GEF IW Stress Reduction Activity

Dry Litter Technology Monitoring Plan

**(Country Name)**

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# Contact Information

|  |  |
| --- | --- |
| **Organisation name:** |  |
| **Contact Person/s:** |  |
| **Phone Number:** |  |
| **Email:** |  |
| **Postal address:** |  |

# Project and Activity Details

|  |  |  |  |
| --- | --- | --- | --- |
| **Project component** | **Outcome** | **Target** | **Indicator** |
|  |  |  |  |
|  |  |  |  |
| **Year activities commenced:** |  | | |
| **Total number of sites within this activity:** |  | | |

# Scope of the Monitoring Plan

This plan outlines the site selection, sampling methods, frequency and reporting requirements for (*check those that apply*):

|  |  |
| --- | --- |
| Coastal water quality | Revegetation |
| Freshwater quality | Wastewater discharge |
| Groundwater quality | Compost compliance |
| Soil or sediment quality | Habitat Assessment |
| Management effectiveness | ….. |

Site sampling and monitoring pro forma used (*check those that apply*):

|  |  |
| --- | --- |
| **Record Keeping** | **Indicator Monitoring** |
| Pilot Site Description | Revegetation survey |
| Description of on-ground works | Water quality |
| Project Journal | Site Condition Assessments |

# Activity Objectives and Goals

The over-arching objective of the activities is to establish locally appropriate and well-supported dry litter technology demonstration sites. Continued use of this technology and research into its optimisation will promote uptake in the farming community and allow for significant reductions in nutrient and pathogen release to the coastal and lagoon environment from animal waste currently washed directly into the receiving environment.

## Activity Objectives

|  |  |  |
| --- | --- | --- |
| **Main objective** of this activity  (*check one most relevant objective*) | Biodiversity conservation/ restoration  Stream bank stabilisation  Improved catchment management  Sustainable farming practices  Fisheries protection | Water quality improvement  Improved domestic animal waste management  Improved human waste management  Other (describe)…………………………. |
| **Other objectives**  (*check any that apply*) | Biodiversity conservation/ restoration  Stream bank stabilisation  Improved catchment management  Sustainable farming practices  Fisheries protection | Water quality improvement  Improved domestic animal waste management  Improved human waste management  Other (describe)………………………. |

If appropriate provide further details on activity objectives. (e.g. *conservation of near shore marine habitat for sea turtle hatchling sites, potential to reduce occurrence of sargassum blooms in the lagoon etc…*)

## Specific Activity Goals

1. Coordinate with (*insert relevant partners and local community/farmers*) to collaborate on establishing dry-litter technology and compost use, monitoring and community outreach programs for long-term success
2. Conduct science based DLT projects that use best practice for compost compliance and use
3. Comprehensively monitor the DLT efforts, including:
   1. Water quality at adjacent sites
   2. Compost temperature and structure for pathogen reduction
   3. Type of dry material used and the impact of this on compost behaviour
   4. Social impacts of the technology for the farmers trialling it
   5. Adaptively manage the demonstration sites to optimise designs for best practice uptake in the community.

## Research and Management Questions

The questions listed below could provide information that can be incorporated into the revised designs and data collection for Dry Litter Technology in Tuvalu.

***Construction and Maintenance***

* Do site conditions affect the materials used in construction?
* Does site orientation affect the efficiency of the dry litter brush down system?
* Are the materials used in construction appropriate for their use?

***Compost Management and Use***

* Do different types of “dry” material or mulch affect the compost process?
* Do site conditions and weather affect the composting process?
* How does turning of piles affect the composting process?
* Are community members agreeable to using the finished compost product?
* What partners can be identified for monitoring compost use and suitably for domestic gardening?

***Coordination***

* Identify additional funding sources
* What other NGO’s or private business are best suited to support the uptake of DLT?
* What organisational structure is best suited for implementing and managing community DLT?

***Monitoring***

* How does the coastal/lagoon water quality at the DLT site compare to reference sites?
* Does the compost from DLT meet international standards for domestic use?
* What is the best means of collecting information from partners and stakeholders?
* What is the best means of communicating results to stakeholders?

# 

# Proposed Sites for Dry Litter Technology

A systematic approach was used to select the sites at which dry litter technology would be both useful for showcasing the technology, and potentially successful, based on site conditions, for reducing nutrient loads to coastal water. The approach entailed identifying types of sites that could be renovated and why, establishing criteria by which sites of suitable types could be selected and then ranked for priority. This process, and the resulting list of sites, is described in this section. (*This is an example, but please detail the method in which the sites were selected, and what criteria were used to choose between sites*)

## Site Types

**General Sites –**

(*Provide a brief description of the general sites that have been identified as potential for applying the dry litter technology*)

**Reference Site –**

(*Provide a brief description of the reference site/s*)

## Site Selection Criteria

To choose a reasonable subset of potential sites from within the area the following site selection criteria was used:

* List the criteria that was used to choose the sites, can include social criteria such as willingness of farmers to participate, available land and ownership etc.
* Potential for successful instalment and maintenance of the dry-litter pens and compost piles
* Willingness of local farmers to operate dry-litter technology pens
* Distance to disturbed water systems
* Potential of improvement in the status of adjacent waters
* Proximity to traditional piggeries to act as a hub for knowledge sharing
* Potential to serve as a success and act as incentive for additional funding in dry litter technology

## Site Locations

Four (4) sampling sites are included in this plan. Their locations are depicted in (*list figure*), with exact locations and access considerations described in Table 1.

