Review of current tools and methods for REDD+ and REALU value chains

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Architecture of REALU: Reducing Emissions from All Land Uses- PHASE II

Preface

In the context of the wider debate on reduction of carbon emissions from tropical deforestation and forest degradation, this report reviews current tools and methodologies for the planning of emissions reductions projects across all land uses in a REALU (Reducing Emissions from All Land Uses) value chain. This work supports Phase II of the REALU project, a joint effort of the ASB Partnership and several partner organizations. The overarching goal of this project is to develop, through action research, a set of approaches, methodologies and national capacity to implement effective landscape-based strategies for reducing emissions from deforestation and degradation (REDD+), within a context of sustainable rural development, national sovereignty, respect for indigenous rights, and integrity of a global Greenhouse Gas (GHG) accounting system.

Phase I of this project was based on research and reviews of key areas to enhance understanding of landscape approaches to REDD+ and the implications for ongoing UNFCCC negotiations. Phase II emphasizes demonstration landscapes, national level backstopping through UN-REDD and FCPF (Forest Carbon Partnership Facility) processes and the generation of comparative action research on global landscape approaches to reducing emissions, including but not limited to REDD+. The project is occurring in four countries: Cameroon, Indonesia, Peru and Vietnam.

This report summarizes the results of a workshop conducted to review mainly current ICRAF tools developed to support REDD+ and REALU projects. The workshop took place in Amsterdam, Netherlands, on the 19th and 20th of April, 2011 at the Vrije Universiteit (IVM), with the generous support of the Government of Norway. The workshop was organized within Project Objective 1: backstop country level planning and implementation of whole-landscape approaches to REDD+ through the provision of methods, tools and relevant training at multiple levels within the framework of multi-lateral initiatives such as the Forest Carbon Partnership Facility (FCPF) and UN-REDD.

Beyond the scope of this workshop, we acknowledge that there exists a variety of other resources and tools which can both complement and bridge gaps inherent in the current set of ICRAF tools. In this regard, this report also outlines other existing tools available to support the REDD+ and REALU project cycle.

We would like to acknowledge all Participants of the workshop (see Appendix 3) for their valuable inputs and review of this report. A special thanks as well to Jeremy McDaniels, IISD-ASB intern for his valuable contributions to the report.

Glossary

ABACUS	Abatement cost curve calculator
AFOLU	Agriculture, forestry and other land uses
ALU	All Land Use Change
ALUCT	Analysis of Land Use Change and Trajectories
ASB Matrix	Land use systems compared on their key attributes
CDM	Clean Development Mechanism
CO_2	Carbon Dioxide
C_{REDD+}	Credited reduction of emissions from deforestation or (forest) degradation
ER	Emission Reduction internationally recognized C_{REDD+} rules exist as yet)
FBA	Functional Branch Analysis, step for deriving allometric equations
FERVA	Fair & Efficient REDD Value chain Analysis
FlowPer	Flow Persistence model
FPIC	Free and Prior Informed Consent
GHG	Greenhouse Gas
ICRAF	International Centre for Research in Agroforestry alias World Agroforestry Centre
IPCC	Intergovernmental Panel on Climate Change
LUWES	Land-Use Planning for Low Emission Development Strategy
MRV	Monitoring, Reporting and Verification
NAMA	National Appropriate Mitigation Action
NORAD	Norwegian Agency for Development Cooperation
NSS	Negotiation Support System
OppCost	Opportunity Cost analysis scheme
PDD	Project Design Document
PEAT	Peatland Emission Assessment Tools
RACSA	Rapid Carbon Stock Appraisal
RATA	Rapid Land Tenure Claim Analysis
REALU	Reducing Emissions from All Land Uses
REDD	Reducing emissions from deforestation and forest degradation
REDD+	Reducing Emissions from Deforestation and forest Degradation plus conservation, sustainable management of forests and enhancement of carbon stocks
REL/RL	Reference (Emission) Level
Repeat	Reduce Emissions from Peatlands
RESFA	REDD+ site level feasibility appraisal
TALaS	Tradeoff Analysis for Landuse Scenarios
TULSEA	Trees in Multi-Use Landscapes in Southeast Asia
UNFCC	United Nations framework convention on climate change
UN-REDD	United Nations collaborative programme on Reducing Emissions from Deforestation and Forest Degradation in developing countries

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Introduction – Why tools for operationalizing REDD+ and REALU mechanisms?

REDD – Reducing Emissions from Deforestation and Forest Degradation – is a climate change mitigation strategy, first proposed at COP11 in 2005, that offers developing countries incentives to reduce their forest carbon emissions. REDD+, as confirmed in the COP16 in Cancun in December 2010, goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (UNFCCC, 2011). REALU – Reducing Emissions from All Land Uses – goes a step further in that in addition to REDD+, it considers all transitions in land cover that affect carbon storage, whether peat land or mineral soil, agriculture, trees-outside-forest, agroforests, plantations or natural forest. This framework effectively bypasses the difficulties associated with confirming an operational definition of "forest", methodological problems of leakage, permanence, measurement methodology and equity issues between and within developed and developing countries with different agro-ecosystems.

REDD+ and REALU hold much promise to reduce emissions and protect forests, and many countries are beginning to develop national strategies that pave the way for proposals for site and national level projects. However, the technical requirements of current voluntary market arrangements are strict and complex and governments and local agents often lack the tools and methods to develop and implement area-specific versions of REDD+ or REALU. Therefore, there is a need for improved access to useful and innovative tools to make REDD+ and REALU work, through targeted information collection, knowledge sharing and capacity building, and to support further analysis of various options, negotiations and decision making.

