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Fifth Regional Steering Committee Meeting (Virtual) for the
GEF Pacific International Waters Ridge to Reef Project entitled:

Ridge to Reef – Testing the Integration of Water, Land, Forest &
Coastal Management to Preserve Ecosystem Services, Store Carbon,
Improve Climate Resilience and Sustain Livelihoods in Pacific Island Countries

Suva, Fiji 22nd to 23rd October 2020

PACIFIC R2R INFORMATION MANAGEMENT SYSTEMS

Summary:

The paper presents the latest update of preparation and deployment of the R2R State of Coast Platform noting key features in the database is about enabling geospatial data sharing between users, groups, and the general-public. More broadly, the primary and secondary data relevant to advancing the ridge to reef concept would include spatial data and related documents to do with the environment, governance, socio-economic and traditional ecological knowledge. Equally, the broader application of EGS & DPSIR approaches[1] provide an opportunity for better coordination and population of the Spatial Data Infrastructure and information management systems for the Pacific R2R Programme. The science portal and spatial data infrastructure launched at the 5th RSC meeting, February 2020.

[1] Ecosystem goods and services (EGS); Drivers-Pressures-State-Impact-Response (DPSIR)

Recommendations:

The Committee is invited to: -

(i) Review the latest updates of development and deployment of the GEF Regional R2R Spatial Data Infrastructure and its feature-sets including uploaded data, maps and documents
(ii) Approve GEF Regional R2R Spatial Data Infrastructure signalling commencement of the regional database and the platform to be used by relevant stakeholders to start sharing their spatial data, related assets, visualisations and models via the platform, in order to enable decision making on a national/regional scale.

Pacific R2R Information Management Systems
R2R State of Coast Platform
Spatial Data Infrastructure for GEF Pacific Ridge to Reef Programme

Introduction

1. The Pacific State of Coast Spatial Data Infrastructure for the Pacific Ridge to Reef Programme is now accessible online, http://r2r.spc.int/. In February 2020, an update of developing this infrastructure and input of data was presented and considered by stakeholders at the RSTC first technical consultation.

2. At that technical consultation, there was opportunity to explore the GEF R2R Spatial Data Infrastructure deployment and its feature-sets, and provide advocacy for the platform at a national project-level to encourage relevant stakeholders to start sharing their spatial data, related assets, visualisations and models via the platform, in order to enable decision making on a national/regional scale.

3. The paper presents the latest update of preparation and deployment of the R2R State of Coast Platform noting key features in the database is about data sharing between users, groups, and the general-public. The science portal and spatial data infrastructure will be launched at the RSC meeting.

Background

4. Beginning of 2019, GEF Ridge to Reef Programme engaged Geo-informatics Section within Geo-science, Energy and Maritime Division, SPC to design and develop a data repository for the State of Coast platform. The section started implementing the project using the parallel approach of:-

(i) Collating regional baseline spatial data for national projects, and facilitating access to available spatial data, derived from several SPC-hosted, regional and international platforms; and
(ii) Developing an extensible mapping platform to enable sharing of data products from the programme.

5. After a year of prototyping, which was mostly dependent on availability of relevant data-sets and templates, the section stood up an Spatial Data Infrastructure, built upon industry standards, which the section envisages will cater for the data exposure and analytical needs of the projects, and will be well supported by the GEM Division beyond lifespan of the GEF R2R programme.

6. Currently the platform hosts baseline and project data for approximately 6 pilot sites, such as in Vanuatu and Waimanu Catchment River, Fiji, along with some regional open data deemed relevant to the national projects. The datasets have relevant metadata tied to them. The GEF R2R Programme Unit has engaged interns who would continue to populate the SDI platform on behalf of national projects.

7. The platform is deployed on Amazon Web Services, Sydney, and being built on proven open source standards and components, can be deployed at national levels with minimal costs and on commodity hardware (e.g: no licencing costs). GEM Division has been supporting similar SDI platforms in the region, at a country-level or ministry-level for the past 12 years.

8. The R2R State of Coast SDI is interoperable (able to seamlessly share and consume datasets) with other CROP regional data platform initiatives, such as SPREP INFORM national data portals and SPC's Pacific Data Hub initiatives.

What is a Spatial Data Infrastructure (SDI)?

8. A Spatial Data Infrastructure, commonly referred to as SDI, enables the efficient use and management of spatial information. Although the manifestation of an SDI is ultimately a technology platform of loosely coupled servers and services, at its heart there is a core set of four guiding principles: people, standards, policy, and data.

