

TUVALU: NAPA PROJECT PROFILE

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TUVALU

NAPA PRIORITY PROJECT 1

INCREASING RESILIENCE OF COASTAL AREAS AND COMMUNITY SETTLEMENT TO CLIMATE CHANGE

RATIONALE

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

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

DESCRIPTION

Goal

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

Objectives

There are two objectives for this project as follows:

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

Outcomes:	Activities:
1. Coastal Areas Protected	Activities will include: <ul style="list-style-type: none">• Training of local Kaupule/Government personnel on construction of: Coastal defenses; and Channel Breakers structures.• Construction of coastal defenses;• Construction of channel current breakers.
2. Coastal communities protection enhanced.	Activities will include: <ul style="list-style-type: none">• Development of nursery;• Planting of a green-belt;• Public awareness.

Short-term outputs

- Severely eroded areas rehabilitated;
- Community Awareness enhanced.

Potential long-term outcomes

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

IMPLEMENTATION

Institutional arrangement

The Primary implementing agencies: Department of Lands (DOLS), Public Works Department (PWD) and Island Kaupule.

Secondary implementing agencies: Department of Agriculture (DOA) and the Department of Environment (DOE) and NGOs and CBOs.

Risks and barriers

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

Evaluation and monitoring

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

COST

The total cost for this project is:

USD 1,906,500

Budget Breakdown

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

Activities	Year 1 (USD)	Year 2 (USD)	Year 3 (USD)
Training of local Kaupule and Government on coastal defense and channel current breakers construction:	50 000	0	0
• Island Construction of Coastal defenses	600 000	600 000	400 000
• Island Construction of Channel Current Breakers	40 000	40 000	30 000
Development of Greenbelt Nursery	15 000	15 000	15 000
Planting of Greenbelt	30 000	30 000	25 000
Public Awareness	5 000	5 000	5 000

Contingencies	500	500	500
Sub-Total	740 500	690 500	475 500
Gross Total			1 906 500

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NAPA PRIORITY PROJECT 2

INCREASING SUBSISTENCE OF PIT GROWN PULAKA PRODUCTIVITY THROUGH INTRODUCTION OF A SALT-TOLERANT PULAKA SPECIES

RATIONALE

The vulnerability of subsistence agriculture in Tuvalu, as highlighted in section 3.3.4 of the NAPA, clearly defines the cause of the shift to a more cash based way of livelihood. A rapid assessment by the agricultural department shows that the level of destruction caused by saltwater intrusion due to sea level rise on pulaka plantations is approximately 60%, and the remaining 40% of pulaka plantations remain highly sensitive to future saltwater intrusion, see Tables 10 and 11 (of NAPA). It was assumed that an absolute destruction to pulaka crops is imminent in the near future for all islands of Tuvalu – possibly in the next decade unless urgent and immediate mitigation measures are implemented. The worst-case scenario is that an absolute destruction to pulaka crop will divert the dependence of the people of Tuvalu on imported foods, thus, an exposure of low-income families to absolute poverty. Therefore, to reduce risks of an absolute destruction of pulaka crop and prevent abrupt shift of Tuvalu's dependence on imported food, it is necessary to introduce a salt-tolerant pulaka species in the region (preferably the Palau pulaka species).

DESCRIPTION

Goal

Increasing Pulaka Productivity in Tuvalu.

Objectives

There are three objectives for this project:

- Increase number of abandoned pulaka pit re-planted;
- People's preference for fresh nutritious pulaka increased.

Outcomes:	Activities:	Inputs:
1. Enhance pulaka productivity	Activities will include: <ul style="list-style-type: none">• Planning field work and logistics;• Transfer and Establishment of salt-tolerant pulaka nursery;• Dissemination of salt-tolerant pulaka to all islands.	Human labour Financial resources Agricultural expert Tool and equipment
2. Local Farmers trained	Activities will include: <ul style="list-style-type: none">• Training of local farmers on:• Maintaining salt-tolerant pulaka nursery• Planting salt-tolerant species• Preparation and printing of training manual• Training local officials on monitoring	Tools and equipment Agricultural expert Financial resources
3. Improved health	Activities will include: <ul style="list-style-type: none">• Training of locals on cooking the salt-tolerant pulaka;• Promote eating locally grown nutritious food.	Financial Resources

Short-term outputs:

- Abandoned pulaka pits planted;
- Reduced unproductive lands;
- Biodiversity enhanced.

