

UN-REDD PROGRAMME



Food and Agriculture
Organization of the
United Nations



Empowered lives.
Resilient nations.



Training to build capacity for REDD+ planning in Liberia

Working session report

*Working session convened as part of Liberia's
National UN-REDD Programme
Monrovia, 13-16 February 2018*

Compiled by

Barbara Pollini (UN Environment World Conservation
Monitoring Centre)

Joe Gosling (UN Environment World Conservation
Monitoring Centre)

The working session was organized by the Forestry Development Authority of Liberia (FDA), UN Environment Africa Office and the UN Environment World Conservation Monitoring Centre (UNEP-WCMC) as a contribution to meeting requirements in relation to REDD+ national strategy finalization and implementation.

The UN-REDD Programme is the United Nations Collaborative Initiative on Reducing Emissions from Deforestation and forest Degradation (REDD) in developing countries. The programme was launched in 2008 and builds on the convening role and technical expertise of the Food and Agriculture Organisation of the United Nations (FAO), the United Nations Development Programme (UNDP) and UN Environment. The UN-REDD programme supports nationally-led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including Indigenous People and other forest-dependent communities, in national and international REDD+ implementation.

The UN-REDD Programme provided technical support for this workshop from UNEP-WCMC. UNEP-WCMC is the specialist biodiversity assessment centre of UN Environment, the world's foremost intergovernmental environmental organization. The Centre has been in operation for over 30 years, combining scientific research with practical policy advice.

Copyright 2018 United Nations Environment Programme

This publication may be reproduced for educational or non-profit purposes without special permission, provided acknowledgement to the source is made. Reuse of any figures is subject to permission from the original rights holders. No use of this publication may be made for resale or any other commercial purpose without permission in writing from UN Environment. Applications for permission, with a statement of purpose and extent of reproduction, should be sent to the Director, UNEP-WCMC, 219 Huntingdon Road, Cambridge, CB3 0DL, UK.

The contents of this report do not necessarily reflect the views or policies of UN Environment, the contributing organizations or editors. The designations employed and the presentations of material in this report do not imply the expression of any opinion whatsoever on the part of UN Environment or the contributing organizations, editors or publishers concerning the legal status of any country, territory, city area or its authorities, or concerning the delimitation of its frontiers or boundaries or the designation of its name, frontiers or boundaries. The mention of a commercial entity or product in this publication does not imply endorsement by UN Environment or the contributing organizations.

Should readers wish to comment on this document, they are encouraged to get in touch via: Climate Change and Biodiversity Programme, UNEP-WCMC: ccb@unep-wcmc.org

Suggested citation:

Pollini, B., Gosling, J. (2018) Training to build capacity for REDD+ planning in Liberia: Working session report. *Working session convened as part of Liberia's National UN-REDD Programme. Monrovia, 13-16 February 2018.* Prepared on behalf of the UN-REDD Programme. UNEP-WCMC, Cambridge, UK

Acknowledgements

With thanks for input and comments from the participants. Thanks also to James Kpadehyea (FDA), Thais Narciso (Un Environment), Lera Miles and Will Simonson (both UNEP-WCMC) for their review.



Table of Contents

Executive summary	5
Introduction	6
1. Overview	6
2. Objectives.....	7
Topics covered	7
1. Introductory session	7
2. Introduction to QGIS.....	7
3. Drivers of deforestation and forest degradation.....	9
4. Benefits and risks of REDD+ interventions	11
5. Mapping areas important for biodiversity.....	11
6. Mapping areas important for the provision of hydrological services.....	12
7. Combining multiple benefits and introduction to spatial workflows	13
Feedback on the session	15
Annex 1 Agenda for first working session.....	18
Annex 2 Participants list.....	21

Acronyms and abbreviations

CI	Conservation International
EPA	Environmental Protection Agency
FDA	Forestry Development Authority
GIS	Geographic Information System
HCS	High Carbon Stock forest
HCV	High Conservation Value forest
LISGIS	Liberian Institute of Statistics and Geo-Information Services
NFI	National Forest Inventory
NGO	Non-Governmental Organization
NTFPs	Non-Timber Forest Products
REDD+	Reducing Emissions from Deforestation and forest Degradation; “+” conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks
RIU	REDD+ Implementation Unit
SESA	Strategic Environmental and Social Assessment
UNEP-WCMC	UN Environment World Conservation Monitoring Centre
WRI	World Resources Institute

Executive summary

This report describes the working session on spatial analyses to support REDD+ in Liberia, carried out in Monrovia in February 2018.

