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USAID
FROM THE AMERICAN PEOPLE

**Global Climate Change:
Carbon Reporting Initiative**

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Progress Report 3 for Year 7

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Putting Ideas to Work

1. Background

This progress report summarizes the activities performed during the third quarter of year 7. Tasks where no progress has been made are not mentioned in this document.

2. Activities for Year 7

Task 1: Collect data to populate the database

Sub-Task 1a. Data collection for emission factors

Several spatial and literature resources have been identified that are appropriate for improving the ACC (AFOLU C Calculator) and are described in more detail below.

Administrative Units

A new global map of administrative units has been created to include the most up-to-date and accurate datasets. This dataset is derived from the GADM database of Global Administrative Areas version 2.0. The administrative units of analysis for some countries, such as Vietnam and Brazil, have been changed to better reflect the scale of USAID operations them.

Carbon Stocks

Mangroves

Forest Protection Tool: Global mangrove data obtained from USGS's Earth Resource and Observation Science (EROS) center has been fully analyzed and values have been established for 2000 extent (Giri et al, 2011)¹. Rates of changes have been established based on FAO data (FAO, 2007)².

Estimates of mangrove biomass for Africa were derived from remote sensing (Fatoyinbo and Simard, 2012)³, and estimates for all other countries were derived from latitude-based allometric equation (Twilley, 1992)⁴.

The database for the mangrove component has been populated and the equations and methods for estimating benefits are currently being written and conveyed to the programmers at Applied Geosolutions for full implementation of this component under the Forest Protection Tool. The full implementation of the mangrove component will be accomplished by the end of the fourth quarter.

Afforestation/Reforestation Tool: We are also expanding the capabilities of the Afforestation/Reforestation Tool to allow for reforestation of mangrove forests. For this addition, a literature review is currently underway to compile biomass accumulation rates of planted/rehabilitated mangroves. Very few such studies exist in the literature and at this stage, we have located and reviewed eight studies to render relevant information on geographic location, mangrove forest composition, characteristics of the plantation project, age of plantations, biomass stocks, biomass

¹ Giri, C.; Ochieng, E.; Tieszen, L. L.; Zhu, Z.; Singh, A.; Loveland, T. (2011) Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*. 20:1 154-159

² Food and Agriculture Organization of the United Nations [FAO], (2007) *The world's mangroves 1980-2005*. FAO Forestry paper 153, Rome

³ Fatoyinbo, T E. & Simard, M. 2012 Height and biomass of mangroves in Africa from ICESat/GLAS and SRTM. *International Journal of Remote Sensing*. 34:2

⁴ Twilley, R.R., R.H. Chen. and T. Hargis. 1992. Carbon sinks in mangroves and their implications to carbon budget of tropical coastal ecosystems. *Water, Air, and Soil Pollution* 64:265-288.

accumulation rates, and uncertainties associated with the statistics compiled. This literature review is expected to yield adequate data to allow Winrock to develop first-order carbon accumulation rates and/or curves for mangroves across the world. The addition of mangroves to the Afforestation/Reforestation Tool is expected to be completed by the end of the fourth quarter.

Agroforestry Systems

Significant new data and information have been compiled by two Agroforestry specialists under year 6. The modifications by the experts along with the updated database have been incorporated in the updated Agroforestry Systems' (AFS) Tool. The methods, including equations and database have been transmitted to the programmers at Applied Geosolutions and are currently under development for full implementation in the online interface.

Additionally, Winrock has been working on peer review publication lead by Montagnini et al (in prep)⁵ to reflect the research conducted to improve the carbon benefits calculated by the AFS Tool. This publication is expected to be submitted to a scientific journal by September 2013.

Selective Logging Timber Extraction Rates

Concluded. No additional progress since Progress Report 1.

Community forest management

Concluded. No additional progress since Progress Report 2. Through literature research we concluded that no clear difference in GHG accounting from the current methodology employed by the Forest Management Tool was identified.

Methodology for even-aged forestry in Temperate Regions

Significant progress was made in this component. More details are available in section 2a below.

Secondary Forests

Concluded. No additional progress since Progress Report 2.

Additional datasets

Winrock is studying the possibility of using the spatial data layers compiled by the World Resources Institute (WRI) to develop the Global Forest Watch 2.0⁶. These data include location of logging concessions, protected areas, amongst other, and would mostly be used for informational purposes, allowing users to put their project intervention areas in perspective in regards to other activities on the ground nearby the project area.