Prospective Long-term outputs:

- Increase of fresh and nutritious local food;
- Enhanced food security;
- Local farmers trained;
- Decreasing trend of lifestyle disease;
- Decrease in percentage of abandoned pit gardens.

IMPLEMENTATION

Institutional arrangements

Primary Executing Agencies: Department of Agriculture and Kaupule.

Secondary executing Agencies: DOE, DOLS, Department of Rural Development (DRD), NGOs and CBOs.

Risks and Barriers

The risks for this project are:

- Actual capability of the selected salt-tolerant pulaka to grow in environmental conditions and parameters of pulaka pits in Tuvalu is not known - only assumptions made;
- Low possibility that the salt-tolerant pulaka will be the preferred family staple compared to rice;
- Introduction of new pest is a possibility.

Monitoring and Evaluation

Monitoring will be done by the Department of Agriculture and the Department of Environment. The Project Steering Committee will evaluate performances on a quarterly basis through convened meetings on the progress of the project activity implementation and expenditure of project funds.

COST

The total cost for this project is:

USD 2,220,000

Budget Breakdown

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

Activities	Year 1 (USD)	Year 2 (USD)	Year 3 (USD)
Planning field work and logistics	30 000	30 000	30 000
Training of local farmers on planting salt-tolerant pulaka/local cash crop and maintaining the salt-tolerant pulaka/local cash crop nursery	35 000	35 000	
Introduction and establishment of salt-tolerant pulaka/local cash crop nurseries	50 000	35 000	25 000
Local Dissemination and planting of salt-tolerant pulaka/local cash crop to other islands	800 000	600 000	500 000
Monitoring	5 000	5 000	5 000
Printing training manual	10 000	5 000	
Local Promotion and advocacy	5 000	5 000	5 000
Contingencies	2 000	2 000	1 000

Sub-total	927 000	722 000	571 000
Gross Total			2 220 000

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NAPA PRIORITY PROJECT 3

ADAPTATION TO FREQUENT WATER SHORTAGES THROUGH INCREASING HOUSEHOLD WATER CAPACITY, WATER COLLECTION ACCESSORIES, AND WATER CONSERVATION TECHNIQUES

RATIONALE

In the past, Tuvalu has relied heavily on two reliable major sources of potable water; rain and groundwater sources. The latter has been polluted by the intrusion of saltwater due to sea level rise caused by climate change and household wastewater leacheates. Dependence on the natural storage capacity of groundwater has been adversely affected by saltwater intrusion and will increase in future as reported in Tables 10 and 11 (of NAPA). However, increasing population and internal migration to urban areas and the increasing changes in climate and variability resulting in erratic rainfall pattern changes caused the water problem in Tuvalu – see Figure 6 (of NAPA).

Currently, Tuvalu depends entirely on rainwater collected and stored in tanks or cisterns as the main source of potable water for human consumption, and therefore, the need to increase household water storage capacity with water collecting accessories, including the enforcement of water conservation techniques are urgently needed for all stakeholders' and especially on low rainfall area Northern islands and highly populated (Funafuti) areas.

The status of the water resources in Tuvalu is briefly outlined in section 2.2.2 (of NAPA). Furthermore, Figure 6 (of NAPA) clearly defines that household storage facilities on Funafuti are insufficient. Therefore, increasing household water storage capacity with water collecting accessories and enforcement of water conservation techniques is the way forward to solving this water problem and for the people to easily access quality potable water.

DESCRIPTION

Goal

Adaptation to frequent water shortages through increasing household water capacity, water collection accessories, and water conservation technologies.

Objectives

There are two objectives for this project as follows:

- Increased household water storage capacity and water collecting accessories;
- Increased use of water conservation technologies.

