

DEMONSTRATION PROJECT PAPER

A. Country(s): **Republic of the Marshall Islands**

B. Title: INTEGRATED WATER MANAGEMENT & DEVELOPMENT PLAN FOR LAURA GROUNDWATER LENS, MAJURO ATOLL

For a detailed budget breakdown please see ANNEX A

For list of Acronyms please see ANNEX B

For Letters of Support please see ANNEX C

C. Executing Body:

The Republic of the Marshall Islands Environmental Protection Authority (RMIEPA) shall be the national executing agency.

D. Cost of Project: **GEF Funding: \$500,000** **Co-Funding: US\$3,362,583**

Project Summary

Assistance is required from the GEF to co-finance the RMI Government's plan to demonstrate sustainable water resource and wastewater management in the Laura, Majuro Atoll. The overall project purpose is to achieve improved water resources management, reduction in groundwater pollution from inadequate waste water facilities, piggeries, cemeteries and landfills and improved water supply on and around the Laura area. This will be carried out with the provision of infrastructure and improved management to protect the Laura groundwater lens, the largest natural water resource in Majuro which provides support to the public reservoirs for over 30,000 residents. Currently the lens is heavily polluted due to a lack of solid waste facilities, poor human activity management, lack of sewage and toilet facilities and poor awareness and enforcement. The proposal will provide supporting funds to assist in the plan to construct several community septic tanks which will be connected to all residences in Laura, along with the provision of a saltwater pump and toilet facilities for houses and a service truck to dispose of waste water into the public sewer. Solid waste and recycling facilities and improved management will be provided through a series of waste disposal bins which will be serviced by a new truck to transport waste from Laura to the public dump in main town Majuro. The pipe that transports Laura groundwater to the public reservoirs will be inspected and repairs made to the current system where leaks occur. Water resource use planning will take place through a Geographic Information System (GIS) and ongoing monitoring and human activity re-zoning and all tasks encompassed within an overall Laura Lens Integrated Water Resource Plan which will be administered and driven by the existing Laura Lens Community Committee. On going public awareness throughout the community is a critical objective of this proposal.

All of these objectives combined together within the plan provide an integrated solution to the contaminated groundwater resource at Laura on which the entire population of Majuro depends.

E. Linkage to IWRM GEF Project Priority Demonstration

Within the GEF Operational Strategy for International Waters this project tackles water and environmental problems using an IWRM approach across GEF Strategic Programme III: Balancing overuse and conflicting uses of water resources in transboundary surface and groundwater basins (with a specific focus on SIDS to protect community surface and groundwater supplies while reducing sewage releases).

The geographical nature of SIDS allows IWRM approaches to rapidly demonstrate the multiple benefits of tackling water resource management in an institutionally horizontal manner, whilst applying a ridge to reef approach, tackling technical and socio-economic issues with communities and civil society at large to demonstrate equity, efficiency and environmental sustainability.

The project will also tackle, through IWRM approaches, many of the issues under GEF Strategic Programmes I and II through identifying and understanding multiple stresses on fragile coastal environments and linking these to freshwater and land management, especially upstream practices; IWRM will contribute to improving coastal fishstocks and biodiversity. IWRM approaches will also include methods to reduce economic and ecologic dead-zones of oxygen deficient water as a result of human and animal sewage waste

The protection of groundwater resources of Majuro Atoll, the urban capital of the Republic of the Marshall Islands (RMI) is critically important to provide essential fresh water supply for the growing population demands of the atoll. The land area of RMI comprises only 0.009% of the total area of the country and groundwater resources are extremely scarce. On Majuro Atoll, the urban centre of the country, 30,000 people live on a tiny strip of land, 3.75miles² in area, making it one of the most densely populated places in the World. The freshwater lens at Laura, a small land area at the western fringe of the atoll, is the largest available groundwater resource in Majuro and supplements the entire water supply system in Majuro Atoll. The high population density in Laura and a combination of adverse human impacts has left the Laura Lens in critically poor condition and facing an uncertain future in its ability to provide clean water for the atoll. The Laura lens' preservation, therefore, is vital to for human health, a functioning and clean environment and future economic prosperity of the Marshall Islands.

This project meets the agreed priorities of the Laura Water Lens Protection Coordinating Committee.

F. Linkage to National Priorities and Programmes

The proposal is also compatible with the following International and Regional Multilateral Agreements to which the RMI is a signatory:

- Convention on Biological Diversity
- The Ramsar Convention on Wetlands
- The United Nations Convention to Combat Desertification (UNCCD)
- Kyoto Protocol on Climate Change
- Stockholm Convention
- Basel Convention on Hazardous Waste
- Rotterdam Convention on Prior Information
- Montreal Protocol on Ozone Protection
- SPREP (South Pacific Regional Environmental Programme) Convention

G. Name and Post of Government Representative endorsing the Demonstration Activity

John Bungitak

General Manager, Republic of the Marshall Islands Environmental Protection Authority

H. Project Objectives and Activities

i. Background:

Majuro Atoll, the capital atoll of the Republic of the Marshall Islands (RMI), is one of the most densely populated places in the World. Consequently there are major constraints affecting water resource management. Majuro is home to 30,000 residents on an area of land only 3.75miles², with a population density of approximately 8000 people per mile².

Laura lies on the western fringe of Majuro Atoll and is connected to the main urban centre of Delap-Uliga-Dirita (DUD) by a 30mile strip of land, often no more than 400m wide in places, formed when sands accreted on coral reefs around a former volcano. The thin coastal strip surrounds a lagoon 113.9 miles² in area. Seawater makes up the 97% of the atoll making land and freshwater resources finite and extremely scarce.

The land area of Laura is Majuro's largest groundwater resource and supplies the entire population of Laura and supplements the whole Majuro water supply system for its 30,000 residents. Rainwater is the primary source of freshwater supply in Majuro which is harvested in reservoirs using the airport runway as a catchment area. The airport catchment water is supplemented by the groundwater pumped from seven wells in Laura to the reservoirs. In frequent periods of drought, the reservoirs often dry resulting in a major dependence on emergency back up supply from the Laura freshwater lens. Laura groundwater lens currently produces about 100,000 gallons of freshwater every day but the dependable yield of the Laura lens is at least 52 millions gallons annually (BECA 2003).

Traditionally known as 'Laura Village', Laura's population totalled 2,256 in 1999, up from 1,575 in 1988. By 2006 it is estimated that its population is now approaching 3,000 (or over 10 percent of Majuro Atoll's population) with the number of people living in Laura doubling in twenty years. In the 21st Century, Laura has rapidly moved on from its traditional setting of a 'village'.