This project is part of a collaboration between UN Environment Africa Office, the Forestry Development Authority of Liberia (FDA) and UNEP-WCMC. It supports the objectives of the ongoing project “UN Environment in UN- REDD: Tools and approaches to support countries in incorporating multiple benefits, green economy and green investments in REDD+ planning”.

This is the first of two working sessions that have been planned for Liberia and led by UNEP-WCMC. Twenty participants from three different government agencies, the Liberia Institute for Statistics and Geo-Information Services (LISGIS), the Forestry Development Authority (FDA), the Environment Protection Agency (EPA) and two NGOs, Conservation International (CI) and World Resources Institute (WRI), attended the training.

The working session had the main goal of building capacity among key GIS national staff in the use of QGIS and in carrying out spatial analyses to support REDD+ planning. The main content of the training included the following:

- Introduction to REDD+ and the use of spatial analyses in supporting REDD+ planning
- Introduction to QGIS, including practical exercises
- Mapping of deforestation and forest degradation drivers
- Overview of REDD+ benefits and risks
- Using data and tools to map biodiversity and hydrological services
- Overlaying and combining benefits layers
- Spatial workflow to identify priority areas for REDD+ interventions.

The main outcomes from this working sessions were the assessment of the participants’ GIS knowledge, capacity-building in the use of QGIS and in developing spatial analyses. The group discussions on the availability and accuracy of GIS datasets in Liberia as well as on the drivers of deforestation and degradation and ways to map them have provided a better understanding of Liberia’s threats to conservation and on the specific GIS data needs.

The discussions, results and testing of tools during the working session has informed the development of objectives and activities for the next training session and for further support on spatial planning to Liberia.

Introduction

1. Overview

This report describes the activities and outcomes of the first of two working sessions planned to provide GIS technical support to Liberia in relation to REDD+ national strategy finalization and implementation. A scoping mission to Liberia in May 2017 identified a demand for technical capacity building amongst an existing network of GIS professionals working in and alongside the FDA.

UNEP-WCMC has therefore planned two such capacity-building sessions for 2018 inviting colleagues from several Liberian institutions involved in national REDD+ spatial planning. This effort falls under the ongoing technical support provided by UN-REDD under the project “UN Environment in UN-REDD: Tools and approaches to support countries in incorporating multiple benefits, green economy and green investments in REDD+ planning”

Liberia has approximately 4.3 million hectares of lowland tropical forest, which constitutes 43% of the remaining Upper Guinean Forests of West Africa and is rich in endemic species. Liberia’s forest cover provides direct benefits that include wildlife habitat, opportunities for ecotourism and sustainable agriculture, soil conservation, provision of water resources and NTFPs to local communities, 67% of which live below the poverty line. This critical natural capital is now threatened by several drivers of deforestation and forest degradation; the main ones are shifting agriculture, pit sawing, charcoal production, palm oil concessions, forestry concessions (mostly for timber sales) and mining exploration (National Strategy for REDD+ in Liberia, 2016).

In order to avoid the loss of Liberia's unique and biodiversity-rich forests and reduce greenhouse gas emissions from deforestation, in September 2014 Liberia and Norway entered into a partnership to support the development and implementation of Liberia’s REDD+ strategy, contribute to sustainable development through protecting natural forests, restore degraded lands, develop the agricultural sector, and work to support progress on global efforts regarding climate change, sustainable development and REDD+. In October 2016, the National Strategy for REDD+ in Liberia was released by the FDA REDD+ Implementation Unit (RIU).

The first working session was held in Monrovia from 13 to 16 of February 2018 and was attended by 20 participants (6 women and 14 men) from three different government agencies (FDA, EPA and LISGIS) and from two NGOs (CI and WRI). The level of GIS knowledge differed among the participants, with some of them having experience in generating maps and developing spatial analyses. The working session agenda and list of participants are provided respectively in Annex 1 and 2.

Box 1: What is REDD+?

REDD+ (Reducing Emissions from Deforestation and forest Degradation +) is an initiative intended to combat climate change by providing incentives for changing the ways in which forests are used and managed, so that emissions of greenhouse gases from forests are reduced and carbon sequestration is increased. REDD+ may require many different actions, such as protecting forests from illegal logging or fire or rehabilitating degraded forest areas.

* The “+” indicates the inclusion of the following activities: conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks.

2. Objectives

The overall objective of the two working sessions is to build technical capacity of key GIS national staff in the use of QGIS and in carrying out spatial analyses to support REDD+ planning, in particular by enabling the integration of benefits beyond carbon in such plans.