Outcomes:	Activities:
1. Household water storage capacity increased	Activities will include: <ul style="list-style-type: none">• Training of Kaupule plumbers in fixing water collecting accessories and water storage structures;• Procurement of materials/water storage structures;• Distribution of water storage structures and water collecting devices.
2. Water conservation techniques demonstrated	Activities will include: <ul style="list-style-type: none">• Conducting a Household water use survey;• Implementing water conservation technologies to minimize volume of water entering waste streams;• Training of Kaupule expert on water conservation technologies;• Public awareness.

Short-term outputs

- Insufficiency of household potable water reduced in project areas;
- Community access to quality water enhanced.

Potential long-term outcomes

- Household adaptation to drought and low rainfall periods improved;
- Improved family and community awareness in low rainfall periods and drought;
- Increased sustainable use of water resources at all levels of society;
- Decreased pollution of groundwater from human wastes.

IMPLEMENTATION

Institutional arrangement

Primary implementing agency: PWD and Kaupule.

Secondary implementing agencies: DOE and NGOs/CBOs.

Risks and barriers

- Insufficient space for water storage structure installation;
- Land tenure problems for non-permanent households;
- Social acceptability of water conservation techniques.

Evaluation and monitoring

- Household water storage capacity increased;
- Wastewater reaching groundwater minimized;
- Improved Household Sanitary standard and health;
- Public Water Demand on government water resources decreased;
- Household resilience to drought and period of low rainfall increased.

COST

The total cost for this project is:

USD 2,675,300.00

Budget Breakdown

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

Activities	Year 1 (USD)	Year 2 (USD)
Training of Kaupule/community plumbers in fixing water collecting accessories and water storage structures	20 000	0
Procurement of materials/water storage structures	2 000 000	500 000
Distribution of water storage structures and water collecting devices	15 000	10 000
Conduct a Household water use survey.	500	15 000
Pilot water conservation technologies to reduce volume of water reaching the waste stream	10 000	10 000
Training of Kaupule expert on water conservation technology.	45 000	45 000
Public awareness.	3 000	1 000

Contingencies	400	400
Sub-Total	2 093 900	581 400
Total Cost		2 675 300

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NAPA PRIORITY PROJECT 4

PROTECTING COMMUNITY HEALTH THROUGH CONTROL OF VECTOR BORNE/CLIMATE SENSITIVE DISEASES AND PROMOTING ACCESS TO QUALITY POTABLE WATER

Type of project: Intervention

RATIONALE

The Tuvalu initial national communication, pointed out that current climate condition enhances conditions for an outbreak of vector borne/climate sensitive diseases. The epidemic potential of climate sensitive diseases increases with increasing availability of vector breeding grounds. There are several ways that vector breeding grounds could be formed: due to king tides and heavy rain (as in section 3.3.2 of NAPA), due to inundation and sea level rise (section 3.3.3 of NAPA), due to hazards such as tropical cyclones (Table 10 of NAPA). Section 2.2.5 (of NAPA) shows that sea level rise and temperature change due to climate change exacerbates Tuvaluan communities' exposure to water borne diseases. Due to the weak adaptive capacity of the Tuvaluan communities and personnel involved in community health sectors, building communities' and health personnel's capacities to efficiently fight climate sensitive diseases is urgent.

DESCRIPTION

Goal

To protect Community health through control of vector borne/climate sensitive diseases and promotion of community access to quality potable water.

Objectives

There are two objectives for this project as follows:

- Increasing community access to clean water;
- Controlling Climate sensitive and water-borne diseases.

Outcomes:	Activities:
1. Community resilience to climate sensitive and water borne diseases enhanced	Activities will include: <ul style="list-style-type: none">• Community-based clean up campaign;• Developing a vector outbreak control plan;• Spraying of priority vector breeding areas.
2. Community and Household access to clean water increased	Activities will include: <ul style="list-style-type: none">• Survey on contamination of household and community water storage systems;• Capacity building of community sanitary aides;• Community water treatment;• Developing a cost effective water treatment plan for communities.
3. Improved Community understanding on climate sensitive/water borne diseases	Activities will include: <ul style="list-style-type: none">• Develop Radio Programme, leaflet, etc;• Awareness raising in community and primary schools.

Short-term outputs

- Vectors controlled;
- Environment cleanliness increased;

- Access to clean water increased.

Potential long-term outcomes

- Water related disease outbreaks controlled;
- Community understanding increased;
- Community health increased.