While developing area-based REDD+ and REALU projects, some key questions emerge:

1. What are the main steps of the project cycle and what do we need to know at each step of the project cycle?
2. What information can be provided at relatively low cost and with sufficient reliability to facilitate project development?
3. What data is required for a comprehensive and rigorous analysis of variables and issues?
4. How can the efficiency and equity of the process be secured in an integrated way?

This report attempts to provide answers to these questions and aims at reviewing, revising and preparing a toolbox for landscape level assessment and planning for REDD+ and REALU. In this document we present different set of tools and methods developed in recent years by the World Agroforestry Centre (ICRAF), The ASB Partnership for Tropical Forest Margins and other international organizations.

Part I of this report identifies a number of perspectives for clarifying the range of tools and methods employed. These include: i) Project cycle perspective and compliance aspects; ii) Nature of tools – for scientists –, i.e. spatial, dynamic, non-spatial, qualitative; iii) Process tools for stakeholder decision making. Part II provides a detailed description of the range of tools and methods existing

for REDD+ and REALU developed by ICRAF, the ASB Partnership for Tropical Forest Margins as well as other international organizations such as James Hutton Institute, Environmental Network Ltd and Landscape Denmark. Part III presents visual representations of the current set of tools (as discussed in the workshop) and highlights and discusses the gaps and outstanding issues with the intent of generating discussion. It also presents visual representations of other external tools. The two tool sets are synthesized in order to identify overlaps and gaps. The conclusion provides recommendations for the way forward. Appendix 1 and Appendix 2 respectively provide a brief preliminary description of external tools and methods, as well as guidelines available for REDD+ and REALU.

I – Clarifying the range of tools and methods employed for REDD+ and REALU

I.1. Project cycle perspective and compliance aspects

Forest Carbon projects are projects that sequester, conserve or otherwise reduce net emissions of CO2 and other greenhouse gases in forests, agro-ecosystems and other landscapes. A REALU approach combines afforestation and reforestation in the framework of the Clean Development Mechanism (A/R-CDM), projects which reduce deforestation and forest degradation in developing countries (REDD+) and projects which include any other transitions in land cover that affect carbon storage, within the framework of AFOLU accounting standards.

Management of a Forest Carbon project cycle requires a series of actions that are required to validate net Emissions Reductions (ER) within a national REDD+ framework, and/or Certified Emissions Reduction credits (CER) in accordance with international regulations. There is currently no standard project cycle management for REDD+ which has been officially approved. Nevertheless, the following scheme is based on current REDD+ guidance and gives an overview of the main processes and procedures to follow in typical forest carbon projects.

Table 1 indicates which technical paths and products are required for each step of the REDD project development process (Olander and Ebeling, 2011). The main steps in developing a REDD+/REALU project are:

1. Preliminary Assessment and Project Idea Note (PIN)
2. Project Design and Planning
3. Development of Project Design Document (PDD) (requires initial Carbon accounting)
4. Development of Project Implementation Strategy
5. Financing and Investments Arrangements
6. Approvals, Validation and Registration
7. Implementation and Monitoring
8. Verification and Issuance

Table 1. Project phases and technical outputs for REDD

Step	Technical Outputs
Preliminary Assessment and Project Idea Note	• Deforestation and degradation analysis (patterns and rates) • Compilation of background information • Identification of goals and objectives • Definition of the project scope and concept • Initial consultations with key stakeholders • Pre-analysis of legal issues • Feasibility assessment • **Project Idea Note (PIN)**
Project Design and Planning	• Analysis of patterns in relation to agents and drivers (spatial land use analysis) • Preliminary definition of project boundaries and leakage zones • Socioeconomic ex-ante impact assessment • Biodiversity ex-ante Impact assessment • Analysis of financial costs and legal issues • Activities definition • Risk analysis of non-permanence • Development of carbon baseline analysis • Establishment of Reference Emissions Levels • Consultation with local communities and stakeholders • Program planning (logical framework)
Development of Project Design Document (Carbon accounting)	• New Methodology Design (if applicable) • **Project Design Document (PDD)** • Development of monitoring plan (deforestation and degradation rates, patterns, emissions, removals, drivers, socioeconomic and environmental impacts) • Harmonization with emerging governmental requirements and guidance
Development of Project Implementation Strategy	• Reassessment of feasibility in light of technical outputs • Development of with-project scenario and ex-ante estimates of emissions reductions
Financing and Investment	• Long-term financial planning
Approvals, Validation and Registration	• Possible integration into national accounting frameworks
Implementation and Monitoring	• Sign and implement all landowner and partner agreements • Undertake needed community engagement and education programs • Implementation of project activities • Monitoring Report (deforestation and degradation rates and patterns,

	emissions and removals, drivers, socioeconomic and environmental impacts)
Verification and Issuance	• Non-Permanence Risk report • Addressing Information Request (IRs) and Corrective Action Requests (CARs)

(modified from: Olander and Ebeling, 2011 and McNally, R., 2010)

In the **Project Idea and Preliminary Assessment stage**, it is critical to start with analysis of local deforestation and degradation, as this assists in defining meaningful spatiotemporal boundaries linked to the analysis of the drivers, agents, and underlying causes of deforestation, and—ultimately—the technical and financial feasibility of the project (Olander and Ebeling, 2011). The feasibility assessment must also examine the legal framework, and ask questions such as 1) Who all might claim part of future C_{REDD+} credits (Credited REDD+)? 2) Is project development allowed under national law? 3) What are the requirements to implement projects and claim C_{REDD+} recognition? 4) Which stakeholders need to be consulted? The Project Idea Note (PIN) needs to contain a preliminary identification of overarching goals, specific objectives and project actions (McNally, 2010). The project scope is especially important for REDD+ and REALU as it helps to define which activities can be conducted during the project, that is, whether it will only be about avoided deforestation or whether it will include avoided degradation and/or reforestation, other forest activities or other types of reducing land-based emissions. For REALU, the project should also consider including activities for high carbon stocks and low carbon development pathways.