Specific learning objectives for the first session were:

1. Developing and analysing spatial information to support REDD+ planning at the national scale, with a focus on the benefits provided by forests, as well as mapping pressures on these ecosystems.
2. Learning how QGIS software and other GIS-based tools can be used to carry out analyses on baseline hydrology and water resources as well as on the potential impacts of land use, land management and climate change.
3. Learning how to combine benefits layers and to identify priority areas for implementing REDD+ interventions. Particular attention will be given to the exploration of different ways of combining and presenting the output layers, and to the likely contrasting results determined by the use of different thresholds and indices.
4. Understanding and setting priorities for future analyses of the multiple benefits for forests at the national scale.

Box 2: Benefits of REDD+

REDD+ has the main objective of protecting and enhancing the carbon stored in the forests, but it has also the potential to deliver benefits beyond carbon. These benefits may be environmental, social and political.

For example, it can promote biodiversity conservation and secure ecosystem services from forests such as water regulation, erosion control and non-timber forest products. It can also lead to improved livelihoods for forest-dependent communities and clarified tenure over forest lands.

Topics covered

The main topics and issues covered during this session are summarized below (Agenda in Annex 1). Presentations, tutorial and other workshop materials are available [online](#).

1. Introductory session

The working session started with welcoming remarks by Mr. James Kpadehyea, the National Forest Inventory (NFI) coordinator for FDA, and continued with a first introductory presentation on REDD+ and the UN-REDD Programme, including an overview of the workshop objectives and activities.

A second presentation was given about the role of spatial data and analyses to support REDD+ planning. Examples from other countries were used to describe the questions that maps help answer and the workflow that can be followed to include spatial analyses in REDD+ planning.

2. Introduction to QGIS

The software QGIS was introduced. Given that some of the participants had previously utilised ArcGIS, the presentation has also highlighted the differences between the two GIS platforms. Before introducing the exercises included in the first tutorial, "An introduction to QGIS", the GIS layers available for Liberia were reviewed by the participants. An important outcome of this review was sharing information on updated boundaries for three protected areas in Liberia, which recognise the presence of local communities (Figure 1).

The participants were then divided into smaller groups of 3-4 people, the QGIS software was installed on the laptops and, by using QGIS, the following activities were carried out:

1. Exploration of the spatial data available,
2. Practice working with projections,
3. Add and remove shapefiles and raster layers,
4. Get familiar with the different symbology of a map,
5. Learn how to query data and to join tables to layers,
6. Conduct spatial analyses (clip, dissolve, zonal statistics, etc.) using the tools in the processing toolbox.

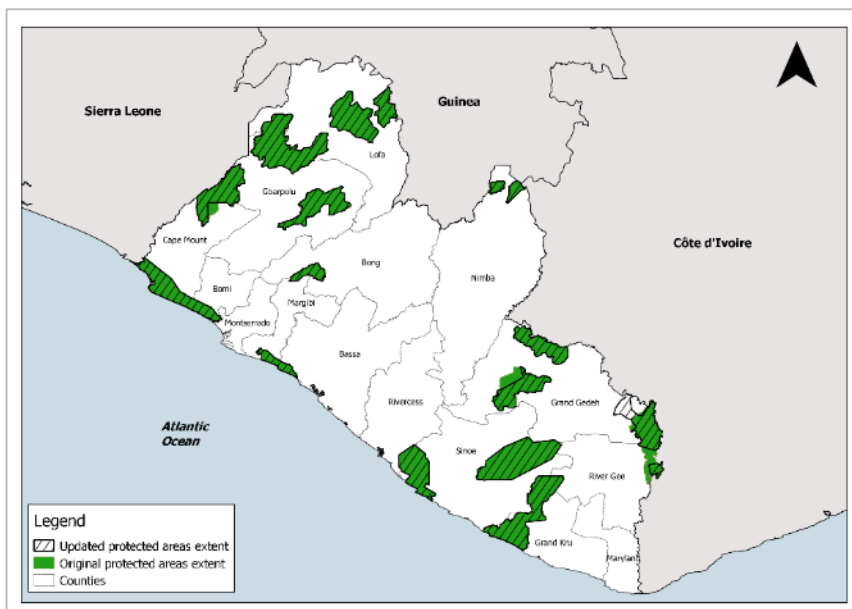


Figure 1 Map showing the changes to protected areas boundaries in Liberia



Figure 2 Participants working in groups on the QGIS tutorial

3. Drivers of deforestation and forest degradation

The second day started with the participants finalising the work on the QGIS tutorial initiated the previous day. The rest of the day was dedicated to a presentation and further discussions on deforestation and forest degradation drivers. The presentation included an overview of the ways forests can be defined and how these definitions have changed over time. The national forest definition used by Liberia is 30% minimum forest cover, 5 m minimum height and 1 ha minimum area. The presentation also focused on two approaches that can be used to define forest, the High Conservation Value (HCV) and the High Carbon Stock (HCS) approaches (Box 3).

