities. Any future climate change is most likely to compound current difficulties in such areas.

46. A large proportion of Vanuatu's rural population of 80% is concentrated on the coast, often on low lying areas. Coastal erosion and inundation are severe in many areas and pose a real threat to human lives, settlements and coastal infrastructure. Salination of ground water resources is significant in this sector and is already affecting the livelihood of some communities.

47. Agricultural crops are showing signs of stress under current climatic conditions. There is a need to change agricultural practices, crop varieties and diversify to crops that are resilient to climate change conditions.

48. Health problems are very much interwoven with the negative effects of climate change on specific sectors. Expansion of mosquito distribution, increased incidences of skin infections, gastroenterities and fish poisoning are emerging problems in communities.

49. The following table summarises the main climate issues and possible adaptation options.

| **TORBA Province** | |
|---|---|
| **Climate Change Issue and Vulnerabilities** | **Adaptation Options** |
| Coastal erosion cyclones & flooding | • Relocation of settlements and relevant infrastructures<br>• Demarcation of hazard and risk areas<br>• Develop provincial adaptation plans or incorporation of climate change into provincial planning |
| Scarcity of sustainable water sources and salination of groundwater resources (Ureparapara, Mota Lava, Mota, Torres & Mere Lava) | Increase rainwater catchment and storage capacity or establish mini- desalination plants |

| | |
|---|---|
| Intrusion of saltwater into water taro plots (Vanua Lava) | Improve and diversify agricultural crops |
| Conflict with traditional calendars and natural indicators | Improve climate change understanding at provincial and community levels |
| **SANMA Province** | |
| **Climate Change Issue and Vulnerabilities** | **Adaptation Options** |
| Coastal erosion, cyclones & flooding (prolonged and intense rainfall) Threatening, tourism, coastal and other major infrastructure | • Develop provincial adaptation plans or incorporation of climate change into provincial planning<br>• Relocation of settlements and relevant infrastructure<br>• Demarcation of hazard and risk areas |
| Limited understanding of climate change | Improve climate change understanding at provincial and community levels |
| Water scarce areas vulnerable to droughts | • Increase rainwater catchment and storage capacity<br>• Establish water distribution facilities |
| Salination of groundwater resources | • Increase rainwater catchment and storage capacity<br>• Establish water distribution facilities |
| Agricultural crops affected by increased temperatures, cyclones and prolonged/intense rainfall | • Diversification of crops and improve crop varieties<br>• Carry out study on farm irrigation |
| Increased ciguatera incidences | • Establish provincial ICZM plan<br>• Improve climate change understanding at provincial and community levels |
| **PENAMA Province** | |
| **Climate Change Issues and Vulnerabilities** | **Adaptation Options** |
| Coastal erosion, cyclones & flooding (prolonged and intense rainfall) Threatening, tourism, coastal and other major infrastructure | • Develop provincial adaptation plans or incorporation of climate change into provincial planning<br>• Relocation of settlements and relevant infrastructure<br>• Demarcation of hazard and risk areas<br>• Replanting of coastal vegetation to protect coastline<br>• Ban/control sand mining<br>• Establish provincial ICZM plan |

| | |
|---|---|
| | • Improve climate change understanding at provincial and community levels |
| Agricultural crops affected by increased temperatures, cyclones and prolonged/intense rainfall | • Diversification of crops, improve crop varieties and implement agricultural best practices<br>• Revival of traditional food preservation techniques |
| Salination of groundwater resources and limited reliable water sources | • Increase rainwater catchment and storage capacity<br>• Establish water distribution facilities<br>• En-act bylaw to protect and manage water shed areas |
| Expansion of mosquito distribution inland | • Implement malaria control measures |
| **MALAMPA Province** | |
| **Climate Change Issues and Vulnerabilities** | **Adaptation Options** |
| Coastal erosion, cyclones and flooding (Most settlements and infrastructure concentrated on the coast) | • Relocation of settlements and relevant infrastructures<br>• Demarcation of hazard and risk areas<br>• Develop provincial adaptation plans or incorporation of climate change into provincial planning<br>• Replanting of trees with the assistance of the department of forests.<br>• Encourage the re-vegetation of coastal species with the assistance of the department of Forests to curb coastal erosion<br>• Encourage establishment of protected areas to ensure sustainability of terrestrial and marine resources |
| Salination of groundwater resources and limited reliable water sources<br><br>El Nino events result in drought | • Increase rainwater catchment and storage capacity<br>• Establish water distribution facilities<br>• En-act bylaw to protect and manage water shed areas |
| Land slides associated with prolonged and intense rainfall | • Demarcation of hazard and risk areas |

| | |
|---|---|
| | • Implement best agricultural practices in sloping areas |
| Farming and logging in water catchment areas | • Control the issuance of logging licenses and closely monitor logging and farming activities<br>• En-act bylaw to protect and manage water shed areas |
| **SHEFA Province** | |
| **Climate Change Issues and Vulnerabilities** | **Adaptation Options** |
| Coastal erosion, cyclones, flooding<br>(Most settlements and infrastructure concentrated on the coast) | • Relocation of settlements and relevant infrastructures<br>• Demarcation of hazard and risk areas<br>• Develop provincial adaptation plans or incorporation of climate change into provincial planning<br>• Replanting of trees with the assistance of the department of forests.<br>• Encourage the re-vegetation of coastal species with the assistance |
| Declining crop production | • Develop improved crop varieties and implement best agricultural practices and diversification of crops |
| Significant vulnerability to droughts especially on smaller islands due to lack/limited underground water and limited capacity to capture and store rainwater | • Increase rainwater catchment and storage capacity |
| Farming & logging in water catchment areas | • Ban/control sand mining and develop ICZM plan<br>• Establish reserve in central Efate. |
| **TAFEA Province** | |
| **Climate Change Issues and Vulnerabilities** | **Adaptation Options** |
| Changes in temperature and rainfall patterns creating favorable conditions for pest activities (mosquito distribution expanding inland) | • Improve climate change understanding at provincial and community levels |
| Coastal erosion, cyclones, flooding<br>(Most settlements and infrastructure concentrated on the coast while | • Relocation of settlements and relevant infrastructures<br>• Demarcation of hazard and risk |