The **Project Design and Planning phase** aims at delivering a Project Design Document (PDD) which clearly defines the project concept, determines the methodology and Emission Reductions expected, develops spatial land use analysis, carbon baseline analysis and establishes Reference Emission Levels for all land uses. Activities have to be clearly defined, for example, the species selection, planting plans, alternative livelihood activities, or in the framework of REALU, development of alternatives for high carbon stocks/low carbon development pathways. There must be consultation with local communities and stakeholders, and substantial analysis of financial costs and possible liabilities (McNally, 2010). Planning for Forest Carbon projects should be considered an iterative process. Adaptive management and learning by doing should be incorporated into project planning in order to identify and prioritize an optimal solution that is both low risk and defensibly viable. Mechanisms should be built into the planning process to include new technical information, risk evaluation, impact assessments, results from stakeholder engagement and consultation with governments and regulatory organizations (Olander and Ebeling, 2011).

As such, the **Development of Project Implementation Strategy** phase should involve a re-assessment overall project viability. At this stage it is possible to make necessary adjustments to project design, and clearly evaluate whether or not a project should be implemented. Action plans, engagement strategies and capacity building may have to be retargeted in order to ensure a realistic implementation process. Once the reassessment has been completed, a clear implementation plan

must be developed. This plan will allocate responsibilities and resources to accomplish clearly defined tasks within definite timelines.

Starting the process of securing financing and investment for project implementation should occur early in the project cycle. Financing agreements or sale may be established at any project phase. As there is no specific rules regarding when financing occurs, it is important to integrate it to the early stages of planning to allow for contingencies and alternatives if targeted financing mechanisms do not work out. There are many different arrangements that may be agreed upon, and different buyers or investors at different stages can apply to different tranches of the overall carbon credit volume (Olander and Ebeling, 2011).

In the **Approvals, Validation and Registration phase**, a third-party auditor will determine whether the project has employed an appropriate development and accounting methodology and whether it has been applied correctly and comprehensively. The auditor will also check that the appropriate steps have been followed, stakeholders have been consulted and local laws have been upheld. Eventually, the auditor will check whether the project is calculating its expected emissions reductions correctly, if the baseline has been determined correctly and if the number of expected ERs is correct (McNally, 2010). If this is the case, the project will be approved, validated and registered. Validation is necessary for eligibility to generate carbon credits, and formal acceptance and registration under the respective standard (Olander and Ebeling, 2011).

Implementation involves signing and implementing all landowner and partner agreements, undertaking the necessary community engagement and education programs and implementing project activities (McNally, 2010). Implementation should occur in accordance with the implementation plan, which specifically identifies responsibilities and deadlines for project activities. Implementation of a project may be a phased process, and may begin prior to full validation and registration. However, it is important to organize implementation in a way that minimizes risks that approval may be help up or jeopardized (Olander and Ebeling, 2011).

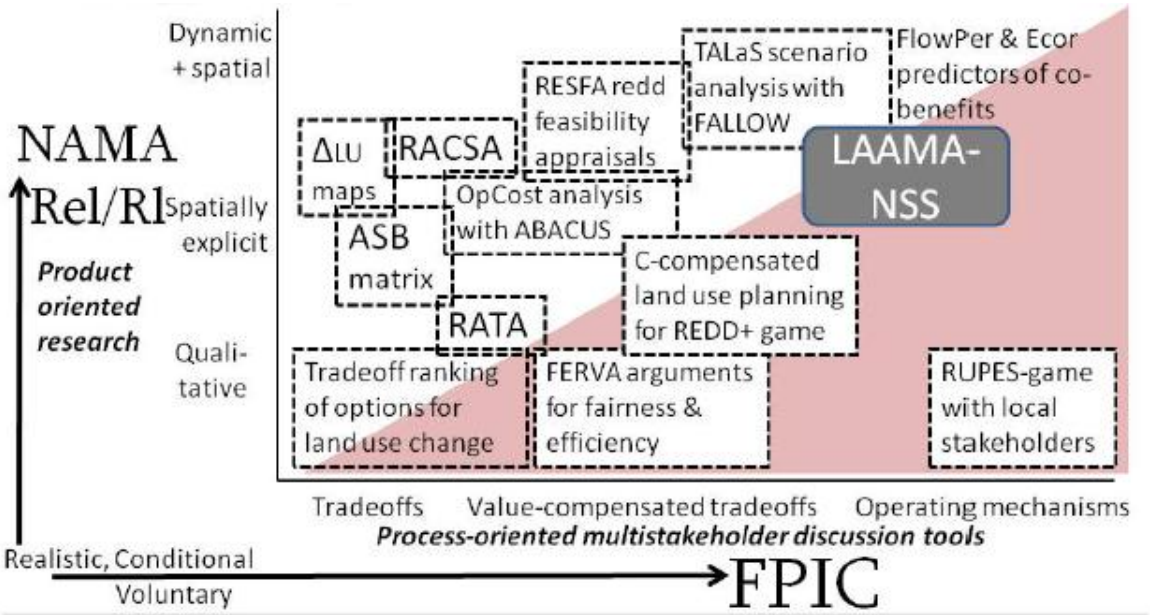
Monitoring is one of the most important steps in the project cycle, as this is when carbon value associated with a project needs to be fully realized. As mentioned earlier, a rigorous monitoring plan will have been developed in the PDD. Monitoring must involve a comprehensive assessment of emissions reductions, deforestation rates, leakage, and social issues and environmental impacts. Without a comprehensive and defensible monitoring programme, there is little evidence that the project is achieving emissions reductions targets, presenting major liabilities for long term viability (Olander and Ebeling, 2011).