Box 3: HCV and HCS forests

High Conservation Value forest (HCV)

The HCV approach is based on six values that aim to protect biological, ecological, social or cultural values which are outstandingly significant or critically important at the national, regional or global level (*HCV Resource Network*).

High Carbon Stock forest (HCS)

The HCS approach uses field data on levels of biomass, vegetation structure and composition to create a classification ranging from high-density forest to degraded former forest areas of scrubs and open land that could be considered for conversion to oil palm or other agricultural commodities. (*The HCS Approach Toolkit, 2017*)

There was then an introduction to the concept of integrated land use planning and to the different current and future drivers of deforestation and forest degradation, particularly focusing on the ways they can be mapped.

The participants were divided into groups and asked to identify deforestation and forest degradation drivers for Liberia, and the input GIS layers they would utilise to map them. Each group presented the results from this exercise. Table 1 provides a summary of the results, which reflect the deforestation drivers identified in Liberia National REDD+ strategy (Box 4).

Table 1 Results from the exercise on deforestation and forest degradation drivers

<i>Group</i>	<i>Drivers</i>	<i>GIS layers</i>
Group 1	Unregulated mining activities	<ul style="list-style-type: none"> ● Mining concessions
	Unsustainable agricultural activities	<ul style="list-style-type: none"> ● Agriculture concessions ● Individual small farmers ● Distance of the concessions from forest ● Soil suitability
	Unsustainable forestry activities	<ul style="list-style-type: none"> ● Forest concessions ● Protected areas ● Community forest

	Urbanization	<ul style="list-style-type: none"> • Infrastructure development plans • Hydropower • Population • Settlement and socio-economic data
Group 2	Shifting cultivation	<ul style="list-style-type: none"> • No layers were identified by the group
	Pit sawing	
	Timber production	
	Illegal logging	
	Infrastructure development	
	Agriculture	
	Economic investment	
Group 3	Plantations and cash crops	<ul style="list-style-type: none"> • Agriculture data
	Infrastructure development	<ul style="list-style-type: none"> • Population data
Group 4	Charcoal production	<ul style="list-style-type: none"> • No layers were identified by the group
	Illegal mining	
	Illegal settlements due to population increase	
	Shifting cultivation	

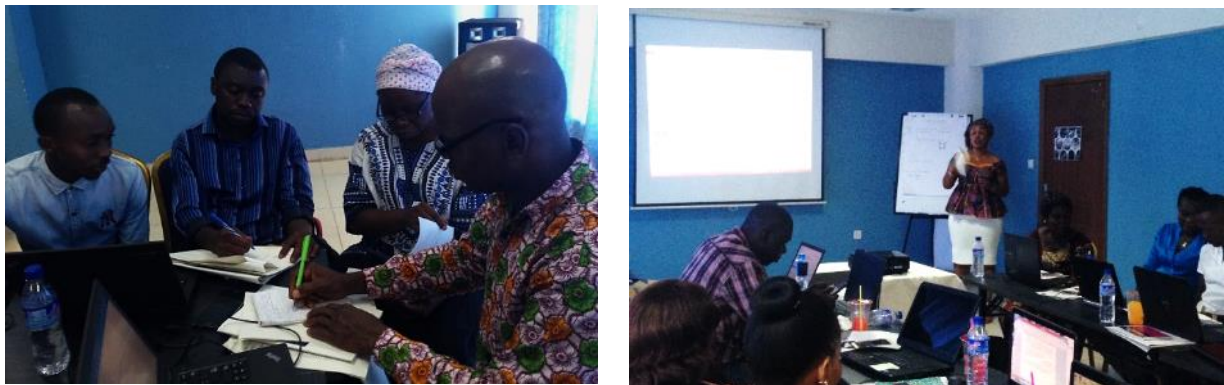


Figure 3 Participants working on the drivers of deforestation and forest degradation exercise and presenting their outputs

The rest of the day was dedicated to the actual mapping of the drivers. Each group chose a driver and tried to map it using the layers available. No final map was produced, but the participants will present final maps during the second working session.

Box 4: Main direct drivers of deforestation and forest degradation in Liberia

- **Palm oil conversion**
- **Timber sales contract**
- **Pit sawing and charcoal production**
- **Shifting agriculture**
- **Commercial logging**
- **Mining**

(National Strategy for REDD+ in Liberia, 2016)

4. Benefits and risks of REDD+ interventions

A brief presentation was given to offer an overview of the benefits that REDD+ can provide beyond carbon, as well as its risks. The methods that can be utilized to mitigate risks and address Cancun safeguards were also provided through examples.