Laura continues to see rapid residential and small commercial development, including recent growth in small-scale commercial agriculture, with its economic contribution to RMI increasing. As a growing urban center, Laura is considered an important government priority. This is manifested by the increasing funding going into Laura infrastructure, including a number of new public school facilities, relatively recent re-paving of the Laura lagoon road and new paving of the ocean side and feeder roads. However, the urbanisation of Laura is having unprecedented adverse impacts on the groundwater lens, lagoon and surrounding marine environment.

Laura is not connected to the Majuro Atoll sewage pipes or public water supply systems. The Laura community relies on the lens to supply water to its residents. In addition, only some households have individual septic tanks and the one that do are badly functioning and have since been disconnected. Therefore at present, there is no treatment or safe disposal of the sewage created by the 3000 residents of Laura. Besides human waste, there is no treatment or disposal of the sewage created by the large number of piggeries in the area, and there are a large number of graves in the many

cemeteries in the area exacerbating the adverse impact on the groundwater lens. There is no solid waste treatment collection, treatment or disposal facilities in Laura and all waste is discarded into previous dug pits or into the lagoon. The infiltration of pollutants from these sources, combined with sewage impacts from the poorly functioning septic tank systems, cause high records of faecal coliform contamination in the groundwater lens. In addition, fertiliser applications to the small scale agriculture plantations and increasing run-off from recent commercial, industrial and housing programmes along the main road traversing the lens have led to an increase in the loadings of nitrates and phosphates into the freshwater resource.

There are a number of factors that now directly threaten the Laura groundwater resource, namely:

- Lack of a sewerage/wastewater system
- Overflow and leakage from home septic tanks
- Chemical pollutants from farming and agriculture
- Lack of solid waste collection system
- Common use of ground pits for solid waste disposal
- Increasing number of graves and burial sites
- Lack of land and resources planning and zoning
- Rapid population growth, residential and commercial development
- Lack of community awareness on the resources and potential pollutants
- Leaks in the water system that pumps water to the reservoir
- Over harvesting of water resources in some areas.

Currently, the poorly managed human activities and inadequate sewage treatment systems in Laura are resulting in a polluted freshwater resource and non-compliance with the environmental legislation created to protect water resources. However there are currently no mitigation measures or alternative systems available to the current practices and therefore it would be unfair to enforce the current legislation on the community of Laura. With population in Laura doubling in the last twenty years, and the government concentrating on increasing tourism in the Marshall Islands, the demand for clean fresh water in Majuro will only continue to rise. However the groundwater resource at Laura water will not meet the population demands of the growing atoll without careful and immediate protection and management – the solution being the LAURA GROUNDWATER LENS INTEGRATED WATER MANAGEMENT & DEVELOPMENT PLAN.

ii. Objectives and Activities:

This project will result in the creation of the Laura Integrated Water Resource Management and Development Plan which will protect the groundwater resource at Laura through a combination of objectives and activities steered by the Laura Water Lens Protection Coordinating Committee (LWLPCC).

The LWLPCC is a recently established interagency committee consisting of members of National Government, Local Council, and Landowners, responsible for management, outputs and deliverables of the project. The LWLPCC was established in February 2007 at the start of SOPAC funded project to raise awareness in the Laura community, as part of

the first stage of the production of the Laura Lens Groundwater Protection Plan. Details of the Committee are provided in I. Project Management Structure and Accountability.

The objectives of the LWLPCC will be:

- To implement the pre-agreed remediation strategies for the protection of the Laura Lens;
- To collect data and create a database of resource use and the potential sources of pollutants within a Geographic Information System
- To raise public awareness for protection and promotion of sustainable development of the groundwater resources at Laura.
- To build the capacity of the members to understand the water related issues affecting the community
- To empower the traditional landowners to take more responsibility and actively participate in decision making for the protecting the water source in the area
- To reduce conflict of groundwater resource use and its threats by involving all relevant stakeholders in the decision making process;
- To create a vision for the future in light of the growing population, the potential increase of pollutants and its implications on society.
- To review the outputs of the project on a regular basis and make improvements.

In Majuro, where small communities depend on community-based or individual water catchments, the people have evolved with a significant understanding of the value of freshwater supply. The limitation of freshwater supply available, has added to the stress of life that people in communities, such as Laura, live under. Because of this understanding, coupled with the lack of toilets and adequate washing facilities, the amount of fresh water consumption per capita is very low when compared to other communities. Despite this low consumption, the limited freshwater supply available to Laura community is heavily threatened and requires a immediate protection.

Protection of the Laura Lens

To protect the underground water lens, the following activities will be implemented:

- Connection of all households to a series of community disposal septic tanks to enable adequate sewage and disposal to prevent untreated sewage from infiltrating into the groundwater lens
- Implementation of a Sewage Monitoring, Collection and Disposal System to monitor the sewage levels of the septic tanks and establish a robust collection and disposal strategy to initiate timely sewage transportation and disposal into the Public Sewer in downtown Majuro.
- Development and implementation of a solid waste collection and disposal system to prevent creation of breeding grounds for disease vectors from spreading in the community and to prevent leachate into the ground water lens

- Implementation of community water tanks and associated equipment for rain harvesting in Laura to reduce local pressure and demand on the Laura lens water resource
- Inspection of leaks in the water system from Laura Village to the reservoir for repair works to prevent waste of water during the pumping of freshwater from the lens to the reservoir
- Establishment of zonings in the area to ensure activities that cause pollution are located far from the water source
- Relocation of pig pens to safer areas away from homes situated directly above the ground water lens will be part of the protection plan, and also placing requirement for piggeries pens to be connected to the community septic tanks for disposal of waste water.

Community Disposal Septic Tanks

The function of the public disposal septic tanks is to receive sewage in liquid form from the overflowing household septic tanks and allow it to be emptied and delivered to the disposal facility in Majuro. Many of the 300 households in Laura have an average of 10 people per house but do not have septic tanks or any form of sewage collection, treatment and disposal. Of the houses that's do have individual septic tanks, all were previously poorly constructed and have been overflowing, leaking and failing for some time. Disconnection has been the only option to prevent further contamination of the groundwater lens. It is an imperative part of this proposal that the implementation of the new community septic tank system will be designed and overseen by qualified water resource consulting engineers to ensure that the system will be robust and meet the demands of the community.