| | |
|---|---|
| infrastructure in Southern part of Tanna island very vulnerable to extreme events) | areas<br>• Develop provincial adaptation plans or incorporation of climate change into provincial planning<br>• Replanting of trees with the assistance of the department of forests.<br>• Encourage the re-vegetation of coastal species with the assistance |
| Agriculture sector, especially crop planting and harvesting are strictly governed by customary tradition. Though shift in climate patterns are being observed people are reluctant to change agricultural practices accordingly because of strict customary practices | • More awareness needed to improve the understanding of communities on climate |
| West part of Tanna experiencing prolonged droughts that are affecting agriculture and tourism sectors | • Development of improved crop varieties, best agricultural practices and diversification of crops |
| More people are using modern housing which are not resistant to climate change conditions | • Traditional practices (including housing) need to be revived to assist in the process of adaptation. |
| Salination of groundwater and limited sustainable water sources<br><br>Farming, logging and settlements around water catchment areas | • Increase rainwater catchment and storage capacity<br>• Establish water distribution facilities<br>• En-act bylaw to protect and manage water shed areas |

**Selecting NAPA Adaptation Options**

50. The next step in the NAPA process involved selecting priority strategies for adaptation, using country identified ranking criteria. This task was undertaken by the technical core group of the National Advisory Committee on Climate Change (NACCC). The team had at its disposal the reports and findings from the provincial workshops, reports from related projects and programmes such as CBDAMPIC, NCSA, UNCCD, UNCBD as well as the plans and frameworks from the relevant sectors such as agriculture and livestock, marine and fisheries, forestry and water.
51. The first part of the consultations entailed evaluation of the potential NAPA activities in light of national perspectives. Stakeholders went over the list of adaptation strategies suggested for various sectors and different regions, and rationalized these into a list that reflected the priority climate change issues in the country. The discussions were expanded to include any other strategies that may have been proposed as part of other national documents such as the 'Priorities and Action Agenda: 2006 -2015', 'Initial National Communications', 'National Biodiversity Conservation Strategy', and sectoral plans.

52. This resulted in the following adaptation strategies, not in any order of priority.
    i. Rainwater harvesting
    ii. Desalination & other alternative water sources
    iii. Water management policies/programmes
    iv. More resilient crop species including traditional varieties
    v. Agriculture & food security (preservation/processing/marketing, modern & traditional practices including bartering)
    vi. Agricultural land use planning and management (modern & traditional practices, early warning including traditional systems)
    vii. Community based marine resource management programmes (modern & traditional, aqua-culture)
    viii. Alternative fisheries (Fish Aggregating Devices (FAD) to promote pelagic fishing and deep water fisheries)
    ix. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)
    x. Relocation of vulnerable settlements and infrastructure
    xi. Develop Integrated Coastal Zone Management (ICZM), including mangroves & coastal flora management plan.
    xii. Sustainable land use management and planning
    xiii. Vector & water borne disease activities (modern & traditional)
    xiv. Enhance meteorological observations network nationwide (terrestrial & ocean) & develop early warning system using contemporary and traditional techniques
    xv. Sustainable Livestock farming and management
    xvi. Alternative sources of energy
    xvii. Energy conservation and efficiency programmes
    xviii. Sustainable forestry management
    xix. Sustainable tourism

It was stressed that that the following core issues were relevant to all suggested options and should be an integral part of any proposed activities:

- Awareness raising at all levels (communities to policy makers)
- Capacity building including institutional capacity
- Research and development
- Promotion of appropriate traditional knowledge and practices
- Technology Transfer
- Education and training
- Mainstreaming climate change issues
- Biodiversity issues are essential considerations in all issues relevant to marine terrestrial, forestry, land and agriculture

37. The next part of the exercise was developing country driven criteria for selecting priority activities to address the needs arising from adverse effects of climate change. The NAPA guidelines specify that a set of locally driven criteria should be chosen but should include (UNFCCC Decision 28/CP.7)

    Degree of adverse effects to climate changes

    Degree of poverty reduction

    Synergies with MEAs

    Cost effectiveness

53. There was extensive discussion on the criteria that are relevant and appropriate to Vanuatu. In particular, it was the general feeling that 'poverty' is not considered an issue for the country. The environment and culture are intrinsically linked, and the Ni-Vanuatu's livelihood is strongly allied to land. In general people feel they can maintain and sustain their livelihoods as long as they can provide for their sustenance from the land and marine resources. Thus, 'poverty reduction' as a criterion seemed at odds with the Vanuatu culture. It was proposed that 'sustaining livelihood' would probably be the more appropriate criterion.

54. After extensive debate, the following were adopted as the criteria that were more relevant to their unique situation:

    i. Impact on livelihood
    ii. Impact on economy
    iii. Impact on environment and biodiversity
    iv. Severity of CC Issues/Sensitivity of sector/degree of adverse effects
    v. Synergies with other MEAs
    vi. Cost – Capital, Operations and Maintenance

The first criteria relating to livelihoods relates not only to access to basic needs such as food, water, shelter, sanitation and health but also embraces the notion of fulfillment, empowerment and a sense of security for the community. The impact on economy is not entirely unrelated to the issue of livelihood, and includes economic/employment opportunities, as well as the importance of 'traditional' wealth

measured in terms of family links and support, and ownership of pigs, kava and mats. The traditional family links are very strong, and is a source of support during times of adversity. The added emphasis of the impact on environment and biodiversity underlines the special association of the Ni-Vanutau culture and the environment which goes well beyond simple synergies with other multi-lateral environmental agreements. The adverse effects cover the vulnerability to hazards as measured by the number of people, ecosystems, areas affected and the consequent impact on the infrastructure, economies and on traditional practices.