The five priorities identified in the National Strategy for REDD+ in Liberia were also mentioned (Box 5) and the participants briefly discussed the risks and the benefits of these priorities.

Box 5: The five priorities in the National Strategy for REDD+ in Liberia

1. Reduce forest loss from pit sawing, charcoal production and shifting agriculture
2. Reduce impact of commercial logging
3. Complete and manage a network of protected areas
4. Prevent or offset clearance of High Carbon Stock and High Conservation Value forest in agricultural and mining concessions
5. Fair and sustainable benefits from REDD+

5. Mapping areas important for biodiversity

The third day of the training was dedicated to identifying and mapping areas important for biodiversity conservation. An overview of the methods that can be used to map species data was provided. Weaknesses and strengths of the methodologies presented were also included using published examples. Global species' range of occurrence data were then introduced, including their source (IUCN Red List of Threatened Species <http://www.iucnredlist.org/>) and the permissions required to use these data.

The participants worked in groups through a tutorial on processing species range data in order to produce a threatened species richness map for Liberia. The species data used included: Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species of terrestrial mammals, birds and amphibians.

Not all of the groups were able to produce the final output. An example of the final map is given below (Figure 4).

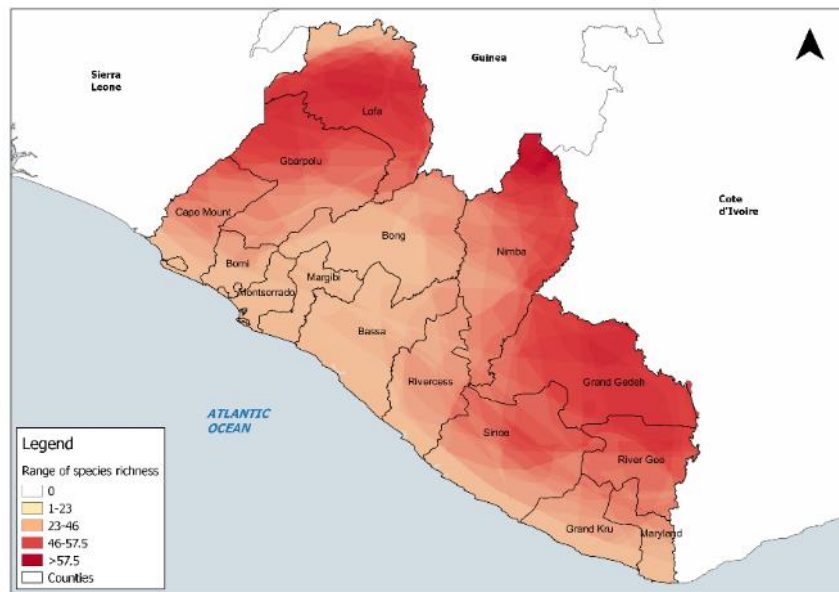


Figure 4 Example of output map from the species richness tutorial

6. Mapping areas important for the provision of hydrological services

At the end of the third day there was a presentation on the importance of forest for the provision of hydrological services. The different tools that can be used to map hydrological services were introduced and particular attention was given to the web-based tool WaterWorld (Box 6).

WaterWorld was one of the tools used in 2016 by CI in collaboration with Liberia EPA to map the natural capital of Liberia. These analyses identified three regions most important for the potential provision of freshwater services, one in the north of the country and two in the south. The services mapped by CI were sediment regulation, flood regulation, freshwater provision and flow regulation. Some of these outputs were presented and discussed with the participants. They were also utilized on the last day to identify areas with the highest number of benefits overlapping.

Box 6: WaterWorld – a web-based hydrological modelling and policy support tool

WaterWorld can be used to understand baseline hydrology and water resources as well as the potential impacts of land use, land management and climate change. It incorporates globally available spatial datasets allowing for the model to be run anywhere in the world at two scales, 1 ha and 1 km, without the need for the user to supply data. By purchasing an advanced license the user can also upload its own datasets. All the model's outputs can be visualized using the Web-interface or downloaded and analysed using any GIS software.

(Mulligan, M. (2013) WaterWorld: a self-parameterising, physically-based model for application in data-poor but problem-rich environments globally. Hydrology Research 44(5) 748-769. Doi: 10.2166/nh.2012.217)

7. Combining multiple benefits and introduction to spatial workflows

The participants were introduced to two different methodologies, Boolean and Fuzzy overlay, to combine benefits layers (Box 7), as well as their strengths and weaknesses. These types of analysis help identifying forest areas of potential importance for a larger number of benefits from REDD+.