Project **verification** is the final step necessary in advance of the issuance of carbon credits. During this stage, an external auditor will review and certify the total emissions reductions that the project has achieved (Olander and Ebeling, 2011).

I.2. Nature of tools

The tools presented here aim to achieve the dual targets of 'clarity' (clear numerical targets for emission reduction, clarity of reference emission level and monitoring) and 'transparency' (stakeholder involvement, free, prior and informed consent, and negotiation support).

Figure 1: Tools for REDD+/REALU readiness



ABACUS = abatement cost curve calculator; ASB matrix = land use systems & their key attributes; ΔLU = land use change; Ecor = Ecological corridors; FALLOW = Forest, Agriculture, Low-value Lands or Waster model; FERVA = Fair & Efficient REDD Valuechain Analysis; FlowPer = Flow Persisytence model; FPIC = Free and Prior Informed Consent; LAAMA = Locally Appropriate Adaptation and Mitigation Actions; NAMA = Nationally Appropriate Mitigation Actions; OpCost = Opportunity Cost analysis scheme; NSS = Negotiation Support System; RACSA = Rapid C stock appraisal; RATA = Rapid Tenure Claim Appraisal; REDD+ = Reducing Emissions from Deforestation and Degradation; REL/RL = reference (emission) level; RUPES = Rewarding Upland Poor for the Environmental Services they provide; TALaS = Tradeoff Analysis for Landuse Scenarios

Within the TUL-SEA (Trees in Multi-use Landscapes in Southeast Asia) Tool project[1] and REALU family of methods developed by ICRAF, we can distinguish three types of tools:

[1] http://www.worldagroforestrycentre.org/sea/projects/tulsea/

Table 2: Type of tool information and targeted stakeholders

Tools	Targeted stakeholders	Examples of tools
Tools that primarily lead to 'extractive' information (above the diagonal)	External stakeholders	RACSA, Land use change analysis, RATA, ASB-matrix of change, OpCost ABACUS, RESFA—REDD site-level feasibility appraisal, TALAS scenario analysis with Fallow, FlowPer—flow persistence, ECor
Tools that primarily support local learning and emphasizes on participatory appraisal steps (below the diagonal)	Local stakeholders	Tradeoff-ranking, FERVA, RUPES-game, C.compensated land use planning for REDD+, Negotiation Support Systems
Tools that provide 'boundary objects' on the diagonal	Relevant for both sides of the negotiating table, external and local stakeholders	TALAS scenario analysis with Fallow model, Negotiation Support Systems

In addition, distinction of tools can also be made based on whether they are – qualitative, spatially explicit, or spatial and dynamic.

Table 3: Nature of tools

Nature of tool	Definition	Examples of tools
Qualitative	A tool that aims to provide an in-depth understanding of human behavior and the reasons that govern such behavior. Qualitative tools investigates the "why" and "how" of decision making, not just the "what", "where", "when".	FERVA, RUPES game, RATA
Spatially explicit	A tool that demonstrates the importance of "where" in addition to "what" and "how much"	OppCost analysis with ABACUS, Land use change
Spatial and Dynamic	A tool that captures dynamic feedbacks between existing population demographics, economics, labor, transport, land use, energy and environmental (energy, water, etc.) models and presents dynamic changes in a two-dimensional spatial manner	Talas scenario analysis with fallow, RESFA

I.3. Process tools for stakeholder participation and decision-making

As much as there is a need for tools addressing technical issues such as assessment of carbon emission reduction potential and costs, Monitoring, Reporting and Verification (MRV) and a need for clear numerical performance targets, tools for a transparent participatory process are of equal importance. Engagement tools can influence supportive or antagonistic responses from stakeholders to a full negotiation phase, and ultimately their decision to engage (or not) in operational agreements on REDD+/REALU activities.

Process tools such as RATA (Rapid land tenure claim analysis), FERVA (Fairness & Efficiency perceptions of REDD+) or RESFA (REDD+ Site level Feasibility Appraisal) involve steps and decisions for stakeholders and a sequence of events and assessments. The process that one follows is as important as the results that are produced. Without understanding the underlying process stakeholders cannot make relevant decisions, and it is difficult to understand how a certain set of results were achieved, or why they were positive or negative. The trade-off between numerical clarity and procedural transparency is a challenge for the current management processes.

Indigenous peoples and local communities have fought for the recognition of their rights by national governments, the international community and by companies, specifically in terms of their rights to give or withhold consent for project development. This has been stated as the right "to give or withhold their free, prior and informed consent to actions that affect their lands, territories and natural resources." This is references as the right to Free, Prior and Informed Consent, or FPIC. In practice, therefore, FPIC refers to a process of engagement, rather than to an endpoint of consent. An important nuance is that the "C" – Consent – part of the acronym should not be taken for granted: free and prior informed non-consent is a real possibility.

Process tools should also allow a comprehensive and sustained approach to sharing information and experience between and among partners. Such exchange can identify best practices as well as categorizing and describing different types of stakeholder engagement processes necessary to facilitate sharing of relevant experiences. In addition, the information gathered in this process can help inform the development of systems to track how stakeholder participation safeguards, as included in the Cancun REDD+ decision, are being addressed and respected.

Figure 2 considers the project cycle process with the different phases in relation to local stakeholder participation. Site-level experience with a set of tools suggests that a flexible toolbox is needed to allow the local context to be articulated. This figure highlights that there are a number of decision points and steps on the way to FPIC to reach a project agreement. These steps require process tools to inform REDD+ and REALU decision-making by local as well as external actors and intermediaries. In addition, it is important to stress that the contract is not the end of the process, but rather the start of real activities.

