Information Technology proposal for the MRV System in Nepal



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Author: Alberto Laurenti

The minimum option is to establish a collaborative framework among the existing projects/institutions related to REDD+ and forestry in general, where data and methodology are shared and discussed jointly. This can be reached through the use of common standard technologies and frequent interactions among different actors.

Methodological guidance

Initial methodological guidance in relation to MRV for REDD+ was provided at COP 15, Copenhagen (2009), Decision 4/CP.15, paragraph 1(d) "**Requests" Parties to:**

"...establish, according to national circumstances and capabilities, robust and transparent national forest2 monitoring systems and, if appropriate, sub-national systems as part of **national forest monitoring systems** that:

- i. Use a combination of remote sensing and ground-based forest carbon inventory approaches for estimating, as appropriate, anthropogenic forestrelated greenhouse gas emissions by sources and removals by sinks, forest carbon stocks and forest area changes [Monitoring and Measurement];
- *ii.* Provide estimates that are transparent, consistent, as far as possible accurate, and that reduce uncertainties, taking into account national capabilities and capacities; [**Reporting**];
- *iii.* Are transparent and their results are available and suitable for review as agreed by the Conference of the Parties;" [Verification].

Main Objectives

Basic requirements of a System capable of supporting MRV activities has been identified:

1. Data & Information

- Collect data at local community level as well as at national level (spatial & non spatial)
- Aggregate and Analysis of data to produce informative report
- Integration of algorithms provided by the expert to correlate available data and extract meaningful information

2. Data Validation

 Support data validation process from authorized personnel, in order to improve and assure data quality

Main Objectives

Basic requirements of a System capable of supporting MRV activities has been identified:

3. Sharing Knowledge

- Share documents among participants on REDD+ activities (privately)
 Disseminate project information and deliverables (publicly)

4. Management

Manage user access to documents, functionalities and information

Architecture of the system



Main Features

The system we propose to support the MRV REDD+ initiative in Nepal is a Web Platform capable of collecting, elaborating and disseminating data acquired during on field activities and from other available resources:

- Based on open source frameworks (Liferay)
- Web Platform accessible from different devices using any Web Browser
- Platform expandable and easy to maintain
- User interfaces user-friendly
- Each functionality is supported by an application of the platform
- Access to applications depends on user's role within the System

Public Area

- User Registration
- Document download
- Information search

Private Area

- User Management
- Document upload/download in private/public area
- Data Input
- Data Validation
- Reporting

User Management

The basic administration functionality is that of **user management**.

In particular each user of the system will have an account to the system.

Private accounts can be created and activated by System Administrators that will define to which **groups** a user belongs and what **roles** he has within the system.

User account can be **modified**, **deleted** or **created** by logging into the system with an account with System Administration privileges.

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Document Management (DMS)

- Create Folders
- Versioning
- Advanced Search

- Upload/Download
- Define visibility (private, groups, public)

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Data Management

- **Custom forms** will be provided to acquire data from expert at a local, regional and national level.
- Form will be realized defining data type in order to enforce validation of input (combobox, date fields, numeric fiels, range input, radio button, list, selection box). Complex data can be acquired on multiple forms (wizards).
- Each piece of information can be **modified**, **deleted** or **inserted** and **visualized** in a **tabular form**. Complex data can be filtered on predefined criteria for easy management and verification.
- Information will be **stored** on appropriate data structure **on a DBMS**.

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Reporting

- Reports built according to predefined templates can be generated in different data formats and projected according to predefined parameters.
- Aggregation of data will be realized according to some predefined algorithms provided by the experts.
- Reports created with this application can be used to have some intelligence on data acquired and can be used to generate documents to be shared on the public area of the website or used privately to monitor data at different times of the MRV work progression.



- The objective is to follow the methodological proposal of the UN REDD Programme to implement a NFMS in order to serve the three **MRV** pillars: UN REDD Programme
 - Satellite Land Monitoring System (SLMS),
 - National Forest Inventory (NFI)
 - National **GHG** Inventory
- Providing a link between historical assessments and current/future assessments, enabling consistency in data and information to support the the implementation of MRV REDD+ activities in Nepal.

- Plan to create an infrastructure that helps in the transparent dissemination of forest change, by processing and publishing forest and related spatial data, validated and open for public feedback of people in the monitored areas.
- ♦ Open source \rightarrow no costs, updated
- ♦ OGC standards → platform independent, interoperability
- ♦ Interactive maps \rightarrow navigation & query
- Reports, graphs, statistics
- Multilingual
- ✤ Feedback → send notes and/or spatial updates

The NFMS system is directly linked to a **client-server platform** which combines MRV database, Desktop GIS applications, image processing and data access functionalities.



This is the **Blue Marble true color earth dataset**, published by NASA. On top of this we can add all the necessary layers.



Allow to **check online** an area of deforestation near by settlement and **report online** whether or not the data and interpretation are correct.



This will not only allow for an entirely transparent **monitoring** and **verification** system on a national level, but it will greatly enhance the **participation of local communities** in the implementation of national REDD+ policies and measures in Nepal.

Send feedback	on map contents 🛛 🗙
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Name: Email: Feedback:	A. Laurenti A. Laurenti xxxxxxxxxxx@xxxx.it Updated bnd due to field survey.

Feedback example:

a deforestation area is out of date

- ✓ First, click on *Feedback* and select the layer.
- ✓ Identify the geographic element on the map.
- ✓ Activate the ^I tool and click inside the region. The original polygon will be retrieved and presented as an orange, editable geometry.
- ✓ Then, select the draging the nodes.
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IT System Maintenance

- Technical Infrastructure (servers, OS, network) can be managed by professional resources with standard training
- Open source platform stack (PostgreSQL/PostGIS-Liferay-Java) can be updated/extended by available professionals
- System Administration can be performed by non technical personnel with appropriate initial training
- System Administration and technical staff will vary depending on the system extension (number of active user in the system, utilization peek, user experience SLAs)



Time for **questions** and **answers**.



Information Technology architecture for the MRV System in Nepal



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Thank you



Alberto Laurenti a.laurenti@agriconsulting.it