9. People are an integral part of any SDI, as they will use it to deliver services and analysis to stakeholders. Within a corporate environment, one can categorize people into three broad types: -

(i) Data Producers - who use powerful GIS/RS tools to create, manipulate, and maintain spatial information, derived from remote sensing techniques or field surveys.
(ii) Data Users - concerned with the analysis and interrogation of spatial information to provide answers. They use a combination of web-based and desktop-based tools.
(iii) Data Consumers – primarily non-technical, concerned with the consumption of data products, analytics and models (usually from data users) to inform decision making and/or business planning.

10. A guiding principle for an SDI is interoperability, which is to say that a policy around the use of spatial tools should not necessarily dictate or advocate the use of any one specific tool. In other words, standardization should not be achieved at the software or tool level but rather at the service level, through the adoption of industry-recognized standards, such as those of the OGC. This ensures long-term sustainability and data reuse beyond project/ funding life cycles.

The Application and the Benefits of the R2R Spatial Data Platform

11. The R2R spatial data infrastructure is all open source and systems that can be deployed into any of the national projects with zero licence needed, thereby making it cost-effective. The platform is user-friendly for non-technical people and allows multiple users updating one map without the restriction of expensive GIS software or power computers.

12. The R2R regional database will be regularly populated with all the necessary R2R datasets and provide easy extraction of data for analyses. The data can also be constantly updated as information becomes available and uploaded. The regional database will be launched along with the re-development of the R2R website at the upcoming RSC meeting.

13. Accordingly, the R2R spatial data is used to develop maps depicting resources, hot-spots, habitats and other related specific "essential life support areas". This was done for the spatial prioritization modelling and trialling work in Vanuatu, where globally available spatial datasets were used to identify coral reef and forest areas in order to develop maps of priority areas for management and conservation actions (national), and forecast outcomes of existing management plans particularly in localized areas (local).

14. For other participating countries including PNG, Samoa and Tonga, spatial data is also used for mapping or performing GIS based watershed analysis. This is done using Quantum GIS to model watershed features and produce maps depicting the current state of watersheds and predictive impact of existing land over and development pressures on the land. The model should be able to identify critical watersheds for conservation because of their role in protecting terrestrial soil and freshwater resources and downstream coastal and marine resources and habitats.

15. For instance, in Samoa land cover mapping used high resolution aerial photography or satellite imagery. This data is available from Forestry Agency or can be collected at lower resolution by WRD using Google Earth Imagery or drones. Ground-truthing and field observations incl. GPS positions can help verify or improve the above data by transferring and overlaying onto a satellite imagery.

16. The following list of datasets are freely available and accessible online on the following links.

Type	**Source**
Watersheds	databasi.org
Land Cover	maps.elie.ucl.ac.be/CCI, www.globallandcover.com
Rainfall	worldclim.org
Soils	isric.org
Streams/Rivers	hydro.iis.u-tokyo.ac.jp/~yamadai/MERIT_Hydro/
Coral Reefs (1)	data.unep-wcmc.org/datasets/1
Seagrass	data.unep-wcmc.org/datasets/7
Mangroves	data.unep-wcmc.org/datasets/4
Coral Reefs (2)	allencoralatlas.org
Population Grids	SPC Statistics for Development, UN Humanitarian Data Exchange

Outlook and Next Steps

13. Since the February meeting, the database development and deployment continued along with the collection and input of primary data from baselines and RapCA fieldworks and observations. There were also ongoing efforts on the extraction of secondary spatial data from reports and publications, derived from several SPC-hosted, regional and international platforms.

14. The following provides a list of other important steps leading up to launching at the next RSC meeting.

(i) Encourage national projects to take ownership and provide feedback for further development
(ii) Enable external project stakeholders to expose their data and assets via the platform
(iii) Facilitate credentials and instructions on administrating datasets and products to external stakeholders and national project counterparts.

(iv) Complete Environmental Data-Sheet Register (GEF R2R Programme Interns), Seek Feedback on Harmonised and Standardises Data Templates
(v) Implement Indicators Capture and Analytics
(vi) Raise awareness with other partnerships, STAR, IW, SPREP etc, and enable relevant data exchange interoperability where possible (eg: pacific-data.sprep.org and other global environmental data platforms)
(vii) Regional training targeting STAR & IW R2R Project Managers and Coordinators, and RPCU staffs on the application and utility of the Spatial Data Infrastructure (SDI)

Recommendations

15. The Committee is invited to: -

(i) Review the latest updates of development and deployment of the GEF Regional R2R Spatial Data Infrastructure and its feature-sets including spatial data populated across the pilot sites;

(ii) Approve for launching GEF Regional R2R Spatial Data Infrastructure signalling commencement of the regional database and the platform to be used by relevant stakeholders to start sharing their spatial data, related assets, visualisations and models via the platform, in order to enable decision making on a national/regional scale.