55. Various criteria that are used in the process of prioritization and screening of NAPA activities were discussed, and given the type of information available, in particular the dearth of cost figures, it was agreed that the use of 'Multi-Criteria Analysis (MCA)' is the most appropriate method for assessing NAPA adaptation options in this case.

56. After careful deliberations, it was also agreed that the options will be ranked on a scale 0 to 10 (with the reverse range, 10 to 0 for costs). The first step involved the ranking of the options by all participants on an individual basis. The matrix arising from these scoring is summarized in Annex 2. The options that scored the lowest were: i, ii, iii, iv, v, xiii, xiv, xvii

57. The exercise was repeated using the following weights for the criteria, which were arrived at after considerable deliberation:

| | |
|---|---|
| Criteria 1 | 0.3 |
| Criteria 2 | 0.2 |
| Criteria 3 | 0.1 |
| Criteria 4 | 0.1 |
| Criteria 5 | 0.1 |
| Criteria 6 | 0.2 |

The lowest options were: i, ii, viii, x, xii, xiv, xvi, xvii.

58. After further discussions, it was agreed that option (i) can be incorporated as part of option (iii) on water management. Options (ii), (viii), (x), (xii), (xiv), (xvi) and (xvii) were eliminated as lower priorities. However, these will be on the list of potential strategies that will form part of the NAPA document, but only the top 5 and 6 of these will be developed into project concepts.

59. The remaining 11 options were then subject to further ranking and prioritization resulting in the ranked priority adaptation options given in Annex 4.

60. The final list of adaptation strategies were ranked in the following descending order:

1. Agriculture & food security (preservation/processing/marketing, modern & traditional practices, bartering)
2. More resilient crop species including traditional varieties
3. Land use planning and management (modern & traditional agricultural practices, early warning including traditional systems)
4. Water management policies/programmes (including rainwater harvesting)
5. Sustainable forestry management
6. Community based marine resource management programmes (modern & traditional/aqua-culture)
7. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)
8. Sustainable Livestock farming and management
9. Develop Integrated Coastal Zone Management (ICZM) programmes, including mangroves & coastal flora management plan.
10. Sustainable tourism
11. Vector & water borne disease activities (modern & traditional)

61. It was noted that the top 3 ranked projects were from the agriculture sector. This was hardly surprising given the importance of this sector to the largely rural population of Vanuatu, and its vulnerability to climate change and climate variability. It was agreed that, notwithstanding the ranking, only one of the agricultural projects be prioritized for development as project concepts at this stage, opportunities being provided for the other sectors.

62. Other options were reprioritized given the importance of particular economic sectors such as tourism which is the main economic sector for Vanuatu, with a significant growth, and forestry that is one of the most important indigenous resources.

63. The priorities were then recast, for the purpose of concept development, as follows:

    a. Agriculture & food security (preservation/processing/marketing, modern & traditional practices, bartering)
    b. Water management policies/programmes (including rainwater harvesting)
    c. Sustainable forestry management
    d. Community based marine resource management programmes (modern & traditional, aqua-culture)
    e. Mainstream climate change considerations into infrastructure design and planning (modern & traditional, EIA)
    f. Sustainable livestock farming and management
    g. Sustainable tourism

64. It was also pointed out that due consideration be given to ongoing projects in some of these areas, and it was agreed that the sectoral representatives will provide this information for the project development phase.

65. Following feedback from the sectors, it became obvious that the Pacific Adaptation to Climate Change (PACC) project was focusing on the infrastructure issues as far as Vanuatu is concerned. It did not make sense to duplicate these efforts, and hence it was agreed to drop this sector as far as developing projects for NAPA was concerned, and focus on other important sectors, for example, tourism. The issue of livestock and management was also closely allied to the priority sectors of agriculture and forestry. These were therefore not considered as part of the five project concepts that were prioritized for possible development into adaptation projects for funding under the LDC and other adaptation funds.

# Part II: Project Concepts

## 1. Agriculture & Food security

**Project Goal:**
The overall goal of the project is to enhance food security and hence resilience of the economy to the adverse effects of climate change.

**Rationale:**
Low productivity and small holdings are the key constraints towards expansion and commercialization of agriculture in Vanuatu. There is little incentive to enhance productivity through use of modern methods and technology. The sector is also vulnerable to change in world prices. Copra and cocoa are the main commodities that have been affected by this to a large degree. Soil degradation is also affecting production. The traditional method of shifting cultivation is no longer practical given the increased demand for land from the rising population. Agro-forestry is being promoted, with the use of intercropping to reduce soil degradation, but its impact has been limited.

The increasing incidence of extreme events and climate change is adding to the stress on this sector. There is little additional information on the effect these changes will have on the other cash crops such as yams, taro and sweet potatoes that are important for the sustenance of the Ni-Vanutu people. The issue is further complicated by the lack of mechanisms to enhance storage to meet shortfalls during times of disasters. Climate related disasters are already impacting production through salt water intrusion, droughts, soil erosion and cyclones. The projected increase in cyclone frequency and intensity further heightens the vulnerability of the agriculture sector. Destructive winds and heavy rainfall associated with cyclone events may result in widespread crop damage.

Crop production has decreased significantly as a result of increased temperatures, more frequent and prolonged dry conditions and increased variability of rainfall. Pest activities have also increased with yams being the crop most affected by a tuba-eating beetle that induces rotting. Cyclone incidences however remain the major threat to the sector often severely damaging subsistence crops.

Annual average temperatures are projected to increase to 28.8 $^{o}$C and 29.7 $^{o}$C by 2050 and 2080 respectively under the selected climate change scenarios. With these projected elevation in temperatures, heat tolerance thresholds of crops are likely to be reached and most likely induce heat stress, wilting and crop failure. Subsistence crop production may fall as a result and in turn threaten food security on the island. Impacts may be aggravated in the event of El Nino episodes, which are expected to cause extreme dry spells in future. Furthermore, in a warmer environment, people will be forced to reduce working hours to the early hours of the morning and the cooler hours of the afternoon and early evenings, hence reducing productivity.