Figure 2: Project cycle process versus local stakeholder participation

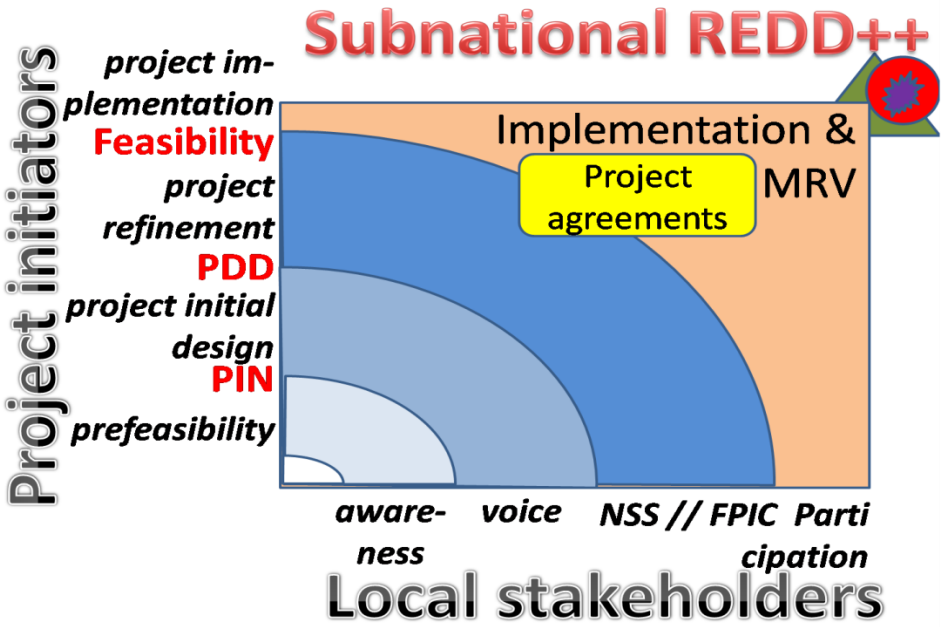
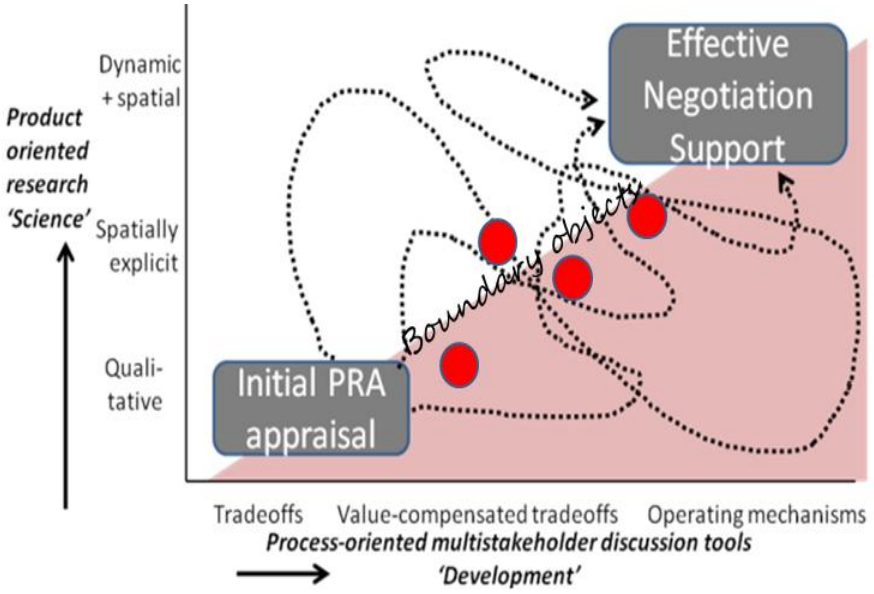


Figure 3: Learning curve towards an effective negotiation support



As shown in Figure 3, effective negotiation support requires a two-way learning curve between project initiators/external stakeholders and local stakeholders in moving from initial interest towards a contract (of any type) and its implementation for an effective increase (or reduced degradation) of

environmental services. A combination of tools is now available to support simultaneous stakeholder learning curves along the main diagonal and provide 'boundary objects'[2] relevant for both sides of the negotiating table. Current methodologies may still have to be improved, with a focus on the interface. For instance, carbon stock measurements need to comply with all requirements of the scientific process but also need to be comprehensible for local stakeholders. Tools that stimulate learning by and with stakeholders are important. Thanks to some of these tools, people in the landscape can increase their capacity to negotiate for themselves, leading to increased understanding and project ownership.

Some important questions that remain include:

- Is there consistency between actions on the ground and discourse at the national scale?
- How do we meet our objective of having people in the landscape use the tools to make their own decisions when the learning curves start from a low level of current awareness?
- How can externally mandated frameworks become an opportunity for active learning? For example, can the required formats for monitoring, reporting and verification (MRV) become a two way process between local and national levels, moving from science into the public domain?

II – Presentation of workshop tools

Part II provides a detailed description of the range of tools and methods existing for REDD+ and REALU developed by ICRAF, the ASB Partnership for Tropical Forest Margins as well as other international organizations such as James Hutton Institute, Environmental Network Ltd and Landscape Denmark. Tools are classified according to five main thematic areas and were allocated to their most relevant thematic area (although they can be useful in different areas as Table 4 will show):

1. Mapping (land use cover) tools
2. Carbon accounting tools
3. Economics of land – use tools
4. Social guidance and community engagement tools
5. Institutional setting / policy related tools
6. Biodiversity and other ecosystem services impacts tools

For each tool, a detailed description addresses the following questions:

- Developer
- What is it used for?
- Where does it fit in the REDD/REALU project cycle?
- How does it work? What are the main steps?
- What are the requirements for using this tool in terms of data and equipment?
- What are the strengths/ weaknesses/ areas for improvement?
- How to access it?