Sub-Task 1b. Finalizing updating and validation of global forest carbon stock map.

The release of this product has been delayed by the author (Dr. Sassan Saatchi) as a result of challenges encountered in some of the remote sensing data during validation of the map. However, the data for Latin America and the Caribbean has already been acquired by Winrock and is currently being processed and analyzed for estimating area-weighted carbon stocks per administrative. Once Winrock acquires the data for the other continents (Africa and Asia), we will process the remainder of the data for estimating area-weighted carbon stocks by our admin units, update the database and then upload the information to the web interface of the Calculator, all in one batch. This entire process is expected to be finished by September 2013.

Sub-Task 1c. Refining estimates of deforestation rates.

Winrock has devised a temporary strategy to update the deforestation rates based on freely available MODIS data up to 2011. That is because the release of the higher resolution product from Dr. Matt

⁵ Montagnini, F., F. Casarim and S. Brown. Potential for carbon sequestration and storage in tropical Agroforestry Systems of Latin America and the Caribbean. In preparation.

⁶ More information at: <http://www.wri.org/gfw2>

Hansen has been delayed indeterminately. Once Dr. Hansen's product is published, Winrock will update the deforestation rates again. However the timeline for the release of such product is still unclear.

Task 2: Build and test tools

Subtask 2a. Modification of the forest management tool

The Forest Management Tool is being revised to include both: (i) uneven-aged forest management (existing Tool), and (ii) even-aged forest management. These practices exist worldwide. The new even aged management calculation approach looks at the long term carbon stock both under business as usual and in the case of project implementation, and is further described in Progress Report 2 of Year 7.

This quarter, progress has been made on leveraging data to estimate rates of carbon accumulation in even-aged forest stands. Literature research has been conducted to identify existing data on the following variables needed for this component:

- Biomass Expansion Factors (BEFs): data sources were identified at IPCC (2003) Good Practice Guidance for Land Use, Land-Use Change and Forestry (LULUCF) table 3A.1.10 'Default values of biomass expansion factors (BEFs). BEF values for both broadleaf and conifer species were assigned to calculator jurisdictions according to their predefined climatic zone.
- Aboveground biomass in (t d.m. ha-1) (AGB): data sources were identified at IPCC (2006) Guidelines for National Greenhouse Gas Inventories Vol. 4 AFOLU, Table 4.8, 'Above-ground biomass in forest plantations', assumed to represent most even-age managed forests. AGB values for both broadleaf and conifer species were assigned to calculator admin units according to their predefined climatic zone and the estimated age of the plantation (≥ 20 yrs).
- Mean annual increment (MAI) (tonnes d.m. ha⁻¹ year⁻¹): data sources were identified in the IPCC (2006) Guidelines for National Greenhouse Gas Inventories Vol. 4 AFOLU. MAI values for both broadleaf and conifer species were assigned to calculator admin units according to their predefined climatic zone and the estimated age of the plantation (≥ 20 yrs).
- Root-to-shoot ratio (R/S): data sources were identified at IPCC (2006) Guidelines for National Greenhouse Gas Inventories Vol. 4 AFOLU, R/S ratios were assigned to calculator admin units according to their predefined climatic/ecological zone and the estimated per-hectare above-ground biomass (determined from values incorporated from 2006 IPCC Guidelines for National Greenhouse Gas Inventories Vol. 4 AFOLU, Table 4.8, 'Above-ground biomass in forest plantations'.)
- Rotation-length averages: Data obtained from FAO is currently being assessed for accuracy and applicability.

Further refinements to the methods are in the works and the Tool will be implemented in the Calculator by September 2013.

Subtask 2b. Adding capability to add geographic specific details

Winrock has worked with the programmers at AGS to complete a design for enabling project activities to have optional explicit geometries which can be drawn or uploaded from a file (see Subtask 2b in Progress Report 2 of Year 7). Currently activities reside in an administrative unit but do not have an explicit geographic extent. The completed design will allow users to input an extent which will be used to calculate area, either through drawing a polygon on the map, or uploading a shapefile – guidelines

and requirements for shapefiles to be uploaded into the Calculator are currently being drafted by Winrock and AGS.