Increased precipitation scenarios may increase annual averages by 2001 mm by the 2050s and 280 mm by the 2080s. Prolonged wet conditions and warmer temperatures may create conditions favourable for pests and diseases, which may flourish and affect production and food security significantly.

Traditionally through a system of bartering, and shifting agriculture the people have managed to deal with these events. However, given the shortage of land and the increased incidence of these events, these mechanisms are no longer adequate. There have been some methods that have been employed to enhance storage and processing, and it is expected that this project will explore ways of adopting these for use throughout the country.

One of the successful practices that has been adopted in certain areas has been the use of a simple process for drying and preserving cassava – an important source of food for most rural communities. This is briefly illustrated below.

**Making of Portable Drying Frame for Cassava Chips**

Recommended structure is a (200 x 91) cm frame on which is stretched some chicken wire covered by some mosquito net. These frames allow for the drying of up to 12 kg of fresh cassava over two to three sunny days.

**1. Cutting the chicken wire**

**2. Stretching the chicken wire on the frame**

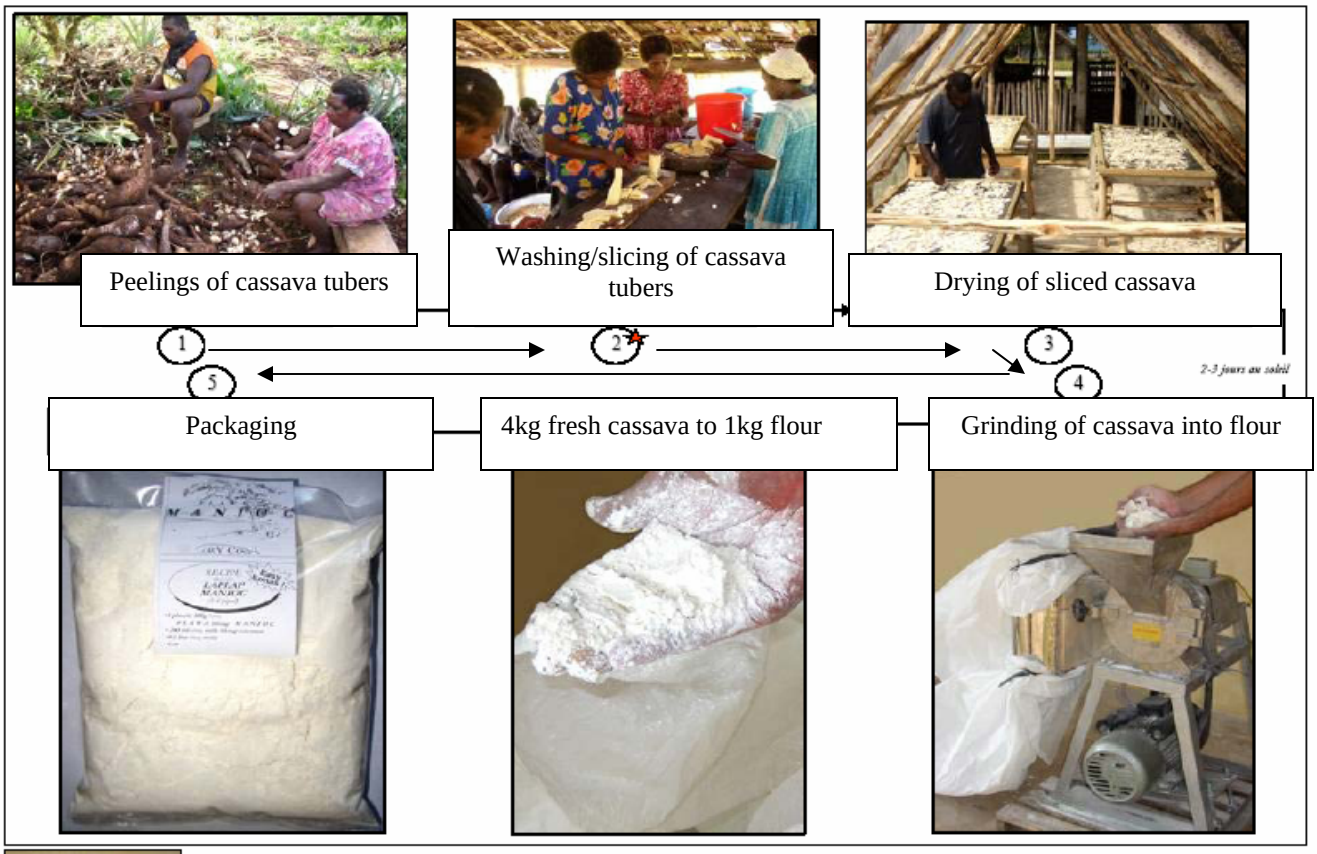
**3. Organising a support for the frame**

**4. Cutting some chips**

**5. Driers being used**

**6. A readily available dryer area.**

**Illustrated Transformation of Fresh Cassava Into Flour**




This slicing machine can be used for high production of cassava flour. It greatly reduces the time required for slicing cassava tubers

Since it's inception in 2002 POPACA, the EU and Government of France have supported the country's root crop sector through rural development projects being implemented by the Department of Agriculture and Rural Development

A Root Crop Development Programme was initiated three years ago on the Island of Santo focusing on the implementation of village based manioc processing, One producer organization was created the Lory Cooperative, and equipped with milling equipment for the production of manioc flour.

The consumption of local products was promoted through assistance to an "*Aelan kakaï (Year of Island Food) stall"* at Luganville, run by local women's groups, who organized local training sessions on creating wholesome food using manioc flour as a main ingredient. The Santo Programme "Flawa Blong Manioc"(Manioc flour) demonstrated that appropriate technology was readily available for the production of manioc flour in Vanuatu. Experimentation demonstrated that it is possible to develop a market for manioc flour products by its incorporation into traditionally 'wheat flour only' products.