[2] Boundary object is a generic term for information products of any type (words, diagrams, audiovisuals, legally valid contracts, institutions, scenario analysis tools) that are the result of direct engagement of multiple stakeholders (e.g. scientists and policymakers or local people, government agencies and private sector) in a negotiation process (Clark et al., 2011)

II.1. Mapping (land use and cover) tools

ALUCT – Analysis of Land Use Change and Trajectories	
Developer	ICRAF-South East Asia
What is it used for?	The Analysis of Land Use Change and Trajectories (ALUCT) tool is based on the analysis of a time series of satellite data. It is used to: 1) estimate emissions level (REL) for the past based on multi-temporal land use change analysis. 2) characterize landscape on the basis of land cover and land use units that are profitability, carbon and ecosystem services relevant, on the basis of a shared legend developed by an interdisciplinary team. The ALUCT data are also used for REFSA and other modules like TALAS and general scenarios modeling. It is also used for the estimate of activity area in the Opportunity Cost Analysis.
Where does it fit in the REDD/REALU project cycle?	This tool can be used in the development of spatial land use analysis (PIN and PDD). Land use/cover mapping and analysis of land use/cover trajectories (ALUCT) are important parts of several of the TUL-SEA Tools, including the RaCSA method. It also forms the basis of scenario studies (FALLOW), land tenure claim appraisal (RATA) and analysis of the drivers of land use change (DriLUC).
How does it work? What are the main steps?	ALUCT workflow has four stages: 1. Clarification of the questions, leading to the level of detail needed in the legend of land cover types and the resolution of images needed to do so. In deciding on legend category, one has to consider: (i) the limitation and potential of particular imageries (ii) the ground realities of agents and drivers of land use systems and land use changes, (iii) description of each category of land use/cover, (iv) the application of the produced maps. Often Remote sensing specialist tends to focus on what is doable technically without much consideration of what should be recognized. Legend categories should be designed such that they can reveal differences among categories in providing environmental services, as results of varying drivers, and as perceived by land managers, especially farmers/local people, as integral part of their livelihoods, i.e., local use value. 2. Selecting the resolution, spectral properties and source of the images, selecting an image date relevant to the study and of sufficient quality (low cloud cover) 3. based on ground-truth sample points and/or pre-established spatial patterns, 4. focused on the research questions of interest, usually linking 'land use' and system life cycles to the land cover types that can be recognized.

What are the requirements for using this tool in terms of data and equipment?	Data requirements in general are similar to those required by any remote sensing based land cover classification, i.e. satellite imageries, sufficient groundtruth data and remote sensing software. However, to increase the accuracy and landscape representation, for ALUCT hierarchical object-based classification has been determined as the default land cover classification method. Hence, specific remote sensing software is needed.
What are the strengths/ weaknesses/ areas for improvement?	ALUCT enables to reconcile the top-down view from satellites with the bottom-up perspective of farmers and other local stakeholders. In combination of the other tool such as RaCSA, for stock-difference methods of carbon accounting, it ensures legend consistency between various data and information by prior consolidation of legend attributes between land cover and ground/plot carbon measurements. A weakness is the accuracy of resolution satellite image. Also, in the tropics with high incidence of cloud cover, sometimes a combination of optical and radar imageries is necessary. Aside from multiple sensors to overcome cloud issues, areas of improvement can also include exploration of multiple resolution satellite imageries for subset areas to increase the accuracy while still allowing cost effectiveness for relatively large landscape assessments by upscaling to lower resolution imageries.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

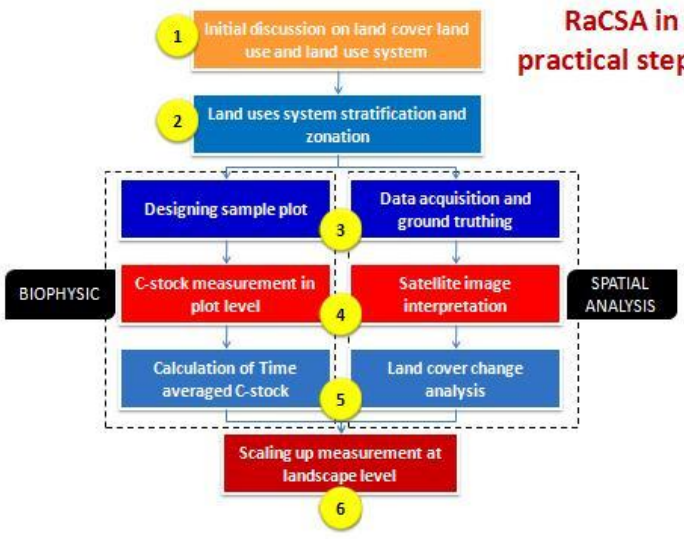
DriLuc – Drivers of Land use change	
Developer	ICRAF-South East Asia
What is it used for?	The objective of DRILUC is to provide a systems-level understanding of the way local drivers of land use change in a landscape relate to external conditions and the types of local/regional/national feedback that currently relate impacts on livelihoods and the provision of goods and services.
Where does it fit in the REDD/REALU project cycle?	It can be used for the development of spatial land use analysis in the framework of the PDD to describe dynamics together with the trajectories that are identified using ALUCT.
How does it work? What are the main steps?	This tool consists mainly in a participatory and multi-actors qualitative assessment of the drivers of change. Systems are described considering exogenous and endogenous feedback mechanisms and goods and services provisions. It considers various components against which landscape transition is assessed. There are 7 main steps: 1) Document changes in land cover, demographics, economic indicators, road/river access; analyze 'conditions and trends' 2) Discuss with key stakeholders the way choices made about changing land uses. This includes 'internal' learning and dynamics, and on the local representation of external change, which may respond to conditioning factors that originate at national scale: 3) Identify Local -National linkage of the 5 capitals (natural (N), human (H), social (S; incl. political), physical (P) and financial (F) capital) 4) Determine position on the (agro)forest transition baseline 5) Dynamics along the segregate-integrate axis 6) Recognize stages of conflict and collective action 7) Understand agents of land use change and stakeholders views on the goods versus services
What are the requirements for using this tool in terms of data and equipment?	Data requirements for this tool can be mainly divided into two: the "Dri" part, which refers to both primary and secondary data to conduct driver analyses, and the "LUC" part, which refers to information on the land use change, landscape characteristics and the dynamics. Data for driver analyses (Dri) can be obtained through Focus Group Discussions and other local level survey, while secondary data can be obtained from any secondary sources including statistical figures. Similarly, land use change (LUC) data source can be obtained from ALUCT approach, from secondary maps as well as from multistakeholders' perceptions on land use change and landscape dynamics including chains and interactions among landscape components.
What are the strengths/ weaknesses/ areas for	Details of the methodology will have to be adjusted to local circumstances and the previous levels of engagement of the DriLUC partners. DriLUC can identify the main

