Workshop on Full Lands Integration Tool (FLINT) to support National Greenhouse Gas Inventories in the AFOLU Sector

Accra, Ghana, 16–17 October 2019

Report

Contents

Summary:

The United Nations Framework Convention on Climate Change (UNFCCC) Secretariat and **SilvaCarbon** organized the workshop to discuss issues of land sector GHG reporting and to introduce a new integration tool called the Full Lands Integration Tool (**FLINT**). The FLINT is an open source tool designed to support reporting on the land sector under the Paris Agreement.

The workshop demonstrated, through presentations and practical exercises, that over time more accurate MRV information can be obtained by using a systemic approach to MRV, by using IPCC Approach 3 (geospecific), and by using integration of various data sets including models, sampling and improved mapping. On the second day, participants reviewed their national land sector policies to determine the minimum requirements for their national MRV systems and checked whether their current techniques could meet these requirements.

Key feedback from the workshop were
- At the end of the workshop, almost all participants (97%) expressed an interest in using FLINT but 94% felt they could not proceed due to financial and/or expertise limitations.
- Most countries have very similar MRV needs so collaboration on developing a joint MRV system can reduce cost and optimize the use of local expertise.
- While they understand the importance of spatial data for policy, few countries are processing remote sensing into land cover time series and they are asking for guidance.
- National reporting requires more accuracy and more consistency between different reports. Only advanced and institutionalized MRV systems can meet these requirements. However, institutional arrangements are reported as the biggest challenge after expertise and funds, and few countries calculate the uncertainty on their reported figures.

Moja global, the organisation that facilitates collaboration on FLINT, agreed (on request from the participants) to coordinate the development of a joint proposal to raise funds to install a FLINT based system in the participants' countries.

Background:

UNFCCC Secretariat and SilvaCarbon brought together 22 countries (see Annex 1) to discuss how new integration tools, in particular the Full Lands Integration Tool (FLINT), and a collaborative approach to further developing them (through **moja global**) can help them to meet their land sector policy and reporting requirements for the Enhanced Transparency Framework (ETF) under the Paris Agreement.

The workshop was organized in response to the challenges many countries are facing when establishing greenhouse gas (GHG) inventory and Monitoring Reporting and Verification (MRV) systems. The land sector is highly complex with various sinks and emission sources. The impact of human activity, combined with the variability of climate over time and the scale and complexity of systems, poses significant challenges for creating a more robust and user-friendly tools to assist in the measurement and reporting of GHG emissions. The challenges reported by the participating countries are discussed in more detail below.

Overview of the activities during the workshop:

Baseline:

Prior to the start of the workshop, all participating countries were requested to complete a survey providing information about the status of their current MRV system and the challenges they are facing. The results of the survey already raise some developments that were confirmed during the workshop:

- Minimum MRV capabilities are driven by domestic reporting needs
- Most countries need advanced MRV systems to meet their needs
- Consultants and international organisation still supplement capacity of public agencies responsible for MRV
- Most countries cover all land use types and the most important activities. Only a few countries have the capability to use their system for co-purposes like biodiversity, woodproducts, water and other natural resources
- While most countries use Tier 1 and Approach 1, these systems might not meet the accuracy required in their reports

Introduction of moja global and FLINT:

It was explained that the FLINT was developed as a flexible integration tool so one tool can meet the specific needs of most countries. FLINT incorporates more than 25 years of experience with advanced MRV systems for the land sector. The first group of FLINT users set up moja global to make FLINT easily available to as many countries as possible and to make it easy for all users to collaborate on the continuous development of FLINT (and possibly other tools).

Integration, system, Approach 3

Integration was clarified as a way of combining various types of data without loss of quality. The advantages of a systematic approach to MRV were explained and illustrated in exercises: The establishment of an official system to do MRV allows for continuous improvements, clear institutional arrangements and easy upgrades between tiers and data sets. It was also demonstrated how the geo-specific results generated by Approach 3, provide essential information for policy development, and the limitations of Approach 2.