Through either of these capabilities, users will be allowed to execute multiple activities at once. Currently, an activity can have extent in only one administrative unit. We will allow multiple administrative units to be selected, and subsequently the user will be prompted to apply an applicable area for each administrative unit. Alternatively, if the parcel is drawn or uploaded the respective areas will be calculated automatically within the Calculator.

In the future the geographic extent entered by users will be the basis to extract parameters used in the calculations from existing geospatial databases (e.g. deforestation maps, C stock maps, etc.).

We are now working with AGS on updating the calculator to handle the aforementioned cases. However, users will continue to be able to use the ACC the way they do now if desired, thus creating three different ways for depicting spatial extent of projects.

Subtask 2c. Add an effectiveness rating calculation component

Project effectiveness flowchart (based on questions/ flowchart) has been implemented through the use of a pop-up to guide users through a sequence of questions, the result of which sets the effectiveness percentage rating. Users are allowed to override the values estimated in the effectiveness rating tool, but only after completing the questionnaire and provide a justification for modifying the value estimated.

Subtask 2d. Policy and capacity building impacts

In the past Winrock has investigated approaches for determining greenhouse gas benefit for policy and capacity building focused activities. In discussions with USAID, we jointly determined that a full calculating tool based on level of investment will face so much variability, leading to impracticality. Thus Winrock shifted the focus on this Tool.

We are now developing a decision tree type of workflow that users will have to go through, narrowing the questions towards defining the type of emissions reduction/sequestration that the policy or capacity enhancement program can achieve. At the end, the decision tree will lead users to existing Tools (Forest Protection, Forest Management, Afforestation/Reforestation, Agroforestry, Agricultural Land Management, or Grazing Land Management) to estimate the potential carbon benefit of supporting such policy and/or capacity enhancement program. For example a policy reducing deforestation could look at historic and current deforestation to calculate the emission reduction.

Subtask 2e. Develop a new bioenergy and land use tool.

This quarter Winrock has completed a literature reviews on the ecological, economic and sociological dimensions of fuel wood and charcoal consumption. We have begun planning a more spatially-explicit tool linking efficiency improvements and adoption rates with reduced forest degradation that will be implemented in 2014.

Additional subtask 2f. Develop uncertainty estimation for calculated carbon benefits

No further progress since Progress Report 2.

Task 3. Train USAID GCC Team and mission staff (extension of Task 9 of Year 5)

A short 15 minutes presentation on the scope and capabilities of the ACC was given to 39 people at the CARPE Technical Toolkit Workshop, held in Washington DC on May 15 and 16 of 2013. Additionally, feedback from approximately 5 to10 users have been received through email, and either incorporated into the ACC, or properly addressed with users.

A brief pamphlet describing the ACC capabilities and highlighting the difference between the carbon benefits estimated using the ACC and marketable offsets estimated for REDD+ project has been prepared, distributed and will also be uploaded to the web interface.

As well, a descriptive text explaining the parameters required under Level B of each of the Tools has also been added to the web interface for most parameters.

Lastly, a draft scientific article is currently being finalized for submission to an open source scientific Journal describing the underlying data and methods used in the Agroforestry Tool.

Task 4. Complete Decision Making Tool.

No additional progress since Progress Report 2.

Task 5: Management and implementation

Subtask 5a. Develop a detailed workplan for year 7

Completed and submitted in October 2012.

Subtask 5b. Host website.

The current version of the ACC will be hosted by Applied Geosolutions during Years 7 and 8.

Additionally, Winrock is also working with AGS to make improvements in the visual appeal and overall user-friendliness and navigability of the ACC. Extensive enhancements were made to the user interface of the website to improve its appearance, accessibility, and delivery of information. These improvements included refining and adding text as well as incorporating appropriate photos, links, and contact information to the various pages in the ACC. Efforts are currently underway to more effectively guide users on operating the website and leveraging its capabilities to the fullest extent. These efforts include the development of a more robust 'Help' section, creating a downloadable user manual, incorporating a FAQ feature, and improving the intuitive work flow in the ACC. Furthermore, explicit definitions for categories and key vocabulary are being generated to better communicate the parameters the calculator considers.

Various members of the Winrock team have also dedicated considerable time to provide feedback in an effort to improve the user interface, information architecture, and to catch bugs in the programs, models, and software. This feedback is periodically being aggregated and shared with the programmers at AGS in order to work out occasional issues and carry out continuous improvements.

Subtask 5c. Production of progress reports.

This document represents the third progress report to be delivered to USAID during Year 7.

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