improvement?	issues in agroforestry technology and/or environmental services that merit further study. DriLUC will also help to define the framework for any land use change scenario analysis and use of simulation models (such as FALLOW). It lacks of quantitative evidence and should include a more structured identification of drivers for primary and secondary causes or other frameworks to conceptualize them. There is the need to understand what is due to local /regional/ external drivers. The results of this tool can be consolidated as well as compared with the results of ALUCT.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

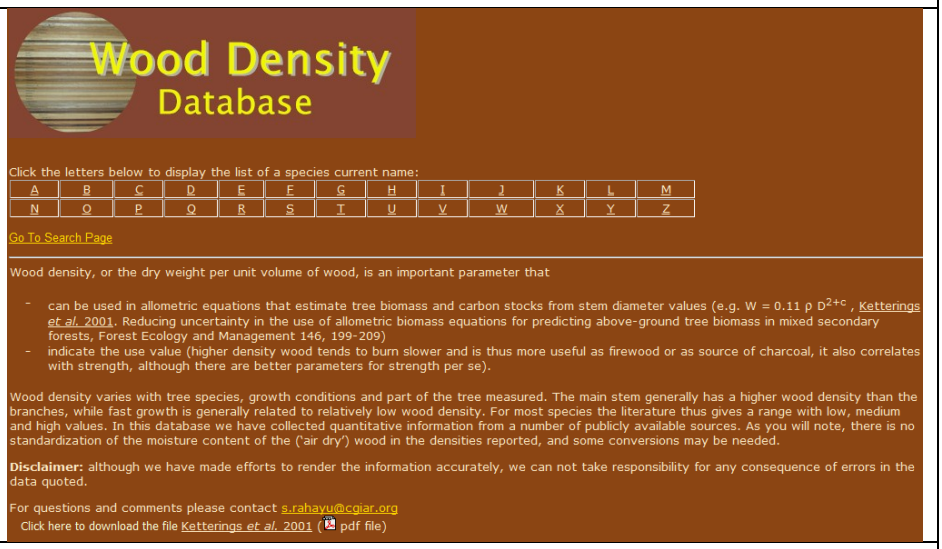
Barrier Analysis for Tree Enhancement: WNoTree Analysis of reasons for shortage of trees in the landscape	
Developer	ICRAF-South East Asia
What is it used for?	The 'why no trees?' protocol examines five aspects that hinder a regreening revolution based on farmer tree planting to contribute to sustainable forest management. A. Property right aspect: Issues of terminology for forests, plantations and reforestation that linked to land tenure and land use restrictions. B. Access to high quality planting material of proven suitability remains a challenge, especially at the start of a farmer-tree-planting phase of a landscape. C. Management skills and information often constrain production for high market values. D. Market aspect: over-regulation often restricts access to markets for farmer grown timber and tree products, partly due to rules intended to curb illegal logging from natural forests or government plantations. E. Financial competition aspect: lack of reward mechanisms for environmental services provided by agroforestry and/or high discount rate and lack of investment
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the Project Idea and Preliminary Assessment for the land-use cover.
How does it work? What are the main steps?	WNoTree surveys will generally have three stages: i) use check-list of potential issues in focus group discussions with farmers and local government agencies to identify the most significant constraints to tree management and domestication in the local context; ii) design follow up surveys to test the hypotheses that emerge from these consultations, in combination with spatial analysis of actual tree presence in the landscape; and iii) action research engagement with local communities and governments to address the primary constraints, and provide a direct test of the preceding analysis.
What are the requirements for using this tool in terms of data and equipment?	There is need for identification of the tree species and tree-based land use systems that hold promise for the EMRP area, stakeholder data, market data.
What are the strengths/ weaknesses/ areas for improvement?	The WNoTree protocol clarifies the 'barriers' that an external support project can address in terms of the Clean Development Mechanism. Removing a barrier provides for 'additionality' of landscape C-stocks.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