Demonstration of FLINT based system

For each participating country, the emissions from the forest sector were estimated using a FLINT based system (FLINTpro). This allowed the participants to get an impression of the capabilities of the FLINT and of the rich information that can be obtained from Approach 3 integration systems. The exercises also demonstrated how easy it is to replace data or models in a semi-automated system without losing time series consistency (as the whole results are recalculated each year.)

Operationalizing MRV systems

Operational MRV systems need to have governance arrangements to support policies and provide technical inputs on a regular/continuous basis. Every cycle has fixed steps: e.g. plan, collect data, estimate emissions (i.e. run the FLINT), report, verification, identify and implement improvements. Several participants confirmed that the ad-hoc approach to MRV is driven by the need to deliver reports but obstructs institutionalization and capacity building.

From Policy to MRV

The participants were asked to review a number of policies from their country and identify the capabilities that an MRV system would need to meet the reporting requirements under these policies. Then the participants were requested to review their current system and whether it had the necessary capabilities (or could be improved to have the necessary capabilities.) The conclusion of the exercise was that most countries had very similar requirements for their MRV system and that cooperation was thus a logical way to reduce cost and required expertise. Moreover, most of the current MRV approaches could not meet the reporting requirements included in their policies. So more advanced MRV systems are required.

Reporting Tool

A software developer from Kenya demonstrated the reporting tool that can produce tables to report to the UNFCCC. The reporting tool takes FLINT outputs on greenhouse gasses and land cover history to create UNFCCC CRF tables. The presentation underlined the need to use one MRV system for many purposes by creating a large output database that can be queried by several reporting tools for multiple purposes. This process ensures consistency between reports. In this way different departments can have access to the FLINT output. This in turn will increase the usefulness of the FLINT system and thus the willingness of the involved institutions to contribute input data.

Conclusion

At the end of the Workshop, the participants were asked whether the FLINT would have added value in their country and what would be the obstacles to its adoption. The responses were anonymous. Only 1 respondent (i.e. 3%) indicated that the FLINT would not have added value. Also, one of the respondents indicated that they are interested in the FLINT and have the funds and the expertise to proceed. 14% of the respondents are interested but have insufficient expertise. 28% are interested but have insufficient funds. Finally, 52% are interested but have insufficient funds and insufficient expertise.
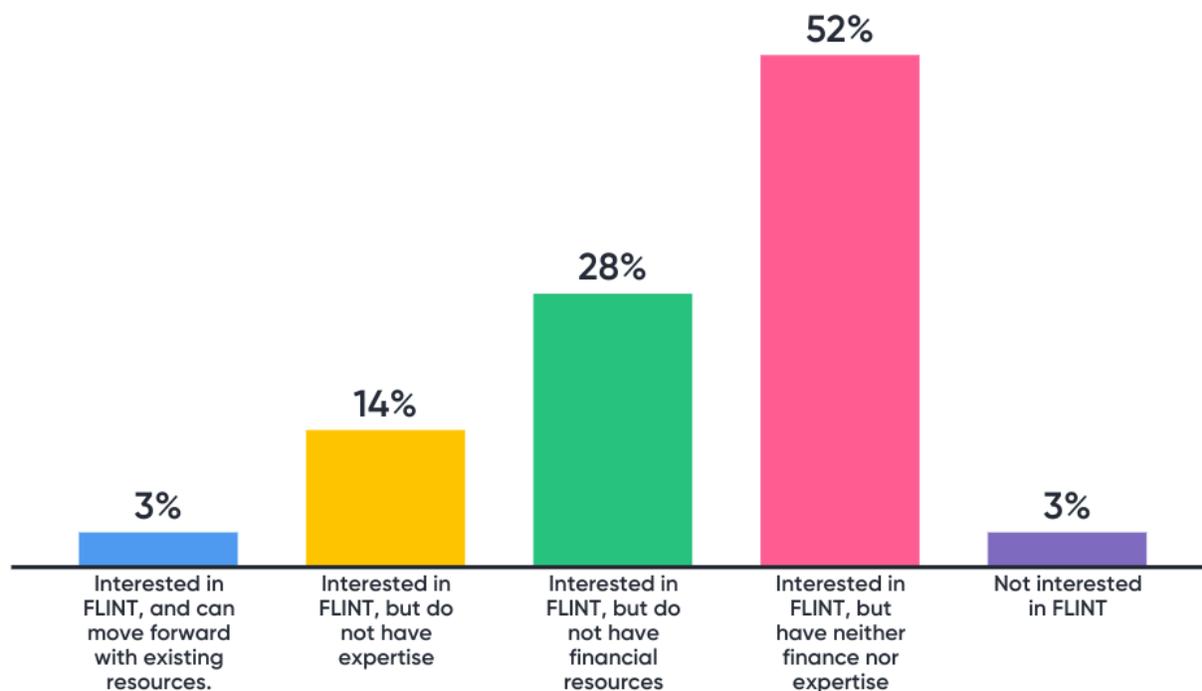
Outcome 1: Most countries require advanced (but similar) MRV tools.