ANNEX 1: REGIONAL R2R DATABASE TRAINING

Introduction

GeoNode is an Open source web-based application and platform for developing geospatial information systems (GIS) and deploying spatial data infrastructures (SDI). It is designed to be extended and modified and can be integrated into existing platforms. Broken into usability components, GeoNode is a Web Application used to: -

- Upload, manage, and share geospatial data
- Create and share interactive maps
- Collaborate and interact with other users

Objectives

The overall aim of the GeoNode Training Package is to increase the understanding and awareness of the benefits of sharing data and geospatial information through open source web-based systems, such as GeoNode. Specifically, the purpose of this guide is to provide a comprehensive manual on how to use GeoNode more effectively and provide practical training on how to achieve this.

Expected Outputs

At the end of the training modules, it is expected that GeoNode user will be able to:

- Understand basic concepts of using an open source web-based system for sharing geospatial information.
- Access and analyse the risks from flood, landslide and strong wind hazards at the Suco sub district or district level
- Produce comprehensive and illustrative maps by using existing data layers or by creating new data layers.

This manual reference information from SPC's PCRAFI User Training Manual, the official GeoNode documentation online– all merged and adapted for the R2R Regional Projects State of the Coast Spatial System.

Manual Reference

Data Management Guideline: GeoNode User Training Manual has been adapted for the Pacific using R2R State of the Coast Instance GeoNode Version 3.00 *dev*

Additional Considerations for the Database Training:

Step 1 – Visit the online GEF Regional R2R Spatial Data Infrastructure to view what's available

The facility is powered by GeoNode Version 3.0, OGC Web Services. The information for developers is accessible on http://r2r.spc.int/developer/. Anyone can explore the online information categorized as follows: –

(i) Data – layers, documents, remote services
(ii) Maps – explore maps
(iii) About – people, groups

Step 2 – Collection of primary and secondary spatial data including satellite imageries and upload onto the science portal

All R2R baselines and RapCA data will be harvested and uploaded onto the regional database. The data includes that of water quality, bathymetry, hydrology, habitats (forest, mangroves, seagrass, coral reefs), Raw data from field work upload straight online or enter into an XL then upload. Notably, high resolutions datasets are accessible from open source web-based platforms and systems, which provide better results.

Step 3 – Extraction of spatial data from published reports and upload on to the science portal

Not all the time primary datasets are available for graphs we read in reports and publications. If this this the case, use the free online software that can estimate relative data underpinning a graph. To this this, extract the graph and export to the online software on this link https://apps.automeris.io/wpd/ to provide datasets associated with the graph.

Step 4 – Digitization of maps and plots that are picture-shots

This includes taking high resolution snapshot, geo-rectify the image and digitize or vectorize the vectors and assign appropriate attributes in table format for uploading online.

Where there are ranges given for parameters then simply build another table with separate columns for minimum and maximum values. It is easy to extract and analyze or graphs such datasets.

Check with the above software if possible, to digitize plots depicting spatial data from numerous sites. This includes putting MS Word tables into MS XL and upload – it is easier to carry out calculations and graphing from MS XL tables. Examples below: -

(i) Where there are MS Word tables of species data, create a new MS XL table with separate columns of species and counts.
(ii) Put MS Word table of fauna checklist for certain areas into MS XL to calculate total species count then upload.
(iii) Put MS Word table of fauna recorded during survey in a watershed catchment into MS XL with 1st column for birds, frogs, etc.; 2nd column scientific names; 3rd column common names; and 4th column conservation status.

Step 5 – Produce comprehensive & illustrative maps using existing data layers or by creating new data layers

Extract relevant data on overlay or superimpose on satellite imageries, for instance, maps of watershed catchments displaying visualizations and models on ecosystem goods and services – e.g. forest cover, degraded habitats, hot-spots,

Use the manual to prepare maps recognizing the R2R spatial data platform may be regularly populated with all the necessary R2R datasets and provide easy extraction of data for analyses. The data can also be constantly updated as information becomes available and uploaded. Examples of maps that can be produced using the R2R Spatial Data Infrastructure platform.