Furthermore, the Santo "Flawa Blong Manioc" Programme ventured into adapting local popular recipes such as laplap using manioc flour instead of more traditional ingredients,

and produced a recipe booklet in Bislama which also provided numerous other cooking suggestions. However, one of the major problems the programme encountered in Santo was the limited size of the local market.
Consequently, it was decided in 2004 to expand POPACA's Root Crop Programme to Efaté, where it is hoped that the country's capital and largest urban centre will offer much greater and diverse market opportunities.

In February 2005, the Department of Agriculture, through **POPACA,** launched a root crop processing pilot project in the villages of North Efaté and, to date, information meetings, survey, training sessions, and workshops have been organised at Magaliliu, Tanoliu, and Malafau. In excess of thirty farmers have been involved in the preliminary stage of the project and are successfully participating in activities organized by the Programme; they have also received drying equipment from POPACA.

In June 2005 an implementation agreement was signed between the Government of Vanuatu and the FAO (Food and Agriculture Organization).
The cassava flawa program has been taken up under the Italian Trust Fund implemented by FAO (Food and Agriculture Organization) under "SUPPORT TO THE REGIONAL PROGRAMME FOR FOOD SECURITY (RPFS) IN THE PACIFIC ISLAND COUNTRIES
The primary overall objective of the root crop processing project is to enhance farmers' livelihoods, incomes and food security.
The project will enable the general development of a greater consumption of locally grown products and more specifically will supply the Port Vila urban market. Other objective expected is to reduce the country's reliance on imported foods and to strengthen technical support to root crop producers.

The development program complies as well with a current policy on improving the level of food security in the country.

The project is aimed at facilitating the setting up of root Crops Processing Units on Villages around the island of Efaté. Only one PU is built at Onesua College (EFATE) due to limited funding. There is processing equipment in three villages around the Island: Teouma, Magaliliu, Tanoliu.

In 2006 three workshops was organized in different villages on the island .The purpose of these trainings was to raise awareness on household food security issues such as local food processing and consumption, and also to promote food preservation as a disaster preparedness. More than one hundred participants attend these sessions that was conducted in collaboration with Agriculture, Trade and Public Health Departments.
It is expected that more trainings will be organized in communities in 2007 on EFATE.

It is imperative that these training sessions, and awareness programmes be extended to other parts of the country. The rapid population growth, land shortage and the projected impacts of climate change makes the case for the food preservation programs a necessity.

**Project Objectives**

1. To facilitate alternative methods of food preservation, processing and marketing by incorporating successful traditional practices with the modern technological methods.
2. Develop capacity of local and national governmental and non-governmental organizations to support vulnerable communities in coping with climate variability and longer-term climate change.
3. To sensitise communities and decision makers on the potential impacts of climate change on food security.

**Outcome 1**

Alternative method of food preservation taking into account traditional and modern practices.

**Outputs**

1.1 Existing technology upgraded
1.2 Particular processing technology tried and tested in other sites and provinces
1.2 Particular preservation technology tried and tested in sites and provinces
1.3 Technology replicated in other identified sites and provinces
1.4 Use of local flour from root crops such as cassava, yams, sweet potatoes etc is enhanced

**Outcome 2**

Alternative method of food processing and marketing strategies

**Outputs**

1.1 Marketing strategies: product analysis ,packaging, labelling adopted at existing sites
1.2 Strategies extended to other sites and provinces
1.3 Training activities on marketing activities be conducted for communities

**Outcome 3**

Raised awareness and enhanced capacity to communicate information more effectively between different sectors and stakeholders.

**Outputs**

1.1 Enhanced knowledge about the techniques/processes and technology
1.2 Greater awareness about food storage as a strategy to meet shortfalls during times of disasters
1.3 Communities better informed about alternative marketing strategies

**Implementation arrangements**

The project will be implemented by the Department of Agriculture and Rural Development (DARD) under the Technical Section. The DARD will work closely with other government agencies such as the Department of Health Food Technology Centre, Department of Forestry and Vanuatu Quarantine & Inspection Services. The project will be under the broad overview of NACCC which will serve as the Advisory Committee.

**Sustainability of the program.**

Food security aspect is one of the major activities that the Department of Agriculture with the other government sector are supporting and implementing since the year 2000.

To assure the sustainability of this program the Department of Agriculture will support all activities at the field level, logistic during the implementation of the food preservation program to achieve its vision.

Furthermore this institution will emphasises that the participation of all stakeholders including small-holder, farmers, youth and women associations, working together for the mutual benefit of rural livelihoods is essential for the Programme to succeed.

**Budget**

It is expected that the GEF will be requested to provide $1m from the LDC fund for the proposed Medium Size Project. An equivalent amount of co-funding will be provided through the FAO and EU projects, and in-kind support from the Government.

## 2. Sustainable Tourism Development

**Project Goal**
Enhance adaptation to climate change in the tourism sector for Vanuatu.

**Aim**
The aim of this project is to further develop and demonstrate adaptation initiatives that will reduce the vulnerability of the tourism sector, and its natural and human resource base, to the impacts of climate variability and change, and in doing so enhance the sustainability of the natural resources and the quality of life of the people of Vanuatu and also generate global environmental benefits. A specific focus of the project is to build and utilize the capacity of Vanuatu to integrate responses to concerns related to climate variability and change into a broader risk management framework, strategy and plan for the tourism sector. The project will build on previous studies linking climate change, biodiversity, human livelihoods and tourism.