Firstly, an assessment of population density of the whole of Laura will be made using the RMIEPA Geographic Information System to establish the most suitable location for three community septic tanks. Three large community disposal septic tanks will be constructed by Republic of the Marshall Islands Ministry of Public Works (RMIMPW) strategically placed in three different areas to service an average of 1500 people per tank (assuming population increases in the next 10 years). All households will be connected to the new community septic tanks. Decommissioned individual household tanks will be removed if failing or connected to the community tanks if simply overflowing. This will ensure that every single household is connected and has adequate sewage collection, treatment and disposal. A community sewage service truck will be required to transport the monitoring team made up of Majuro Water Sewage Company (MWSC), RMIMPW and RMIEPA to inspect the community septic tanks on a monthly basis to asses the levels sewage in the community tanks. Please see ANNEX C for the letter of support for this project from MWSC. Based on the increase in sewage levels, the team will devise a collection strategy to transport the sewage and dispose of into the Majuro main sewerage system, using the sewage collection truck.

Toilet Facilities and Water Catchment

The toilet facilities in the households of Laura will be flushed using saltwater so as not to create any unnecessary demand on the freshwater lens. A saltwater pump will be required for the project to flush the toilets with saltwater pumped from the lagoon. The waste water and sewage will then be flushed into the community septic tanks. Many households in Laura do not have flushing toilets or toilets of any kind, and therefore new toilet systems will be provided for under the housing development project with the National Development Bank for new homes in Laura to ensure all their domestic sewerage is connected to the system to be collected and disposed of to prevent contamination of the lens.

The additional water catchments and toilet facilities for all the households in Laura will be provided by the EU Funding Envelope B and the Rural Development Bank funding. In addition, water catchment facilities and water tanks will be provided to reduce demand on the water supply from the lens, where by rainwater catchment facilities will be installed within the Laura community.

Solid Waste Collection and Disposal

A Pilot Project for solid waste collection and disposal funded by the Asian Development Bank (ADB)TA No. 4653 (RMI) is currently being implemented by the Majuro Atoll Waste Management Company (MAWC) for Rita in downtown Majuro. This will be used as a model for a similar system in Laura.

It is proposed that 3m² bins be assigned to cater for approximately 8-15 households in Laura depending on accessibility and the willingness of the community to host bins. Approximately 20 - 30 bins will be needed. An assessment of the need and type of bins was conducted by the ADB project team for the Rita project, whereby stakeholders, which included the government, the private sector and the general public, supported the use of these bins because it prevented animals from entering the bins, reduces smell, keeps solid waste tidy and most importantly it was the most versatile collection system suited for Majuro Atoll's environment. A survey of the most suitable locations for the bins will be undertaken for Laura Village and a comprehensive public awareness and consultation program will be developed in tandem with the introduction of the bins. The program:

- (i) Seeks the cooperation of the community, including the traditional landowners
- (ii) Informs the community on the proper use of the bins, including sorting waste for recycling at the *Mottainai* Recycle Centre
- (iii) Informs the general public where the bins are located
- (iv) Informs the general public that there is an alternative to dumping solid waste in the lagoon and private tips and burning waste
- (v) Informs the community that compliance monitoring and a phase-in of compliance enforcement will be conducted to ensure the solid waste systems are utilised.

A solid waste collection truck will be required by the project to service Laura, by emptying the bins into the truck for transportation to the Majuro Public Dump in Jable approximately 30 miles from Laura. This will be conducted once a week for this first two months. Monitoring will be undertaken during the first two months to assess if one collection a week is adequate to dispose of all waste. Based on a review of the monitoring collection times may be increased. It is anticipated that funding for the equipment for the mobilisation of the solid waste collection system in Laura will come from US Compact funding and Republic of China (ROC) funding. Additional funding will be required for the operation of the collection and disposal system which will be funded through this GEF proposal. A letter of commitment and support for this proposal is provided by MAWC in ANNEX C.

MAWC have recently taken over the responsibility for the management of the public dump, including collection, treatment, storage and disposal and have been making major improvements. MAWC will be responsible for the solid waste part of the plan for Laura. This will build on the solid waste collection, treatment and disposal system already in place for the rest of Majuro. Laura and the far end communities to the west of Majuro, are currently the only communities without assistance from the MAWC and therefore this will be a major improvement ensuring that local landfill sites are no longer used as all trash will be collected in bins and transported to the public dump.

This will build on current initiatives in Majuro. On top of daily collection within the rest of Majuro, MAWC and the RMIEPA are both negotiating with foreign companies to come to Majuro to remove metal solid waste for recycling overseas. This would involve cutting up existing old cars, containers, vessels and other metal structures that line the coast of Majuro, loading them onto a large barge for transportation overseas. This would vastly improve the water quality and aesthetic appearance of the coast.

Other initiatives in support of this work are the regular clean ups undertaken by RMIEPA, the Marshall Islands Conservation Society (MICS) and Japanese Overseas Cooperation Volunteers (JOCV) where by beach cleans and road clean ups are advertised in local communities for all to join in. This has proved a very popular activity on Saturday mornings and builds on the daily road cleans being undertaken by the MAWC.

Inspection and Repair of Water Pipes from Laura to Majuro Reservoirs

Over half of the freshwater from the groundwater lens that is pumped daily to the Majuro city water supply reservoir is lost due to leaks in the pipe, possible incorrect water pressure management and illegal water connections.

Currently, MWSC do not have the resources and equipment to conduct a thorough inspection of the pipes to identify the main sources of water loss. However staff from MWSC are attending an upcoming SOPAC Water Demand Management workshop facilitated by SOPAC in Pohnpei next month on Water Loss and Leak Detection.

Funding from New Zealand through SOPAC's Water Demand Management Project will provide equipment and specialists from SOPAC to provide assistance to MWSC in identifying the sources of the water loss in the pipes. Specialist equipment, such as flow meters, pressure meters, loggers will also be provided to assist the survey of the entire system for leakages. The leakages report produced will also identify measures to improve water pressure management and identify the locations along the pipe where there are currently illegal connections.

Once this is completed, the MWSC will repair the system which will be supported by Government funding. A letter support from MWSC to this intent has been provided in the ANNEX.C. In addition, MWSC, supported by EPA will work together to stop the illegal water connections.

Implementation of these measures will bring Laura community and the Government in line with RMI environmental national legislation, namely the Toilet and Sewage Regulations 1990 and the Public Water Regulations 1994 and Solid Waste Regulations 1988.