The participants combined four layers – species richness, carbon, sediment regulation and flood regulation – using a Boolean method. Just few groups were able to complete the exercise. An example of the output map is shown in Figure 5.

The participants will complete this exercise remotely using both methods and will prepare final maps to be presented during the next working session.

Box 7: Methods to combine multiple benefits

Boolean method

All the layers are converted to Boolean statements (0/1) of suitability and then combined together. This method preferable when the variables are thought of as constraints, since they serve to delineate areas not suitable for the benefits being considered.

Fuzzy overlay method

The parameters are evaluated as fully continuous. Before being combined, the layers need to be standardised and weighted. This method can be controversial because of the weights assigned to each factor, thus it involves consultations with experts and other stakeholders.

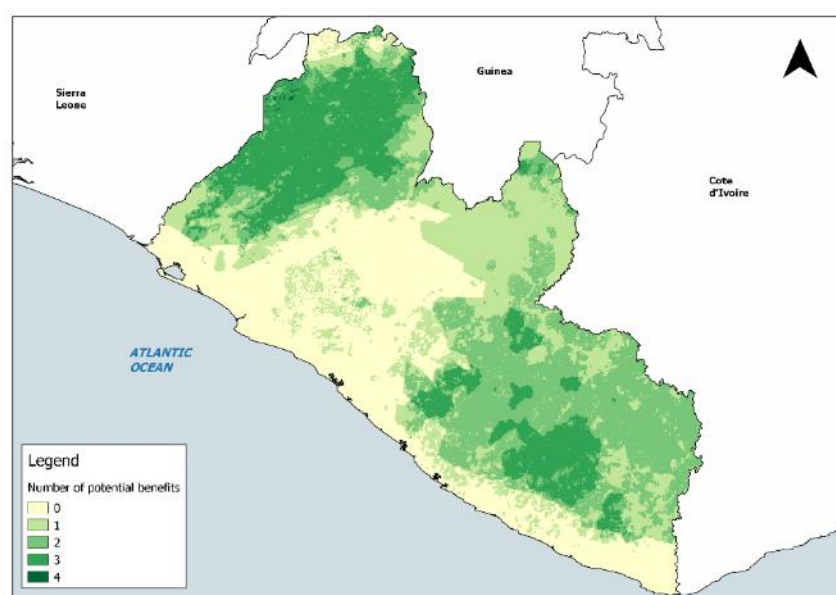


Figure 5 Example map showing the location of four combined potential benefits: species richness, carbon, sediment regulation and flood regulation.



Figure 6 Participants carrying out the exercise on combining benefits

A final presentation was given to summarize all the topics covered, as well as to plan spatial workflows to identify potential priority areas for implementing REDD+ activities. The presentation was an introduction to one of the main topics that will be covered during the next working session.

The closing remarks were given by Mr. Saah David, Liberia National REDD+ Project Coordinator, who also gave an overview of the main REDD+ priorities and objectives in Liberia.



Figure 7 Mr. Saah David giving the closing remarks.



Figure 8 Final group photo

Feedback on the session

At the end of the session a link to the UN-REDD satisfaction survey was provided to the participants. The survey had to be filled out remotely due to the lack of internet at the training venue. The survey included a total of 15 questions. 60% of the participants have filled in the survey, of which 15% were women and 85% men. The key results are discussed below by thematic areas.

Effectiveness of the training

All the respondents found the event effective in increasing their knowledge for the advancement of REDD+ in the country, with 60% categorizing the training as moderately effective and 40% very effective. The overall level of satisfaction of the training results show the same percentages.

Areas of knowledge improvement

The respondents reported that their knowledge was highly improved in two areas: drivers of deforestation and forest degradation (56%) and national REDD+ strategies or action plans (44%). Their understanding REDD+ and UNFCCC was moderately improved (67%). See Figure 9 for the whole overview of knowledge improvement areas.