IMPLEMENTATION

Institutional arrangement

Primary executing agencies: DOH, PWD, CBOs and Kaupule.

Secondary implementing agencies: DOE and NGOs.

Risks and barriers

- Community commitment to clean up campaign;
- Lack of legal framework on vector control at community;
- Fund availability.

Evaluation and monitoring

- Annual clean-up campaign – just before rain season;
- Existence of community water treatment plan;
- Sanitary aides trained;
- Existence of vector outbreak control plan;
- Communities better informed.

COST

The total cost for this project is:

USD 381,500

Budget Breakdown

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

Activities	Year 1 (USD)	Year 2 (USD)	Year 3 (USD)
Community-based clean up campaign.	30 000	30 000	30 000
Develop a vector outbreak control plan.	20 000		
Quarterly Spraying of priority vector breeding areas	20 000	20 000	20 000
Survey of household and community storage system's water quality	15 000	5 000	5 000
Capacity building of community sanitary aides	0	30 000	0
Community potable water treatment	30 000	30 000	30 000
Develop a cost effective community water treatment plan	20 000	0	0
Develop Radio Programme, leaflet, etc.	5 000	5 000	5 000
Awareness raising to community and Primary schools	10 000	10 000	10 000
Contingencies	500	500	500

Sub-Total	150 500	130 500	100 500
Total Cost			381 500

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NAPA PRIORITY PROJECT 5

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

Type of project: Intervention (with community focus)

RATIONALE

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

DESCRIPTION

Goal

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

Objectives

There are four objectives for this project as follows:

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

Outcomes:	Activities:
1. Community sustainable marine management plan completed	Activities will include: <ul style="list-style-type: none">• Developing a sustainable community-based coastal marine biodiversity management plan;• Increase local capacity in execution of the management plan.
2. Priority Conservation Area identified per Island	Activities will include: <ul style="list-style-type: none">• Identification and implementation of priority Conservation areas per Islands;• Develop a Marine resources inventory for community.
3. Improved Community knowledge, skills, and commitment to marine resource conservation	Activities will include: <ul style="list-style-type: none">• Integration of traditional and modern conservation practices;• Awareness and Capacity building for communities on conservation areas.

Short-term outputs

- Marine Resources Productivity increased;
- Community Awareness enhanced.

Potential long-term outcomes

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

IMPLEMENTATION

Institutional arrangement

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

Secondary executing agencies: NGOs and CBOs.

Risks and barriers

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

Evaluation and monitoring

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

COST

The total cost for this project is:

USD 636,500

Budget Breakdown

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

Activities	Year 1	Year 2	Year 3
Develop a Sustainable community-based coastal marine biodiversity management plan	20 000	15 000	15 000
Identification and implementation of priority Conservation areas per Islands	130 000	130 000	125 000
Develop a Marine resources inventory for community	60 000	30 000	20 000
Integration of traditional and modern conservation practices			20 000
Awareness and Capacity building for communities on conservation areas	15 000	40 000	15 000
Contingencies	500	500	500
Sub-Total	225 500	215 500	195 500
Total Cost			636 500

TUVALU

NAPA PRIORITY PROJECT 6

STRENGTHENING COMMUNITY DISASTER PREPAREDNESS AND RESPONSE POTENTIAL

Type of project: Intervention (with community focus)

RATIONALE

The vulnerability of Tuvalu to natural disasters is high. Climate change increases the frequency of natural hazards. There is the likelihood of a trend in increasing frequency of climate hazards in Tuvalu (Table 11 of NAPA). Losses from major disasters can be high (as defined in Table 1 of NAPA) and also low (as described in NAPA Section 4.1 on the evacuation of king-tide victims in 2006 under the Disaster plan). It is important to reduce risk from disaster and to increase community preparedness and response. The communities should also be aware of the disaster plan and its execution during and after disaster due to the increasing trend of climate hazard frequency (as highlighted in tables 5, 10 and 11 of NAPA). Public awareness and traditional knowledge are also useful in enhancing community preparedness to disasters. Increased flow of public friendly climate information will increase community understanding on preparedness and response to disasters. Increasing climate monitoring in Tuvalu will enhance community preparedness for disasters.