Water Resource Use Planning

A Geographic Information System of water resource use and associated activities has been created by RMIEPA. The GIS contains details of all the households, water resource use and the threats to the lens including locations of the piggeries, cemeteries, landfill sites and illegal dumps etc. Monitoring wells have previously been installed to assess the level of water in the lens. These monitoring wells are serviced and evaluated by MWSC and are also plotted in the GIS. This system will be used to plan the locations of the community septic tanks, water catchment facilities and solid waste

facilities. The GIS will also be used to identify suitable areas away from the land under which the groundwater lens sits, where piggeries and other associated threats to the lens can be relocated.

Consultation and Public Awareness Strategy

Consultation with the relevant stakeholders at the national level and local level is essential to the success of the project. The LWLPCC includes members from relevant Ministries in Government and regulatory authorities, and also important landowners whom will be responsible for communicating important information back to the local people.

Consultation by the LWLPCC with the community is essential to facilitate the implementation of the plan. For example it will be necessary for some restrictions to be imposed on use of hazardous chemicals and pesticides by the farmers, and especially for construction of proper storage of farm chemicals. Successful consultation and awareness raising has already been demonstrated through a recent workshop on pesticides with 48 farmers in Laura. The workshop was jointly conducted by the Collage of the Marshall Islands Land Grant (CMI), Ministry of Resources and Development's Agriculture Unit (R&D) and the Environmental Protection Authority (EPA) and issues such as fertilizers, pesticides, and regulations were addressed during the workshop. Many of the farmers were not aware of the side effects or risks associated in mishandling the chemicals in their farms. Many have decided not use pesticides or many of the fertilizers after attending the workshop gaining knowledge that there are other safe and effective local materials available for use as fertilizers. Many also learned not to store chemicals in places their children will have easy access. A frequent targeted approach to awareness raising and consultation will be essential for this level of responsibility to continue into the future. One of consultations and awareness campaigns are not sufficient on their own and therefore workshops would be organised four times a year to achieve the following outputs:

- Continued awareness raising at the local level
- Review of current human activities and practices affecting the groundwater resource
- Update of Laura Lens Inventory and GIS Database
- Review and guidance on options to reduce the impact on the resource
- Review of zoning plans to reduce impact n resource.

In addition, the Marshall Island's Visitor's Association whom are responsible for promoting tourism in RMI will also be involved in the public awareness raising for the project. MIVA have a mandate to raise public awareness on solid waste management issues and EPA and MIVA already have a partnership in place, conducting public awareness on solid waste in schools in Majuro. Currently, MIVA place advertisements in the Marshall Islands Journal every week to raise awareness on solid waste and other environmental issues. MIVA will be part of the workshop team when conducting awareness in Laura and will also place periodic advertisements in the Journal to gather support for the project objectives.

One of the key initiatives to come out of the project will be to establish an Environmental Science Club with students at Laura Public High School. The Club will participate in community and school awareness raising projects like the current EPA program with Jesuit High School.

iii Incidental Benefits

Some of the incidental benefits to the community and to commerce that will arise from this Demonstration (and which would present added incentive) would be:

- The protection of freshwater resources of Laura Lens through implementation of sound sewage treatment and disposal systems, solid waste collection and disposal systems and relocation of current adverse human activities away from the freshwater lens area
- The groundwater lens will then be safe and clean and sufficient to supply the community of Laura and also emergency back up water supply to supplement the freshwater reservoirs for the rest of the Atoll.
- A more responsible and environmentally aware community with direct participation of the management of the resource on which they depend for future water supply.
- The protection of a national heritage by way of an important area of land of value to future generations, and to educate our future generations about their environment, flora, fauna and their history.
- Assistance with the sustainable development of alternate methods for community-based water resource management with support from the inter-agency LWLPCC.

There would be a requirement for a fully participatory consultative process to include all relevant stakeholders throughout the lifetime of this project and beyond. Such a participatory approach is essential for the long-term sustainability of the objectives and deliverables of this initiative.

The evaluation and review of the success of this project will enable similar water resource protection and management plans to be adopted in the outer atolls and islands of RMI. There are no water catchments or reservoirs in the outer islands and atoll of RMI. This Demonstration Project in Laura will provide a foundation from which to facilitate similar schemes in remote outer islands where groundwater dependence is huge and protection of their freshwater resources is crucial.

iii. End of Project Landscape:

Laura Lens Integrated Water Protection and Management Project will not only dramatically change the lives of the community of Laura but also the entire population of Majuro. The transformation of a once, contaminated freshwater lens to a fully functioning healthy system will provide the essential clean water resources on which the Laura community depend for survival and sustainable growth. In addition, in periods of natural drought, the entire population of Majuro will have access to emergency clean fresh water supplies when the public reservoirs drain low.

The community will become fully aware of the critical importance of the protection of the lens and be provided with the essential water resource facilities and infrastructure to avoid continued contamination of the lens. Following the delivery of the project, the community will become aware and compliant with the RMI environmental legislation and be empowered by the success of their project. The community will adopt ownership of the plan and become custodians of the model for best practice water resource protection and management in small island and atoll communities.

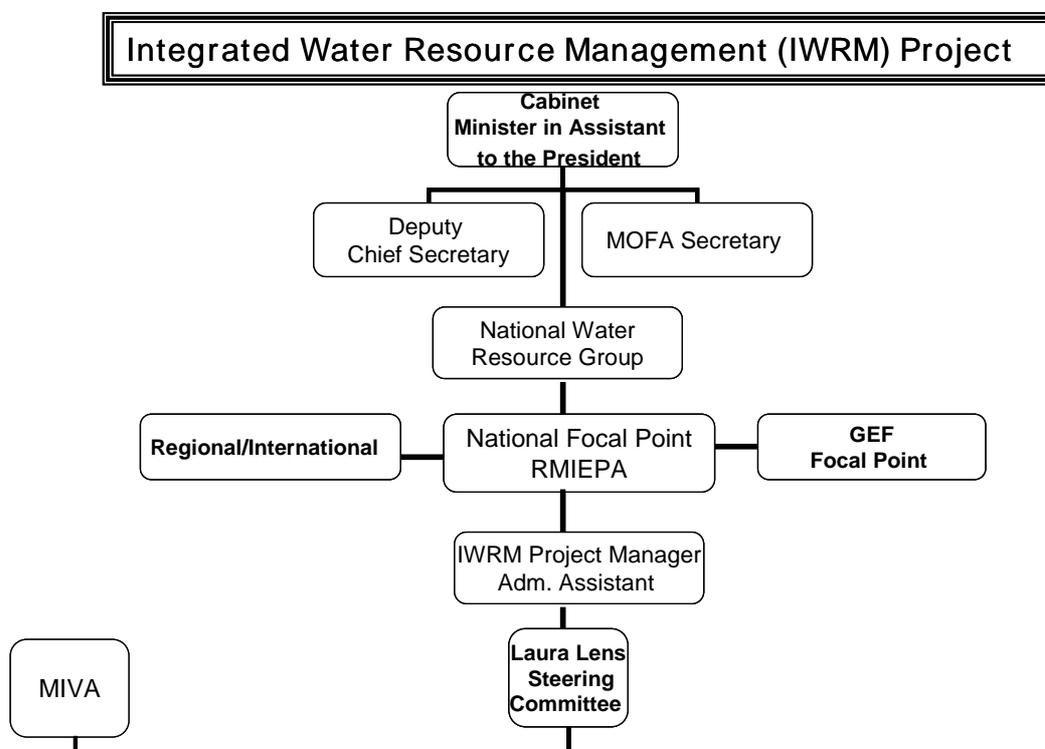
In particular, the following primary indicators should be apparent:

- A complete sewage treatment and disposal system for every household in the entire community of Laura, consisting of three new community septic tanks to be emptied and disposed of in to the public sewerage system using a new truck
- Flushing toilet facilities for every single household connected to the above sewage treatment and disposal system.
- A rainwater catchment system for the entire community to provide freshwater to alleviate the demands on the Laura groundwater lens
- A complete solid waste system for the disposal of domestic waste in strategically placed bins, to be collected and disposed of at the public dump
- An inventory of areas in the groundwater pipe where leaks occur and a strategy for maintenance to be completed by MWSC
- A government supported joint inter-agency and community committee to oversee the implementation of the project
- Alteration of methods used and types of agro-chemicals used in the treatment of crops to reduce water quality impacts on the lens
- A relocation of human activity that has a direct impact on the Laura lens through infiltration of sewage, i.e. piggeries.
- Effective monitoring and compliance will be in place ensure solid waste and sewage system are being adequately complied with.

I. Project Management Structure and Accountability:

The management of the project will be done by the RMIEPA leading the Laura Lens Integrated Water Resource Management Committee (LLIWRMC) which in turn will answer to the National Water Resource Group and Government integrated into the RMI National Disaster Management Group. It is important to note that only 10% of the proposed GEF funding will be used for project management and the rest on implementation (See detailed budget breakdown).

1. Organogram: Project Management Structure.



- a. Minister In-Assistant To The President
 - i. Cabinet/President Representative to receive copies of all Progress Reports on the IWRM project.
- b. National Water Resource Group
 - i. Created by the Chief Secretary – Members include all of the Laura Lens Coordinating Committee PLUS, Representatives from MOH, Bottling Companies, Wutmi Rep., Church Rep.

The project will be managed by the Laura Lens Integrated Water Resource Management Committee (LLIWRMC) who will be responsible for guiding and steering the project. The Steering Committee will evolve out of the existing Laura Water Lens Protection Coordinating Committee (LWLPCC), ensuring that there is appropriate facility for project implementation by Government Ministries, as well as non-government stakeholder and community participation and . The LWLPCC currently consists of the following groups:

- The Republic of the Marshall Islands Environmental Protection Authority (RMIEPA)
- Majuro Water Sewage Company (MWSC)
- Majuro Local Government (MalGov)
- NOAA Weather Station
- Laura Farmers Association
- Laura Senior Landowners
- College of the Marshall Islands (CMI) Land Grants Department

The LWLPCC will consist of the key Government groups responsible for implementing the project, and will collectively be known as the Steering Committee. The groups and their roles are listed below:

Organisation	Role
Republic of the Marshall Islands Environmental Protection Authority (RMIEPA)	Project steering and management, Geographic Information Systems, Compliance Monitoring
Majuro Water Sewage Company (MWSC)	Water resource assessment, overview and guidance of septic tank and water catchment implementation
Republic of the Marshall Islands Ministry of Public Works (RMIMPW)	Construction of sewage systems, toilet facilities, water catchment
Republic of the Marshall Islands Ministry of Finance (RMIMF)	Accounting for project budget and distribution of funds
Majuro Atoll Waste Company (MAWC)	Solid waste system, implementation, collection and disposal
Laura Water Lens Protection Coordinating	Awareness raising, dissemination to the Laura

Committee (LWLPCC)	community, monitoring and review of project
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The Steering Committee will seek advice and guidance from technical experts and particularly from stakeholder groups which will review, monitor and evaluate project strategies as they are being developed and implemented. Consultation and awareness raising through the current LWLPCC will be instrumental to the success of the project.

As the project evolves, the long-term intention will be for the LWLPCC to gradually take on the management of the protection of the Laura Lens through implementing the recommendations of the Laura Protection Plan. The Government Departments involved in the project will provide ongoing support. In particular the RMIEPA will offer assistance through continued public awareness, enforcement of the environmental regulations to avoid damage to the lens and the MAWC will continue to provide solid water services and MWSC will condicy monitoring and maintenance of the pipes and lens itself.

The Steering Committee will report from time to time (as required by the overall IWCAM Executing Agencies), on the status of the demonstration project (see **M. Monitoring and Evaluation**).

J. Stakeholders and Beneficiaries:

Various government departments and institutions will be involved in an integrated and multisectoral approach to the development and implementation of the objectives and deliverables of this demonstration project. They include:

- The Republic of the Marshall Islands Environmental Protection Authority (RMIEPA)
- Majuro Water Sewage Company (MWSC)
- Majuro Local Government (MalGov)
- Majuro Solid Waste Company (MAWC)
- Ministry of Finance
- Ministry of Public Works

However, it will be essential to involve the entire community of Laura and other non-governmental stakeholders to capture traditional knowledge and expertise and foster support for the overall process, and to actively contribute to the implementation of a shared vision for the protection and management of the Laura Lens. These will include the following;

- Laura Senior Landowners (Community)
- Laura Farmers Association (Community)
- NOAA Weather Station
- College of the Marshall Islands (CMI) Land Grants Department.

International and local NGOs will also be asked to participate in the project aside from the members of LWLPCC. Under the National Disaster Reduction and Mitigation Plan, a National Water Coordination Group will be established to promote development and management of water resources in RMI. This group will consist of representatives from different Government Agencies and Ministries and International NGOs many of whom already have some degree of input into the LWLPCC.