Based on the discussions and collected feedback, one can conclude that the current MRV systems are not sophisticated enough, but cooperation between countries on an advanced MRV system can reduce cost and better allocate expertise.

As indicated above, during the workshop the participants determined what their MRV system must be able to do to meet their domestic and international obligations. Countries were asked to analyse some of their policies and extract the capabilities their MRV system would need to have to be able to meet the reporting requirements under those policies.

The conclusion was that most countries need more advanced MRV systems but the required MRV capabilities are very similar for most countries. This is a good basis to collaborate between countries on one advanced MRV system. This will save cost and reduce the required expertise to design and develop MRV systems.

In this presentation the required capabilities are presented. In summary most countries need an MRV system with the following capabilities:
- Do more than emissions estimation: (In order of importance) wood-products, crop yields, biodiversity, economics (livelihoods), water resources
- Report on all land uses (Forest, Agriculture, Grassland, Wetlands)
- Take into account a wide range of activities (from degradation to fertilizer.)
- Has to report annually
- Must be able to generate projections of expected emissions
- Observable unit must be 1 ha or smaller
- Must be able to nest reports from smaller areas (e.g. provinces or projects)

- Must be able to combine Tiers 1, 2 and 3.
- Must be able to use Approach 3
- Must have an indication of uncertainty of the results

The importance of the accuracy of the results will increase as more countries engage in results-based payments. At this moment 50% of the countries report that their reports will be used to obtain payments.

Outcome 2: FLINT and moja global mitigate current MRV challenges

The following issues were reported as challenges and key areas for intervention. These issues were identified based on the results of the survey that was conducted before the start of the workshop and the information gathered during the workshop. The challenges (as the requirements above) are remarkably similar between countries.

Outcome 1 above already suggested that collaborating on the development of a joint MRV system would be advantageous. FLINT and moja global would be appropriate collaboration opportunities if moja global succeeds in resolving most of the challenges countries are facing. The challenges are listed below, and each section describes the challenge first and then indicates how moja global could remove or reduce the impact of these challenges.

Local Expertise and financial capacity:

Local expertise and financial capacity continue to be the most commonly reported challenges for the majority of countries. Expertise is required in various areas. The land sector is complex and even globally only limited expertise is available to support land sector MRV development. The cost of land sector MRV is high once accuracy requires country specific modules and country specific data. As complexity increases, advanced integration tools are necessary to bring all the information together while limiting the risk of errors.

moja global is using collaboration to reduce cost and peer-to-peer learning to build expertise. The FLINT is built by experts from many countries which results in a division of labour that spreads the cost and reduces duplication. Rather than each country building their own MRV system, countries can collaborate to develop one system for all that is still flexible enough to adjust itself to National circumstances. Expertise will remain in short supply, but moja global can ensure that the existing expertise is used more effectively by reducing duplication. By connecting experts from across the globe, moja global also creates an environment where every level of expertise can improve their skills and where different ideas combine into new levels of creativity. moja global also provides an opportunity for MRV users to connect with potential funders / donors. FLINT and moja global are proven systems which might create the trust for donors to support the installation of a FLINT based system. Finally, moja global tries to assist parties that need a FLINT based system with the writing of joint proposals to donors. The countries that participated in this Workshop also requested moja global to facilitate the development of a joint proposal to install FLINT based systems.