**Project Objectives Outcomes and Outputs**

Objective 1: Strengthen the capacity of the tourism sector and other key players for adaptation policy, planning and implementation
*Outcomes*
- Enhanced capacity of the tourism sector and other key players to prepare and implement adaptation policies and plans;
- A strengthened enabling environment for addressing climate-related risks, nationally, internationally and at island and enterprise levels
- Improved understanding of the climate-related risks facing the tourism sector, the costs and benefits of risk management initiatives, and practical understanding and experience in addressing these risks through adaptation initiatives undertaken at operational level and through island-scale planning and regulation to national strategic planning, by tourism enterprises, communities and all levels of government;

*Outputs*
- A capacity needs assessment, carried out through a multi-stakeholder participatory workshop and interviews with key representatives;
- A capacity enhancement action plan, based on an assessment of the current adaptive capacity of the tourism sector and on the requirements for strengthening this capacity in order to address the current and anticipated climate risks of relevance to the tourism sector; this plan will be coordinated and integrated with the SNC;
- An inter-ministerial and multi-stakeholder consultative or advisory group such as the NACCC which was mandated by the Council of Ministers (COMs) to oversee project coordination and implementation. The committee will involve representatives of key public, private and NGO institutions, and will be expected to coordinate and monitor climate change adaptation activities in the longer term;
- Identification of support and donor institutions for the co-financing of the project implementation.

Objective 2: Demonstrate how climate change adaptation by the tourism sector contributes to national sustainable development, including through sound management of the environment and natural resources

*Outcomes*

- Demonstrated effectiveness of climate change adaptation as a result of:
  - major sustainable development benefits for communities and the nation as a whole, in relation to water, energy, health, agriculture, and natural resources, and especially through the transfer and uptake of environmentally sound and sustainable technologies; and
  - improve living standards through tourism operations;
- Contributions to national priorities, including the SNC;
- A national consultation and implementation mechanism for climate change adaptation in the long term.
- Global benefits for the environment as a result of three coordinated country projects that enhance the sustainability of tourism, including implementing activities that take climate change risks into account, improve the management of natural resources, and protect biodiversity;

*Outputs*

- In cooperation with the Vanuatu Meteorological Services, prepare a climate risk profile for Vanuatu that evaluates current risks and how these may alter as a consequence of climate change; the climate risk profile will give specific attention to climate risks of relevance to the tourism sector and to locations that are particularly important for tourism.
- Selection Matrix to choose a most useful mix of adaptation demonstration projects. A range of adaptation measures will be identified and assessed through stakeholder consultation in order to implement in selected pilot coastal zones. Examples of possible adaptation measures include:
  - Revision of existing legislation and policies, gap analysis and definition of new regulations and policies needed
  - Preventive solutions in tourism infrastructure development and planning policies: e.g. designation of coastal development zones, integration of climate risk criteria in development projects, beach management and monitoring, conflict resolution among users, etc.
  - Contingency and evacuation plans in case of extreme climatic events
  - Engineering solutions (e.g. rainwater collectors)
  - Environmental management in tourism operations (e.g. water-saving)
  - Financial incentives and public-private partnership for the application of engineering and environmental management solutions.
  - Nature conservation through tourism: identification and implementation of techniques to minimize impacts of tourism activities in natural environments, and creating revenue-generating mechanisms through tourism for the maintenance of protected and other natural areas.

    - A plan that identifies, coordinates and promotes adaptation initiatives at business, community, provincial and national levels in order to address the current and anticipated climate-related risks facing the tourism sector;
    - Relevant information on the costs and benefits of the adaptation initiatives, including the global environmental benefits;
- Develop a risk management framework for climate change impacts on tourism as part of a wider risk management plan for tourism in Vanuatu.
- Specific demonstration projects of climate change adaptation interventions identified in the above plan;
- Relevant tourism stakeholders with the capacity to mainstream adaptation in their policies and work programmes and to undertake specific adaptation initiatives;
- Coastal planning toolkit for local and beach authorities, resorts and businesses;

Objective 3: Contribute to wider national and international understanding of climate change adaptation policies and measures by documenting and disseminating the success factors, lessons learned and barriers, as well as good practice guidelines for replication and upscaling.

*Outcomes*

- Wider national and international understanding, and increased use of good practices in adaptation by the tourism sector globally;
- Increased efficiency and effectiveness of efforts by tourism-focused enterprises, communities and governments in SIDS to manage climate-related risks as a result of replicating and upscaling the lessons learned and success factors from the demonstration projects, and overcoming the barriers.

*Outputs*

- A synthesis of the lessons learned, success factors and barriers associated with each of the specific demonstration projects; these findings will also be made available for inclusion in the SNC; the synthesis will emphasize: a) the enabling environment; b) implementation process; c) cost-benefit of adaptation; and d) replication and up-scaling.

**Rationale**

Tourism is an important source of revenue for Vanuatu and it accounted for 40% of the GDP in 2000. It is concentrated around the two main urban centre (90% of Vanuatu's hotel capacity is focused in Port Vila) but, it is also expanding rapidly into the rural areas (Statistics Office, 2000) Climate change and its various impacts pose a significant risk to tourism, especially in developing countries where tourism is often the single most important industry. Climate change will impact on tourism, the marine and terrestrial biodiversity, and as a consequence on the livelihoods of local communities. Globally, the tourism sector will have to face the risks of climate change, contribute to mitigation of greenhouse emissions, and adapt to unavoidable impacts through careful management of the natural and other resources on which the sector relies. Among all tourist destinations, Small Island Developing States (SIDS) and coastal zones are most vulnerable and many are already experiencing impacts consistent with climate change. Understanding

vulnerabilities, managing risks, building capacity, and implementing adaptation policies and measures is therefore urgently needed in SIDS and will achieve the greatest immediate benefit within the whole tourism sector.

The sector has been identified as having great potential for Vanuatu, but in need of further analysis. Amongst the constraints identified to realising its full potential, there is a need to increase community awareness of tourism development and benefits that can accrue to the local communities are important. The proposed project will assist in addressing these challenges, and go a long way in facilitating the mainstreaming of climate change into the development plans for the tourism sector in Vanuatu.

**Implementation arrangements**
The project will be executed by the National Tourism Development Office (NTDO), and the Vanuatu Tourism Office (VTO) which will work closely with the Vanuatu Hotel and Resort Association, Chamber of Commerce and Ministry of Tourism. The overall guidance for the project will be provided by NACCC.

**Budget**
A proposal for $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.

## 3. Community based marine resource management programmes

**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 $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.

## 4. **Sustainable Forestry Management**

**Project Goal**
To mainstream climate change issues in the country's sustainable forest management policies and practices.