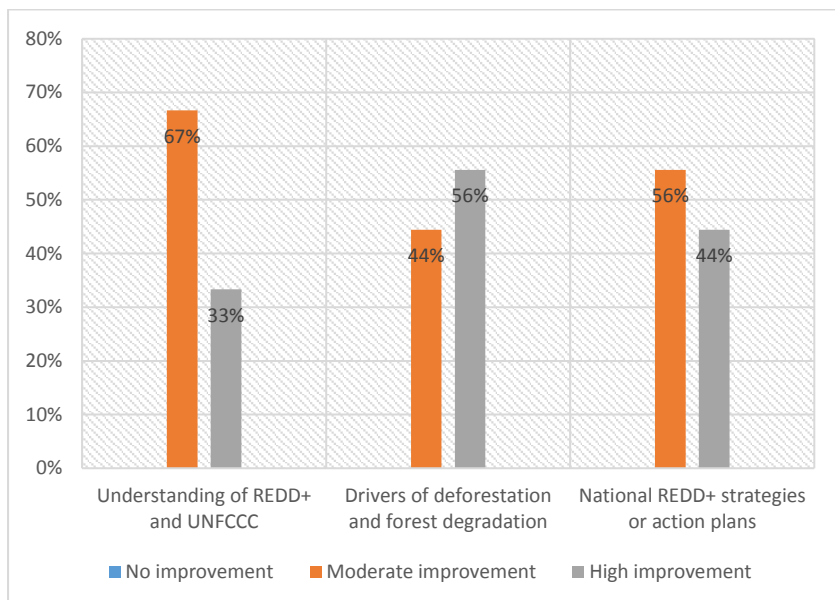


Figure 9 Answers to the question: “How did your knowledge of the following REDD+ areas improve as a result of the event?”

All the respondents agreed that:

- Their knowledge on REDD+ preparedness and implementation increased,
- They will use what they learned during the event and that it will be useful to share that knowledge with colleagues,
- They would like to will participate again in similar knowledge exchange events and they would recommend them to colleagues or partners in the country.

Effectiveness of the methodologies used during the working session

The respondents found particularly effective two methodologies utilized during the working session, “Sharing and reflecting on your country’s experience” (90%) and “Group work and roleplay” (88%). See Table 2 for the detailed results.

Table 2 Detailed results for the question “Select and rate the effectiveness of the methodologies used during the event”

	In-effective	Neutral	Effective	N/A
<i>Learning from leading technical experts</i>	0%	20%	80%	0%
<i>Learning from the experience of other countries/participants</i>	0%	10%	80%	10%
<i>Networking with other countries/participants</i>	0%	10%	80%	10%
<i>Sharing and reflecting on your country’s experience</i>	0%	10%	90%	0%
<i>Working on case studies</i>	10%	10%	80%	0%
<i>Group work and roleplay</i>	0%	13%	88%	0%
<i>Field visits</i>	33%	33%	33%	0%
<i>Guided discussions / knowledge cafe</i>	0%	33%	56%	11%

- 60% of the respondents found that the combination of methodologies was effective and 90% assessed as good the balance of time between presentations, discussions and group exercises.
- 80% of the respondents suggested giving more priority to group exercises in similar events.

Final comments and feedback

The main final comment provided by the respondents to the satisfaction survey, and by the participants in general, is that there is a need for further training sessions to include a field component. This feedback has been acknowledged and will be used to plan the next working session.

Annex 1 Agenda for first working session

Monrovia, 13-16 February 2018

Time	Topic and activity
13th February: Introduction to QGIS	
08:30-09:00	Registration and receive material
09:00-09:15	Welcoming regards
09:15-09:30	Introduction and ice-breaker
09:30-10:00	Objectives of the week, agenda and discussion of expectations
10:00-10:30	Presentation: Role of spatial information in supporting REDD+ planning and overview of spatial analysis tools available to support this process
10:30-10:40	Q&A
10:40-11:00	Tea/coffee break
11:00-11:30	Distribution of USB sticks, and checking QGIS installation
11:30-12:00	Presentation: Introduction to QGIS and exploration of QGIS interface
12:00-12:20	Exploration of the data available from different sectors
12:20-13:00	Group discussion and report back on the data available for Liberia
13:00-14:00	Lunch
14:00-15:30	Tutorial: Introduction to QGIS. The tutorial includes a series of exercises and steps to practice <i>This tutorial will introduce QGIS and will show how it can be used to undertake spatial analysis relevant to REDD+ interventions.</i>
15:30-15:45	Tea/coffee break
15:45-17:00	Continue working on the QGIS tutorial
14th February: Mapping multiple pressures on forests	
08:30-09:30	Continue working on the QGIS tutorial if necessary
09:30-10:00	Presentation: Mapping forests and their current and future deforestation and degradation drivers
10:00-10:30	Group discussion: Definition of forest and what data from different sectors can inform the development of maps showing current and future drivers of deforestation and forest degradation as identified in Liberia REDD+ national strategy
10:30-10:50	Tea/coffee break
10:50-11:00	Introduction to exercise on drivers: working in pairs the participants after having identified the GIS layers that can be used to map drivers, will overlay those with the forest-cover layer. <i>This exercise aims to help understanding where different drivers</i>