Table 1: Water quality monitoring sites and locations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site name** | **Site ID** | **Brief description** | **GPS Coordinates** | **Access considerations** |
|  |  |  |  | None |
|  |  |  |  | None |
|  |  |  |  | None |
|  |  |  |  | None |

(*Include a mud map of monitoring sites*) z

# Timeline

Activities associated with the installation of dry-litter technology will occur year-round.

# Field Assessments

## Field Activities

Two main types of monitoring will be included in the program, frequency and sites are detailed in table 3.

* Photo point monitoring
* Water quality (physical, chemical and biological)
* Compost Pile Monitoring

Table 3: Monitoring parameters and frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site name** | **Site ID** | **Site type** | **Parameters** | **Frequency** |
|  |  | Activity site | T, pH, DO, BOD, turbidity, chlorophyll a, phosphate, nitrate, nitrite, ammonia, total coliform | Annually.  Low, mid, high tide  1 – 3 days |
|  |  | Reference site | T, pH, DO, BOD, turbidity, chlorophyll a, phosphate, nitrate, nitrite, ammonia, total coliform | Annually.  Low, mid, high tide  1 – 3 days |
|  |  | Activity site | Photo point, temperature, moisture | Twice a week |
|  |  | Reference site | Photo point, temperature, moisture | Twice a week |

## Photo Point Monitoring

Permanent photo points will be established at the piggery sites prior to the construction. Photos will be taken quarterly.

## Water Quality

**Person/s responsible for field monitoring and/or sample collection:** Annual water quality monitoring will be led by the Science Officer and team from the Regional R2R PCU. Support will be provided by the (*country name*) IW R2R Project Manager and (*insert supporting agency staff name & job titles*)

Unfortunately, water quality characteristics are not spatially or temporally uniform from one parameter to another. This sampling program recognizes such variations and takes measures to provide a basis for compensations for their effects. Samples will be taken repeatedly during the monitoring event to cover the full tidal cycle.

Sample collection for this activity shall follow the procedures and requirements found in the *Field Sample Collection SOP* and related parameter SOP. Field blanks and duplicates will be collected for sites and parameters.

## Compost Compliance

**Person responsible for field monitoring and/or sample collection:** The IW R2R Project Manager will conduct twice-weekly compost pile monitoring.

The compost piles are located at the same site as the dry litter pens.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Site name** | **Site ID** | **Compost Pile Name** | **GPS Coordinates** | **Access considerations** |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

(*Include a drawn ground map of monitoring sites*)

Temperature and moisture monitoring conducted twice weekly during the first 2 -3 months while the composting is most active. At these times, other notes will be made on odour, turning events, presence of vectors etc.

Sample collection for this activity shall follow the procedures and requirements found in the *Compost System SOP*.

# Maintenance

Committing to a maintenance strategy and budget is an integral component to any successful husbandry effort. The maintenance strategy associated with the effort should be integrated into all aspects of the project, from planning to implementation to the actual maintenance phase.

Much of the maintenance effort will be supply of dry litter mulch and compost maintenance. (*include additional maintenance measures as appropriate*)

Components of the dry-litter strategy include:

* Source and provide supply of dry-litter mulch as required
* Respond to and control pest vectors
* Turn and maintain the compost piles
* General cleanliness of the pig pens and surrounding areas

Each of these items will have an associated cost that will be better defined during pilot project operations. Each site will have specific maintenance needs that will need to be analysed and defined for long-term success of the effort.

# Work plan

A suggested work plan for monitoring progress towards habitat restoration at revegetation sites is described below. Monitoring schedules may change due to cost or personnel constraints however a minimum of baseline monitoring and annual indicator monitoring must be adhered to.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Year One** | **Year Two** | **Year Three** | **Year Four** |
| **Sites** | Reference, Target, Management site | Management Site | Management Site | Reference, Target, Management site |
| **Survey Type** | Site descriptions, baseline assessment | Monitoring, site condition | Monitoring, site condition | Monitoring, site condition assessment |
| **Record Keeping** | Construction, maintenance activities | Maintenance activities, monitoring events | Maintenance activities, monitoring events | Maintenance activities, monitoring events |
| **Timing** | Prior to construction | Quarterly or half yearly | Quarterly or half yearly | Quarterly or half yearly |
| **Samples** | Observations, N, P, BOD, T pH, EC compost compliance | Observations, N, P, BOD, T pH, EC compost compliance | Observations, N, P, BOD, T pH, EC compost compliance | Observations, N, P, BOD, T pH, EC, compost compliance |
| **Personnel** | Two field staff, one week per site. | Two field staff, one week per site. PM weekly for compost. | Two field staff, one week per site. PM weekly for compost. | Two field staff, one week per site. PM weekly for compost. |
| **Access** | Requires access to sites and a suitable ‘lab’ space | Requires access to sites and a suitable ‘lab’ space | Requires access to sites and a suitable ‘lab’ space | Requires access to sites and a suitable ‘lab’ space |
| **Cost**  **(indicative only)** | Staff salary  Equipment start up  Consumables | Staff salary  Consumables | Staff salary  Consumables | Staff salary  Consumables |
| **Outputs** | Site Assessments, Baseline Report, Construction Report | Monitoring Reports, updated database | Monitoring Reports, updated database | Monitoring Reports, Site Condition Assessments, updated database |

# Data Management

|  |  |
| --- | --- |
| **Person responsible for collecting field data:** |  |
| **Person responsible for transcribing field data:** |  |
| **Person responsible for data analysis and management:** |  |
| **Hard copy data storage location/s:** |  |
| **Electronic data storage location/s and method:** |  |
| **Intended data use:** |  |
| **Reporting type and frequency:** |  |
| **Report and/or communications recipient/s:** |  |