**Rationale**
The forests and forests industries of Vanuatu are making an increasingly important contribution to the development and economy of Vanuatu. In 1996, the value of forest product exports was US$3.62 million, about 13.2% of total exports. Landowners received abut Vt 36 million in log royalties and US$0. 27 million in sandalwood royalties, while forestry workers were paid an estimated US$1.20 million in wages.

However, the importance of Vanuatu's forests can not be judged only from an economic perspective. Forests, land and people in Vanuatu are inseparably linked. The forests are a vital part of the country's cultural heritage and contribute to the welfare and economic development of the people.

Forests provide the basic needs of water, food, shelter, fuel, and medicine. In addition to these fundamental forest values, the commercial benefits that can be derived from the forests are increasingly important to the traditional landowners and to the Government. Apart from providing job opportunities, income, and badly needed rural infrastructure, the development of the forest resources stimulates activities within the whole economy.

Careful planning and management of the use of the forests is important to ensure that the values supplied by forests are not jeopardised by the equally important need for development. The balancing of the need for environmental protection and development can be achieved through sustainable forest management.

Vanuatu's vision for the management of the forestry sector is an arrangement where the Government will work cooperatively with the landowners and the forest industries to achieve sustainable forest management and thereby encourage revenue generation for ni-Vanuatu landowners, economic development for the wider community and conservation of Vanuatu's forest biodiversity. This forestry vision includes:

- A strong national commitment to sustainable forest management to maximize the benefits of the forests for both present and future generations.
- Forest-based rural development leading to a greatly increased importance of the forest sector in the overall economy of Vanuatu.
- Comprehensive land use and forest planning mechanisms together with the proper implementation of planned forestry operations.

- Increased national forest resources, through improved natural forest management, joint-venture commercial forest plantations and agroforestry, despite a shrinking natural forest area.

- Development and expansion of efficient, viable, value-adding forest industries which contribute to economic and employment growth.

- Improved knowledge of Vanuatu's forest resources, ecosystems, biological diversity and the silviculture of the indigenous species.

- Improved awareness of the values of forests and trees and the active involvement of ni-Vanuatu in the management, conservation and development of these resources.

- Protection and management of the nation's significant conservation sites involving full participation by the ni-Vanuatu landowners.

- Increased regional and international cooperation for the forest sector together with international recognition that forest products from Vanuatu come from sustainably managed forests.

- A competent and adequately funded forest department which is effective and responsive to the needs of the government, the forest industries and the community.

Sustainable forest management is the management of a forest estate to produce a sustainable yield of timber and non-timber forest products over hundreds of years. The sustainable yield of timber from a forest is the volume that can be cut continually without depleting the total timber resource; that is, the volume cut must not exceed the growth of timber in the forest.

The concept of sustainable forest management in Vanuatu must be tempered by the fact that there is no government-owned forest land, and that it is an inalienable right of landowners under the Constitution to manage their land as they see fit. If they wish to clear forest for agriculture, that is their right; if they want to log that also is their right. However, in the situation of a decreasing forested area, sustained yield in Vanuatu only can be assured by increasing the productivity of the remnant forest area and by establishing highly productive forest plantations.

Ecologically sustainable forest management involves balancing sustainable forest management with the maintenance of the ecological processes that sustain forest ecosystems, the conservation of the biological diversity associated with forests and the protection of water quality and associated aquatic habitats.

**Project Objectives Outcomes and Outputs**

Objective 1: Strengthen the capacity of the forestry sector and other key players for adaptation policy, planning and implementation

*Outcomes*

- Enhanced capacity of the forestry sector and other key players to prepare and implement adaptation policies and plans;
- A strengthened enabling environment for addressing climate-related risks, nationally, internationally and at island and enterprise levels
- Improved understanding of the climate-related risks facing the forestry sector, the costs and benefits of risk management initiatives, and practical understanding and experience in addressing these risks through adaptation initiatives undertaken at operational level and through island-scale planning and regulation to national strategic planning, the department of forestry, communities and all levels of government;

*Outputs*

- A capacity needs assessment, carried out through a multi-stakeholder participatory workshop and interviews with key representatives;
- A capacity enhancement action plan, based on an assessment of the current adaptive capacity of the forestry sector and on the requirements for strengthening this capacity in order to address the current and anticipated climate risks of relevance to the forestry sector;
- An inter-ministerial and multi-stakeholder consultative or advisory group to oversee project coordination and implementation. The committee will involve representatives of key public, private and NGO institutions, and will be expected to coordinate and monitor climate change adaptation activities in the longer term;
- Identification of support and donor institutions for the co-financing of the project implementation.

Objective 2: Demonstrate how climate change adaptation by the forestry sector contributes to national sustainable development.

*Outcomes*

- Demonstrated effectiveness of climate change adaptation as a result of:
  - major sustainable development benefits for communities and the nation as a whole, in relation to water, food, shelter, fuel and medicine, and especially through the transfer and uptake of environmentally sound and sustainable technologies; and
- A national consultation and implementation mechanism for climate change adaptation in the long term.
- Global benefits for the environment as a result of the country project that enhance the sustainability of forestry, including implementing activities that take climate change risks into account, improve the management of natural resources, and protect biodiversity;

*Outputs*

- Prepare a climate risk profile for Vanuatu that evaluates current risks and how these may alter as a consequence of climate change; the climate risk profile will give specific attention to climate risks of relevance to the forestry sector.