	<i>are occurring now and in the future and where there may be spatially explicit barriers to implement a measure for conservation, sustainable management and forest enhancement.</i>
11:00-13:00	Exercise on pressures
13:00-14:00	Lunch
14:00-14:40	Report back
14:40-15:30	Group discussion: How can the analyses on deforestation and forest degradation drivers can be combined with other data or proxies if the factors are not directly spatially explicit (such as political decision, technological advancements, etc.)
15:30-15:50	Tea/coffee break
15:50-16:10	Presentation: Overview of benefits and risks of REDD+
16:10-16:55	Group exercise on reviewing the benefits and risks of REDD+ implementation in Liberia identified in the SESA developed in 2016 for the country, identifying new ones and exploring monitoring options
16:55-17:15	Report back from exercise on risks and benefits
15th February: Multiple benefits	
08:30-08:45	Recap of previous day
08:45-09:00	Presentation: What spatial data can be used for mapping benefits
09:00-09:30	Group exercise/discussion: Identifying benefits and what spatial data would you use to map them
09:30-09:50	Report back: What are the 3 key benefits identified and which spatial data would you use to map them
09:50-10:00	Presentation: introduction to the species richness tutorial
10:00-10:20	Tea/coffee break
10:20-13:00	Exercise on species richness <i>In this activity, workshop participants will use IUCN Red List data and other relevant datasets to identify areas where REDD+ activities could deliver highest biodiversity benefits in Liberia</i>
13:00-14:00	Lunch
14:00-14:30	Presentation: Mapping the importance of forest for water supplies and soil erosion mitigation
14:30-15:30	Exercise: Mapping forest hydrological services <i>Participants will use outputs from hydrological analyses to produce maps showing the importance of forests for hydrological services (water provision and soil erosion) to end users.</i>
15:30-15:45	Tea/coffee break
15:45-17:00	Continue on exercise
16th February: Combining forest benefits and pressures for the implementation of REDD+	
08:30-08:45	Recap of previous day
08:45-09:00	Presentation: Different ways of combining and presenting multiple benefits and pressures layers for the implementation of REDD+ interventions

09:00-10:00	Exercise on spatial analysis techniques to combine layers produced on the previous days <i>In this activity the participants will explore different ways of combining and presenting the output layers to identify priority areas</i>
10:00-10:20	Tea/coffee break
10:20-12:00	Continue exercise on spatial analysis techniques to combine layers
12:00-13:00	Report back on the exercise
13:00-14:00	Lunch
14:00-14:30	Presentation: Introduction to spatial workflow
14:30-15:30	Group discussion: What are the criteria needed to identify priority areas for REDD+ interventions in Liberia, based on Liberia strategic priorities for REDD+, and what are the spatial steps you would use?
15:30-15:50	Tea/coffee break
15:50-16:30	The participants will give a 5 minute presentation of their proposed workflow
16:30-17:00	Wrap up session: - Discussion of next steps and list of layers to be prepared by the participants for session 2 - Evaluation forms - Closing remarks

Annex 2 Participants list

	Name	Contact details	Gender	Organization
1	Isaac Nyaneyon Kannah	inkteah@gmail.com	M	RIU/REDD+
2	James Kpadehyea	jkpadehyeah@gmail.com	M	RIU/REDD+
3	J. Negatus Wright	wright_jn@yahoo.com	M	LISGIS
4	Kayloe R. Frank	Ruthiefrankkay25@gmail.com	F	LISGIS/GIS
5	Florence Nyumah	taiwahnyumah@yahoo.com	F	LISGIS/GIS
6	Jannie Fahnbulleh	Janfahnbulleh2010@gmail.com	M	LISGIS/GIS
7	Tom Richard Glassco	richbglassco@gmail.com	M	LISGIS/GIS
8	Abraham Saar	abraham118saar@gmail.com	M	LISGIS/GIS
9	Whymah M. Goyanvator	whymahm@yahoo.com	M	FDA/GIS
10	J. Oimage Paye	jomagepaye@gmail.com	M	FDA/GIS
11	Pesoe G. Manscole	pgreenemenscole@yahoo.com	F	FDA/GIS
12	Archielous G. Johnson	Fannieat7@gmail.com	M	FDA/GIS
13	Teta Bonar	Bteta100@gmail.com	F	FTI
14	Yekeh D. Howard	yekehhoward2016@gmail.com	M	EPA/GIS
15	Lucas Knight	Lucasknight09@gmail.com	M	EPA/GIS
16	Berexford S. Jallah	jberexford@gmail.com	M	EPA/GIS
17	Solomon C. Carlon	scarlon@conservation.org	M	CI
18	Daniel D. Wleh Jr	danieldwlehjr@gmail.com	M	WRI
19	Laytoyo B. Johnson	laytoyoj@gmail.com	F	FDA
20	Jenebre Toure	Jtoure4real@gmail.com	F	LISGIS