K. Long-term Sustainability Strategy:

The long term sustainability of the Laura groundwater lens is critical to ensure the continued provision of freshwater supply to the community of Laura and the rest of Majuro Atoll. In atoll nations, freshwater is finite and extremely scarce where limited land space makes the provision of purpose built reservoirs a problematic development. Additionally, natural underwater groundwater lenses are also scarce and easily contaminated in rapidly urbanising land areas, making the protection and management of these resources essential. The lack of adequate water resource infrastructure results in a variety of serious issues such as pollution and contamination, wasting water resources and poor resource use.

The long term sustainability of the freshwater lens can be achieved through reducing the demand on the freshwater lens through the provision of water catchments. The contamination of the lens can be reduced and pollution sources eliminated through the provision of adequate sewage and solid waste collection, treatment and disposal. Zoning of land-based human activities can be undertaken to remove point source infiltration from agriculture and other associated sources of pollution, so that these activities no longer lie directly on top of the fragile freshwater lens.

Long-term sustainability of the project's objectives and deliverables will hinge on demonstrating the value of the water resource, through awareness raising and information disseminating through the Laura Water Lens Protection Coordinating Committee. The project will demonstrate to the community how alternative practices combined with lifestyle improvements will create major improvements in the community's environment, human health and quality of life. By being directly involved in the co-ordinating, management process and decision making of the project the community will be empowered to act more responsibly and see themselves as custodians of a sustainable model for small island water resource use which can be replicated worldwide.

As part of encouraging awareness at the grass-roots level, water quality monitoring programmes (and other associated environmental monitoring) have been developed by the RMIEPA and MWSC. This project will build on the monitoring and include plans to monitor sewage levels in septic tanks and solid waste surveys. The responsibility will be with the RMIEPA, MWSC and MAWC and will also involve members from the through the LWLPCC supervised by the RMIEPA. The need for the monitoring process would be explained, and would provide a linkage and an explanation to the overall management and policy process as well as any legislative requirements.

Financial sustainability of the project objectives and deliverables will depend on government commitment and stakeholder support. Certain disincentives for water wastage of inappropriate land use and practices may well include compliance monitoring of the environmental regulations. However, the focus would be on phasing in the enforcement as time is required for the community to understand the alternative systems and make use of them to avoid damage to their resources.

L. Replicability:

The regional environmental benefits from developing such a model would be in its replication within developing areas of the other 28 outer islands and atolls of RMI. In addition, the project would provide regional replication in other atoll nations who critically depend on proper protection and management of their finite and scarce freshwater resources, nations such as Kiribati, Tuvalu, Niue and Federated States of Micronesia (FSM).

Once this project has been completed, the steering committee will report to the Government of RMI to demonstrate how this model can be replicated in other outer islands. Outer islands in the RMI that have growing populations and a lack of adequate sewage treatment systems or freshwater supplies include Ebeye, Wotje, and Jaluit. Resettlement programs will require this model to be replicated in re-populated islands of Rongelap, Enewetak and Bikini. None of these atolls and associated islands have a public water supply system or reservoirs. It is not feasible to construct such systems on such small islands as connection between islands and communities would make such systems extremely difficult and not economical. Therefore water catchment and proper community sewage treatment systems are the most sustainable and economical solution to provide freshwater and protect groundwater resources.

Similarly, other atoll nations could take this model and utilise it for their own community-based water resource plans. All atoll nations face similar problems with water resource use, protection and management and Laura project will provide a replicable model that can be adopted and implemented for all small isolated island communities.

M. Monitoring and Evaluation Process:

The Project will be overseen by a Steering Committee made up of stakeholders to the project and chaired by the General Manager of the RMIEPA. Each group member of the steering committee will produce brief quarterly Progress Reports to be presented at each review meeting. Once every year a detailed report will be compiled by the RMIEPA and submitted through the Steering Committee to the Executing Agencies. This report will provide a full review of the workplan to identify project achievements and deliveries versus the approved schedule, budget expenditures, recommendations with respect to any amendments to workplan and budget, staff contracting and performance, and any other information required by the Steering Committee and/or the Executing Agencies. Furthermore, the Regional IWRM Executing and Implementing Agencies will carry out monitoring and evaluation of all of the national IWRM demonstration projects as part of the Full IWRM Project.

Monitoring of the project indicators and outputs will be reported in the progress reports. Recommendations for revisions and improvements will be made where necessary. The detailed list of indicators will be used as a benchmark to gauge the project outputs. The water quality of the lens will be a key indicator, with the presence of bacteria and other water borne diseases reducing as the project progresses. The quantity of water available for supply from the lens will also be monitored. These two indicators will be the primary tools to assess the improvements made by the project implementation. In addition, monitoring of community compliance with regulations, and general environmental well-being of the community will be assessed to measure the projects success.

Project Activities	Outcomes	Baseline Indicators (existing condition)	Target Indicators (apply SMART)
1. Construction and Installation of Community Disposal Septic Tank Systems	Implementation of new Septic Tanks Systems to be designed by water resource engineers to ensure the system will be robust and meet the demand of the community.	<ul style="list-style-type: none"> • Lack of sanitary septic lead to poor hygiene and sanitation. • High incidences of water related diseases. • High level of faecal contamination of groundwater lens. 	<ul style="list-style-type: none"> • Three operational Community Septic Tank Systems installed by end of year 5. • Reduced number of water related diseases by 80% by end of year 5. • Periodic emptying of filled septic tanks by Sewage Delivery truck. • By the end of the project, 100% of all residences will be using flushed toilet and connected to a sanitary Community Septic tanks.
2. Installation of Saltwater Flushed Toilet and Solid Waste Collection Bins at individual households.	Improved sanitary facilities at Laura households and management of solid waste disposal.	<ul style="list-style-type: none"> • Lack of household sanitary facilities. • Continue use of beaches and bushes as toilets. • Undesirable siting of solid wastes landfills 	<ul style="list-style-type: none"> • 100% of all individual households connected to saltwater flush toilets by end of project year. Community have access to solid waste disposal facilities.
3. Relocation of pig pens to safer areas away from homes situated directly above the groundwater	Reduced pollutant sources to groundwater.	<ul style="list-style-type: none"> • Wastewater from pig pens pollutes groundwater 	<ul style="list-style-type: none"> • All pig pens sites should comply with national safe drinking water standards.
4. Implement Rainwater Harvesting System	More rainwater tanks made accessible	<ul style="list-style-type: none"> • Limited water supply • Pressure on water lens due to high demand of water 	<ul style="list-style-type: none"> • About 70% of Laura residences have access to rainwater by end of year one. • Freshwater lens become more sustain ably managed by Water Managers
5. Develop and Implement Solid waste Collection and Disposal System	Better management of solid waste disposal and reduce uncontrolled landfill activities	<ul style="list-style-type: none"> • Uncontrolled disposal of solid waste. 	80-90% reduction in solid wastes violation and non-compliance to RMIEPA Solid Waste Regulations.
6. Establishment of zoning in the area using GIS to ensure activities that cause pollution are located far from the water source.	Better management of water extraction and water supply.	<ul style="list-style-type: none"> • No proper planning of surface activities such as location of pig pens, cemeteries, and septic. 	<ul style="list-style-type: none"> • Reduced/eliminated sources of contamination. • Land-based activities are monitored and sited away from water sources.