Data quality

Data quality is also reported as a key challenge. Many countries are collecting remote sensing and ground data to help estimate land sector greenhouse gas emissions and removals. While remote sensing data is now widely available, processing of this data into usable time series products is the focus of most participating countries. Most countries have been advised to use a sample-based system which are inherently more difficult to apply as complexity increases (number of land uses, classes etc.) and often cannot allow for other policy needs (nesting, analysis of drivers, etc.). Finally, the use of specific data tends to lock users into specific MRV solutions which reduces the options for collaboration (i.e. cost saving and joint learning.)

moja global has focused on remaining flexible vis-a-vis the input data available: i.e. FLINT will adjust to the available data rather than the other way around. FLINT is an Approach 3 system as this is required by many policies (see previous section.) Where the policy and reporting needs require it (and many do) countries are advised to develop wall-to-wall maps as input data using samples to assist with accuracy assessments, QA/QC and verification.) Since most countries have not yet managed to develop consistent wall-to-wall time series, moja global is advised to develop a documented methodology for countries to make progress in this area (preferably in collaboration with established open source systems that can produce time series like SEPAL.)

Shift from International Reporting to National Policy Development:

While international reporting has been the main driver behind MRV approaches, the participants in the Workshop indicated that reporting under their National policies is rapidly becoming more important. This is in part due to the Paris Agreement and its NDCs, but it is also linked to the climate change impacts that are increasing the urgency of mitigation and adaptation measures. As indicated in the previous section, National policies tend to put higher demands on MRV systems including: emissions projections, full AFOLU reports, multiple indicators (e.g. biodiversity), etc. In addition to technical demands, there is a need to improve communication between policy makers and inventory managers. Policy makers need to set clear policy needs (accuracy, reporting frequency, etc.), system managers need to focus on institutionalizing the system and creating value for all contributing agencies, technical staff and academics need to focus on operational solutions that meet both policy and budget (collaboration will have to be considered from a cost perspective.)

FLINT supports the rising importance of national reporting by meeting the MRV requirements of most policies or by allowing for collaborative improvements of the FLINT to develop features identified as priorities by the users (e.g. projections, full AFOLU, biodiversity, etc.) The structure of a FLINT based system supports the use of one system for multiple objectives: i.e. the FLINT results are stored in one big database that can be queried by several reporting tools. This allows various departments to generate the information they need ensuring consistency between the different Government reports.

Accuracy and Uncertainty:

Several recent developments are driving the need for increased accuracy of MRV systems. To establish the level accuracy uncertainty calculations are required. The drivers are often National but of course there are also some important international drivers: e.g. the reporting requirements under the Paris Agreement and results-based payments of various types. In the

land sector, most countries struggle to firstly define what accuracy is required let alone determine the best ways of achieving the required accuracy over time. And even determining the level of accuracy is proving to be challenging as most countries do not systematically apply uncertainty measurement methods.

FLINT is supporting higher levels of accuracy in various ways: The use of integration of different data sets increases accuracy. The possibility to replace models and data sets when better versions become available allows for improved accuracy. FLINT is developing uncertainty modules that can calculate uncertainties and the drivers of uncertainty. Finally, FLINT is part of an institutionalised system that produces results on a regular (annual?) basis. With each iteration the system can be improved. This continuous improvement is the best approach to learning and higher levels of accuracy.