- Selection Matrix to choose a most useful mix of adaptation demonstration projects. A range of adaptation measures will be identified and assessed through stakeholder consultation in order to implement in selected pilot coastal zones. Examples of possible adaptation measures include:
    - Revision of existing legislation and policies, gap analysis and definition of new regulations and policies needed
    - Preventive solutions in forestry infrastructure development and planning policies: e.g. integration of climate risk criteria in development projects, conflict resolution among users, etc.
    - Engineering solutions (e.g. for soil erosion)
    - Environmental management in forestry operations (e.g. sustainable logging code)
    - Financial incentives and public-private partnership for the application of engineering and environmental management solutions.
    - Nature conservation through identification and implementation of techniques to minimize impacts of logging activities in natural environments, and creating revenue-generating mechanisms for the maintenance of protected and other natural areas.
    - A plan that identifies, coordinates and promotes adaptation initiatives at business, community and national levels in order to address the current and anticipated climate-related risks facing the sector;
    - Relevant information on the costs and benefits of the adaptation initiatives, including the global environmental benefits;
- A plan that identifies, coordinates and promotes adaptation initiatives at business, community and national levels in order to address the current and anticipated climate-related risks facing the forestry sector;
- Relevant information on the costs and benefits of the adaptation initiatives, including the global environmental benefits;
- Develop a risk management framework for climate change impacts on forestry as part of a wider risk management plan Vanuatu.
- Specific demonstration projects of climate change adaptation interventions identified in the above plan;
- Relevant stakeholders with the capacity to mainstream adaptation in their policies and work programmes and to undertake specific adaptation initiatives;

Objective 3: Contribute to wider national and international understanding of climate change adaptation policies and measures by documenting and disseminating the success factors, lessons learned and barriers, as well as good practice guidelines for replication and upscaling.

*Outcomes*

- Wider national and international understanding, and increased use of good practices in adaptation by the forestry sector globally;
- Increased efficiency and effectiveness of efforts by forestry enterprises, communities and governments in SIDS to manage climate-related risks as a result of replicating and

upscaling the lessons learned and success factors from the demonstration projects, and overcoming the barriers.

*Outputs*

- A synthesis of the lessons learned, success factors and barriers associated with each of the specific demonstration projects; these findings will also be made available for inclusion in the SNC; the synthesis will emphasize: a) the enabling environment; b) implementation process; c) cost-benefit of adaptation; and d) replication and up-scaling.

**Implementation arrangements**

The Department of Forestry will have the overall mandate for the project which will be undertaken in consultation with the Departments of Agriculture, Livestock, Lands and Environment. NACCC will serve as the Advisory Committee for the project.

**Budget**

A proposal for $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.

## 5. Integrated Water Resource Management

**Project Goal**
Enhanced resilience of watershed through integrated water resource management.

**Project Objectives**
The objective of the project is to reduce vulnerability to the anticipated impacts from climate change on the country's water resources, with a primary focus on watershed areas. Specifically, the project seeks to identify national policies to address the impacts of climate change on water resources at the national level and to specifically formulate and implement pilot adaptation actions and specific measures in representative systems in order to protect their environmental functions and their rich biodiversity from climate change related impacts.

The project's goal is to enhance capacity to cope with projected climate change and climate variability in the watershed areas of Vanuatu. This will be achieved by the following strategies/activities.

- Assess the vulnerability and adaptive capacity of upland farmers and local institutions to climate change
- Build resilience of upland farmers to the impacts of climate change by developing sustainable livelihoods (eg diversified farming; agroforestry; conservation farming)
- Integrate climate change risks in protected area and watershed planning
- Develop a watershed-based early warning and monitoring system for climate phenomena such as ENSO
- Build capacity of government and civil society organizations in coping with climate change

**Expected Outcomes and Expected Outputs to Achieve Outcomes**

The project's main goal to enhance capacity of local stakeholders and institutions in Vanuatu's watersheds to cope with climate variability and climate change will be attained by the specific objectives, outcomes and outputs outlined below.

**Objective 1:** To develop and pilot strategies for building resilience of farmers to the impacts of climate change and climate variability.

**Outcome 1**. Sustainable livelihoods practices in pilot sites enhance resilience of farmers to cope with climate change and climate variability.

Output 1.1 : Database containing hydro-climatic and socio-economic information

Output 1.2 : Current coping mechanisms

Output 1.3 : Livelihood options (eg diversified farming; agro-forestry; conservation farming) to enhance resilience identified.

Output 1.4: Enhanced capacity of government and civil society organizations to cope with climate change

**Outcome 2**. Early warning and monitoring systems provide timely and relevant information to assist farmers cope with climate variability.

Output 2.1 : Integrated watershed management information system

Output 2.2 : Training provided in use of climate information

Output 2.3 : Stakeholder network established to enhance interaction

**Outcome 3**. Climate change risks, preparedness and mitigation integrated in protected area and watershed planning.

Output 3.1 Stakeholders (government, NGOs, private sector) trained to mainstream climate risks.

Output 3.2 : Watershed management plans developed and enhanced

Output 3.3 : Guidelines for mainstreaming adaptation

**Outcome 4**. Community's awareness of climate change and variability issues enhanced leading to successful replication of coping strategies in other areas.

Output 4.1: Best practices and lessons learned documented and disseminated widely using the media.

Output 4.2 : Climate issues integrated into current agriculture and forestry activities.

Output 4.2 : Community organizations strengthened.

**Outcome 5**

Developing mechanisms to promote sustainable land-use patterns that maintain the functional integrity of watershed areas. Promoting the sustainable use for watersheds and keeping the environmental and ecosystem services for native and migratory species as well as sustainable economical activities tuned to the specific characteristics on each area.

It is expected that the results of the project could be more widely replicated in other watersheds areas in the Vanuatu. The country is high volcanic with large mountains and hills, with many farmers cultivating rainfed sloping areas.

**Rationale**

According to the PAA approximately 80% of the population have access to improved water services (reticulated supply and rainwater catchment tanks) and over 80% of the population have improved sanitation. Moreover, most of the programmes that are currently implemented in the water sector focus mainly on getting water to the people but not addressing issues such as deforestation in the watershed area, encroachment of agriculture into the watershed and coastal areas.

**Implementation arrangements**

The project will be implemented by the Departments of Geology,Mines and Water Resources and Agriculture, working closely with the Departments of Forestry, Lands and Environment, with NACCC acting as the Advisory Committee.

**Budget**

A proposal for $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.

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