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7. Consultation with the Stakeholders at the National and Local Level	Increased awareness on the proper usage and protection of water resources.	• Lack of knowledge and understanding of groundwater lens.	<ul style="list-style-type: none"> • Proper handling and storage of hazardous chemicals and pesticides during the project years. • Landowners and farmers switch to safer and more effective fertilizers.
8. Implement the monitoring and collection of sewage from Laura to the Majuro Public Sewer	Periodic emptying of Laura Community Septic to avoid groundwater pollution.	• Lack of sewage truck to empty filled/overflowing septic.	• Accessible of Sewer Delivery Truck for emptying filled Septic tanks.
9. Assessment of the Laura Population density using GIS.	Data collection on the number of households and acquire population density.	• Lack of zoning for housing and infrastructure development	• 80% of all residences be properly sited and control of infrastructure development.
10. Decommissioning of overflowing and leaking septic tanks.	Reduce eliminate sources of pollutants to groundwater resource.	• Lack of understanding and knowledge of impact of overflowing/leaking septic.	• 100% of all overflowing/leaking septic be removed from surface of Laura area by first year of project.
11. Provide Sewage Service Truck to transport the Monitoring Team to inspect the Community Septic Tank	Provision of sewage service truck for Laura Community to dispose wastes at sanitary sewage disposal site.	• Non-existent	• Scheduled service to Laura to empty the Community Septic Tank on a regular basis.
12. Install saltwater pump for toilet flushing	Provide saltwater for flushing toilets to a Community Septic Tanks.	• Non-existent	<ul style="list-style-type: none"> • 80% of all household be able to use saltwater flushed toilet. • Helps reduces demand on use of groundwater resources.

N. Co-Funding:

Republic of the Marshall Islands already has projects that are in pipeline related to the protection of the underground water resources at Laura Village. These include the EU Envelope B Fund that aims to distribute water catchments to the households in both Laura and downtown urban areas in Majuro. With the distribution of these water tanks, there will be less pressure on the water lens as the demand will not be as great as it is presently being pumped to the city water reservoir at the rate of 100,000 gallons daily during drought season. With each household having access to 1,500 gallon catchments, this will play a crucial role to utilize the underground water resources in a more sustainable way. In addition, the NZ government aid project to detect leakages in the water system will also greatly reduce the present loss of water when being pumped to the water reservoir. As reported by the water company, there is about 60% of the water being pumped from Laura does not reach the city water reservoir. This means a lot of water is being lost or wasted. Further contributions to the development and protection of the water lens are also reflected in the operation routine operations of the local government and the national Majuro water sewage Co. The terms and conditions for housings under the Federal Rural Development Programs with the Development Bank require that water catchments are also provided as part of the housing loans. The Government of the Marshall Islands had also began talks with the Government of Japan for the expansion of the present city water reservoir to double its capacity as it is still inadequate to service the population for longer periods during draught. The government also intends to approach number of regional and international agencies for assistance in implementing various project elements. These agencies include UNDP, OAS and USAID. Government will provide significant co-funding through an ongoing commitment to staff salaries and maintenance. However, for the purposes of the current project proposal, activities are intended to provide seed money to initiate the planning and management process.

The RMIEPA and MIVA will match the CMI Land Grant fund of \$10,000 for public awareness of the project in Majuro and Laura.

Other co-funding associated with the protection and conservation of water resources in Laura Village includes:

1. Disaster Risk reduction in Pacific ACP States (EU) = USD1,028,625

The total EU fund is closer to US\$1.3millions but the exact figure above relates to the various components which are relative to the Laura Protection Project i.e. not Outer Island Projects, highlighted in the letter of support in ANNEX C.

Activities:

- Procurement of water tanks (capacity of 1,500 gal.)
- Construction of elevated concrete base for water tanks
- Installation of tanks
- Public Awareness, training and Monitoring

These funds will form part of the IWRM project work for water management, sanitation and awareness.

2. Water Demand Management (NZ AID) = USD32,000

Activities:

- Procurement of equipment
- Survey water system for leakages

These projects will conduct leak detection in tandem with the IWRM project.

3. HYCOS (Hydrological Cycle Observing System) (EU) = USD66,833

This is a SOPAC initiated project to conduct baseline surveys of groundwater resources in Laura and provide monitoring information for the IRWM project.

4. Water Quality Monitoring capacity Building Programme for Pacific Island Countries (NZAID) = USD76,000

This SOPAC project will conduct water quality monitoring for the IWRM project.

5. Pacific Water Safety Plans Programme (AusAID) = USD76,000

This WHO project will determine contaminant sources for public water supplies at the sources and at treatment plants and provide immediate response

6. Rural Housing Development and Improvement Project = US\$390,000

Activities:

- Construction of additional toilet facilities
- Construction of requisite pipeline to facilitate the connection of reservoirs to existing distribution network
- Procurement off drill rig and compressor

8. Majuro Atoll Waste Company (MAWC) will provide in kind donations for various equipment, planning for solid waste management, options for waste recovery and recycling = USD380,000

All of the above co-funded initiatives represent conservation measures which mitigate pressures on Laura underground lens, reduce wastage from the Laura Village aquifer or generally within the distribution system (thereby easing pressure on underground lens), streamline the overall water resource management process, and provide valuable lessons for the community. Some of the activities will provide direct baseline information for the demonstration project.