Institutional Arrangements:

After funding and expertise, institutional arrangements were reported most often as a challenge for land sector MRV systems. Institutional arrangements include the division of labour between different departments, the establishment of reporting needs by policy makers, the establishment of MRV requirements, data collection, data sharing agreements, budgeting, planning, etc. Many countries are not using a systematic (i.e. institutionalised) approach to MRV but they are generating the emissions estimations on an ad-hoc basis each time a report is due. This not only leads to incomparable results, it also makes it impossible to learn and improve over time.

Moja global encourages countries to use an institutionalized approach combined with the continuous improvement of the system. FLINT is adapted to that approach as it is modular and different parts can be managed by different departments. While governance arrangements are a national issue, the exchange of experience through the moja global network might stimulate innovative governance solutions.

Agreed Follow-up after the Workshop:

The following key next steps will be taken to follow-up on the Workshop:
- Participating countries will indicate whether they want to develop a joint proposal to raise support from various donors to install a FLINT based system in their country
    - Moja global will coordinate the development of such a joint proposal
    - Moja global will share the proposal with the donors who are already active in land sector MRV in the participating countries
- Moja global will explore how it can make the transition from sample-based systems to wall-to-wall maps easier for countries who want to use FLINT
- Moja global will make the improvements of the FLINT requested by the participating countries a priority. The following modules are sorted in order of priority:
    - Uncertainty Module
    - Country specific forest growth models
    - Modules to calculate emissions from agriculture
    - Modules to monitor biodiversity, water resources and livelihoods impacts
    - Wetlands Module
    - Forest Degradation Module

Annex 1: Participating Countries:

1. Argentina
2. Belize
3. Benin
4. Cambodia
5. Cameroon
6. Côte d'Ivoire
7. Democratic Republic of Congo
8. Ghana
9. Lao PDR
10. Malawi
11. Montenegro
12. Namibia
13. Nepal
14. Nigeria
15. Philippines
16. Papua New Guinea
17. Rep. Congo
18. Serbia
19. South Africa
20. Trinidad and Tobago
21. Viet Nam
22. Zambia (The Gov. Rep. could not attend but info was collected before and during the workshop.)

Annex 2: Workshop Agenda:

Wednesday, 16 October 2019	Introduction to moja global & concepts of integration for AFOLU MRV
09:00	Welcome, workshop objectives and agenda
09:30	Presentation: How did we go from emissions to moja global?
10:00	Presentation: Recap Core concepts in IPCC and GHG inventories. Tiers and Approaches etc. TACCC Beyond UNFCCC reporting
10:30	Presentation: What is integration?
11:00	*Coffee break, exercise continues*
11:30	Exercise: Data Integration and Accuracy difference between Approach 2 and 3
12:30	Feedback on the Exercise
13:00	*Lunch and group photo*
14:00	Presentation: Introduction to the FLINT
14:30	Exercise: FLINTpro LogIn & Walkthrough & Free Play

15:00	Demonstration: Use of FLINTpro based on 1 selected country or project
15:15	Exercise: FLINT system (FLINTpro version)
15:30	Feedback on the exercise
15:45	*Coffee break, exercise continues*
16:00	Exercise: FLINT system (FLINTpro version)
16:15	Feedback on the exercise
16:30	Feedback on the day: issues yet to be covered
17:00	End
Thursday, 17 October 2019	**Matching technical and policy solutions**
08:30	Moja team available for questions
09:00	Presentation: Operationalising MRV
09:15	Presentation: From Policy to MRV System Requirements
09:30	Exercise: From Policy to MRV System Requirements
10:15	Feedback on Group Work: From Policy to MRV System Requirements
10:45	*Coffee break*
11:15	Meeting Policy Needs - Demonstration of the reporting tool
11:45	Exercise: MRV System Requirements versus Current MRV Systems and FLINT
12:15	Conclusions of the morning session
12:30	*Lunch*
13:30	Feedback on Exercise: MRV System Requirements versus Current MRV Systems
14:10	Presentation: How to plan the next steps?
14:25	Exercise: Back to Office Presentation
15:10	*Coffee break, exercise continues*
15:25	Feedback
16:10	Closing remarks by UNFCCC and SilvaCarbon
16:40	End