DESCRIPTION

Goal

Strengthening of Community Disaster preparedness and response capability

Objectives

There are two objectives for this project as follows:

- To ensure community preparedness and effective response to disasters;
- To ensure that climate hazard risks on island communities are reduced.

Outcomes	Activities
1. Community disaster preparedness and response enhanced	Activities will include: <ul style="list-style-type: none">• Developing a post-disaster resettlement and rescue plan;• Awareness raising on existing disaster plan;• Developing a disaster preparedness and response strategy;• Enhancing and documenting traditional knowledge.
2. Climate hazard risks reduced	Activities will include: <ul style="list-style-type: none">• Integration of risk reduction into national development;• Disaster risk reduction training.
3. Increased climate monitoring and information	Activities will include: <ul style="list-style-type: none">• Establishment of new Automatic Weather Stations (AWS);• Developing stakeholder-friendly climate information;• Developing early warning systems.

Short-term outputs

- Risk reduction integrated into national development;
- Community Disaster Awareness enhanced.

Potential long-term outcomes

- Preparedness and Response to disasters strengthened;
- Community's perceptions of the level of risk they face increased;
- Decreased economic losses associated with disasters;
- Community climate understanding enhanced.

IMPLEMENTATION

Institutional arrangement

Primary executing agencies: National Disaster Management Office (NDMO), DOE and Tuvalu Meteorological Services.

Secondary implementing agencies: NGOs, CBOs and Kaupule.

Risks and barriers

- Lack of financial resources;
- Lack of human resources capacity;
- Limited lands.

Evaluation and monitoring

- Quarterly Reporting;
- Annual Project Report.

COST

The total cost for this project is

USD 462,000.00

Budget Breakdown

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

Activities	Year 1	Year 2	Year 3
Develop a post-disaster resettlement and rescue plan	15 000		
Awareness raising on existing disaster plan	15 000	45 000	10 000
Develop a Disaster preparedness and response strategy	15 000		
Documenting Traditional Knowledge	10 000	6 000	6 000
Integration of risk reduction into national development	5 000	10 000	10 000
Disaster Risk Reduction training	45 000	10 000	5 000
Establishment of new AWS	60 000	60 000	60 000
Develop stakeholder-friendly climate information	10 000	10 000	10 000
Develop early warning systems	15 000	10 000	5 000
Contingencies	5 000	5 000	5 000
Sub-Total	195 000	156 000	111 000
Total Cost			462 000

TUVALU

NAPA PRIORITY PROJECT 7

ADAPTATION TO COASTAL SHELLFISH FISHERIES RESOURCES PRODUCTIVITY

RATIONALE

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

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

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

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

DESCRIPTION

Goal

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

Objectives

There are three objectives for this project as follows:

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

Outcomes	Activities	Inputs
1. Shellfish Breeding Programme (Marine and On-shore) Established	Activities will include: <ul style="list-style-type: none"> • Training and Establishment of shellfish breeding programme Team for Islands; • Training of Island experts; • Dissemination of shellfish cultures; • Training of locals. 	Human labour Financial resources Shellfisheries expert Tool and equipment
2. National Shellfish and Coral Reef Ecosystems Conservation Plan Drafted and Enforced	Activities will include: <ul style="list-style-type: none"> • Drafting of By-Laws and penalties for poachers at each participating Island; • Drafting of the National Shellfish and Coral Reef Ecosystems Conservation Plan; • Development of a conservation shellfish breeding area; • Training of locals. 	Conservation expert Financial resources
3. Marine Resources Public Understanding Enhanced	Activities will include: <ul style="list-style-type: none"> • Public Awareness; • Radio; • Leaflets; • Others. 	Financial Resources

Short-term outputs

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

Potential long-term outcomes

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

IMPLEMENTATION

Institutional arrangement

Primary implementing agency: DOF, DOE and Kaupule.

Secondary implementing agencies: NGOs/CBOs.

Risks and barriers

- Cost-effectiveness may determine the adoption of the practice to use;
- Replication of the practice would depend on the outcomes of the project and Government/ Falekaupule commitment;
- Fund availability.

Evaluation and monitoring

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

COST

The total cost for this project is:

USD 388,500

Budget Breakdown

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

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