Other Co-financers Include:

- **Pacific SIDS Integrated Water Resources Management Planning Programme USD165,000;**
- **Marshall Islands Visitors Authority USD25,000**
- **Majuro Atoll Local Government USD190,000**
- **Marshall Islands Economic Policy, Planning and Statistics Office, Office of the President USD851,125**

Letters of support also include:

- **Majuro Water and Sewer Company**
- **Environmental Protection Authority (Marshall Islands).**

ANNEX A: BUDGET DETAILS

A.1. DETAILED BUDGET

BUDGET LINE	DESCRIPTION OF EXPENDITURES	Baseline	US\$		US\$		US\$
			GEF	OTHER	In-Kind	Funds	
SALARIES							
Full-Time Project Staff (30months GEF, 30 Months RMI)							
Project Manager	60months @ \$1,500/month		17,000	45,000		EPA	62,000
Administrative Assistant	60 months @ \$1000/month		30,000	30,000		EPA	60,000
Coordinating Committee Stipend	10 Members @ \$50 per 8 meeting				4,000	EPA	4,000
ADMINISTRATION (12 months GEF, 12 Months MWSC)							
Office Rental	60months@\$1000/month			50,000		MALG	50,000
Communication	Telephone, fax, e-mail @ \$300/month	51,744		18,000		EPA	69,744
Travel and subsistence (stakeholders)	9 meetings, 30 persons @ \$50 per person	15,216	3,000				18,216
Utilities	Electricity, Water, etc(\$200 per month)	230,931		12,000		EPA	242,931
Workshop costs and DSA	9 meetings @ \$1,000 per meeting				9,000	EPA	9,000
EQUIPMENT							
Office equipment	Computers and peripherals	28,214		20,000		MALG	48,214
Tank Truck	Delivery of Waste Water (1-2000 gal.)		100,000				100,000
Sewer cleaner	Clean Community Sewer	81,295	20,000				101,295
Salt Pump, Water Meters	Delivery of Salt Water	45,000	2,000				47,000
Solid Waste Equipment	Trailer etc		28,000	40,000	300,000	MAWC	368,000
	Truck, Bins etc			20,000		MALG	20,000
Construction of toilets & Watercatchments	Install additional toilets etc.				628,125	EPPSO USDA RHDIP	928,125
Solid Waste Operation	Solid waste collection and disposal		80,000				80,000

Pipe Lines	Accessories and Leak repair equipment	7,000	20,000				27,000
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Water Tanks	Household tanks (Laura only)				1,028,625	SOPAC EU B Envelope	1,028,625
MAINTENANCE							
Inspection of pipes and survey	Water Demand Project				32,000	SOPAC /NZ Water Demand Project	32,000
Leak Repair	Equipment and tools				40,000	USDA RHDIP	40,000
REPORTING AND PA							
Report and Guidelines	Reports to Steering Committee	28,050		10,000		EPA	38,050
PUBLIC AWARENESS							
	Sensitise local, tourist and policy makers	25,540		5,000		MIVA	30,540
	Workshops, Radio and Journal Advertisements	28,050		20,000		MIVA	48,050
SUB-CONTRACTS							
Baseline Surveys of Site	Hydro-geological survey				56,833	SOPAC HYCOS	56,833
	Natural resource and ecosystem survey				10,000	SOPAC HYCOS	10,000
Review of Land-Use Practices and Associated Pollution Threats	Agricultural practices review			10,000		MALG	10,000
	Pesticides practices review			10,000		MALG	10,000
Development and design of disposal Septic tank	Design and planning consultations for Septic tank Plan				50,000	USDA RHIDP	50,000
	Design and planning for solid waste management			20,000		(MAWC)	20,000
	Full Laura Water lens Management Plan			15,000	10,000	SOPAC EU	25,000
Separation of Wastes Plan	Options for recovery and recycling			20,000		MAWC	20,000
Policy and Regulations review	Study and recommendations				80,000	SOPAC EU	80,000
Monitoring and Compliance Mechanisms	Study and recommendations				25,000	SOPAC EU	25,000
Financial Sustainability Mechanisms	Identification of long-term funding				25,000	SOPAC EU	25,000

Public Awareness	Community awareness meetings				10,000	SOPAC EU	10,000
Water Quality Monitoring	Regular water tests of the underground lens.				76,000 34,250	SOPAC/WQ EPPSO	110,250
Water Safety Plans	Plan to detect sources of pollution and provide response				30,000	SOPAC/WHO	30,000
Sewage Disposal Septic Tanks	Construction materials , etc.		200,000		188,750	EPPSO	388,750
	Land Acquisition			80,000		MALG	80,000
TOTAL		541,040	500,000	425,000	2,937,583		4,403,623
			In-kind	Direct	TOTAL		
Total Co-Financing			425,000	2,937,583	3,362,583		
Percentage Co-Financing			12%	87%			

Baseline	Alternative	GEF	Co-Financing
541,040	4,403,623	500,000	3,362,583

A.2 BUDGET SUMMARY

Budget	US\$	US\$		US\$
	GEF	OTHER		TOTAL
		In-Kind	Funds	
Salaries	50,000	155,000	13,000	218,000
Equipment	250,000	80,000	2,256,750	2,586,750
Maintenance	-	-	72,000	72,000
Reporting and PA	-	10,000	-	10,000
Public Awareness	-	25,000	-	25,000
Sub Contracts	200,000	155,000	595,833	950,833
Total	500,000	425,000	2,937,583	3,862,583

ANNEX B: LIST OF ACRONYMS

ADB	Asian Development Bank
CMI	College of Marshall Islands
EPA	Environmental Protection Authority
EU	European Union
FSM	Federated States of Micronesia
GEF	Global Environment Fund
HYCOS	Hydrological Cycle Observing System
JOCV	Japanese Overseas Cooperation Volunteers
IWRM	Integrated Water Resource Management
LWLPCC	Laura Water Lens Protection Coordinating Committee
MaLGOV	Majuro Local Government
MAWC	Majuro Atoll Waste Company
MICS	Marshall Islands Conservation Society
MIVA	Marshall Islands Visitor's Authority
MWSC	Majuro Water Sewer Company
MPW	Ministry of Public Works
NOAA	National Oceanographic Atmosphere Administration
RMI	Republic of the Marshall Islands
RMIEPA	Republic of the Marshall Islands Environmental Protection Authority
RMIMF	Republic of the Marshall Islands Ministry of Finance
RMIMPW	Republic of the Marshall Islands Ministry of Public Works
SOPAC	South Pacific
SPREP	South Pacific Regional Environmental Programme
UNDP	United Nations Development Programme
USAID	United States AID

ANNEX C LETTERS OF SUPPORT

See Letters in Country File