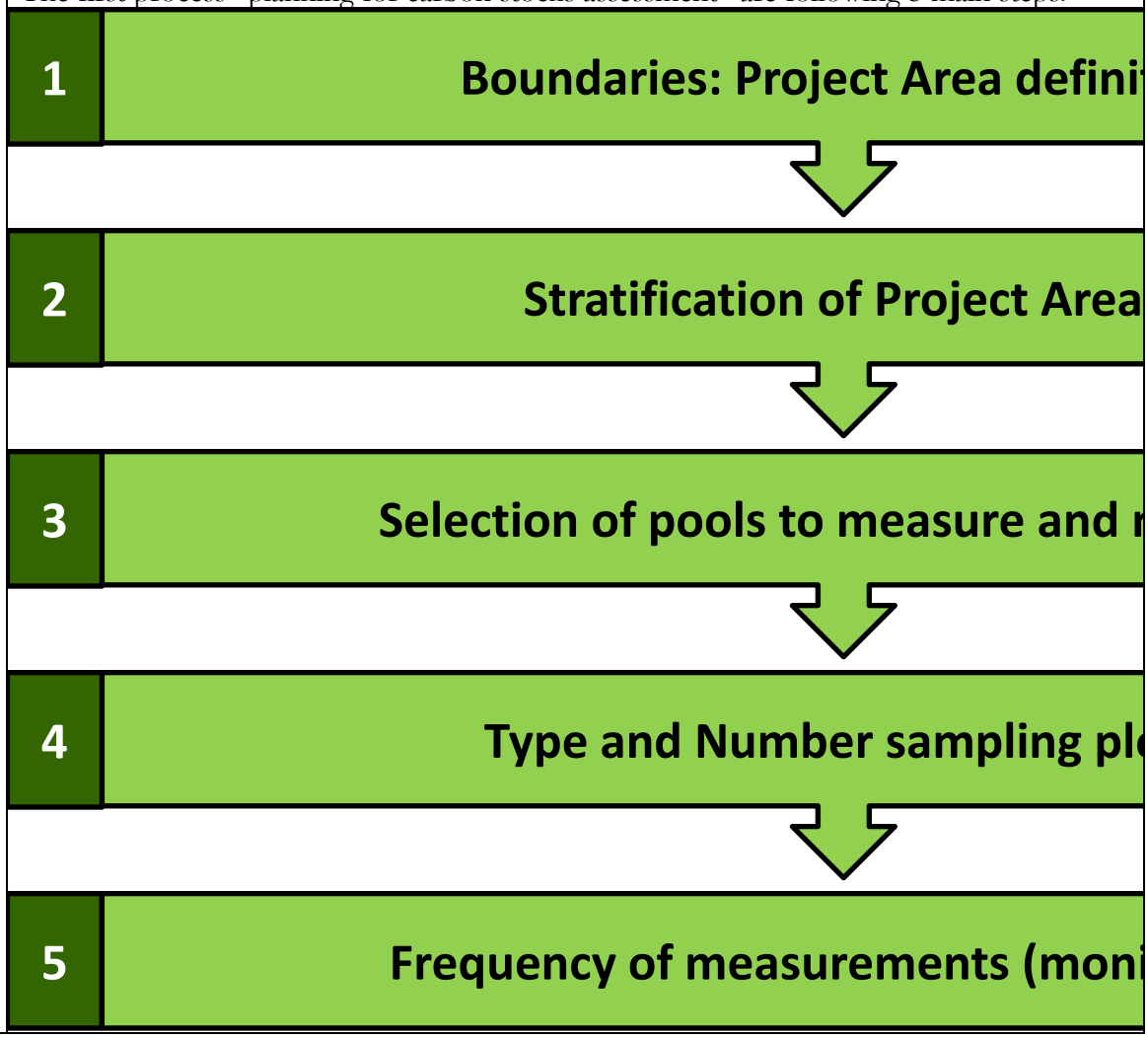
II.2. Carbon accounting tools

Land Health Surveillance Framework	
Developer	ICRAF- Nairobi (under the UNEP-GEF Carbon Benefits Project)
What is it used for?	The Land Health Surveillance Framework addresses a major issue which is the ability to measure and monitor soil carbon cost effectively. The Land Health Surveillance Framework is meant to measure soil carbon dynamics over years in a given landscape.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the ex ante scenarios (for PIN and PDD development) and monitoring carbon change phases.
How does it work? What are the main steps?	The Land Health Surveillance Framework promotes use of new science and technology : 1. Use of robust statistical sampling schemes, such as the one being used by the Africa Soil Information Service (ASIS). Sample plots are randomized in a hierarchical, spatially stratified way to avoid sampling bias and allow data to be aggregated at different spatial scales. 2. Use of standardized, repeatable sampling protocols, tested under the toughest possible conditions 3. Use of infrared spectroscopy for rapid soil characterization. Using only light, this a rapid, low cost and high reproducible methods, which can predict not only carbon but a number of other soil functional properties. It can also be used for rapid prediction of wood density and carbon concentration. ICRAF and its partners have developed a simple protocol using a carpenters' awl for taking volumetric wood samples from hardwood species. Universal calibrations could speed estimates of carbon content of wood samples and facilitate statistical sampling approaches in landscapes. This is already functional in Peru and Kenya.
What are the requirements for using this tool in terms of data and equipment?	This tool requires remote sensing technology and analysis, ground based measurement, new rapid laboratory techniques for soil testing, and rigorous statistical analysis.
What are the strengths/ weaknesses/ areas for improvement?	This tool requires a high level understanding of sophistically and technical methods and can be easily transferable to stakeholders such as NGOs or policy makers.
How to access it?	http://www.africasoils.net/

RACSA – RApid Carbon Stock Appraisal Tool	
Developer	ASB-Phase-1 (1993) & stepwise refinement
What is it used for?	The RACSA appraisal tool is a rapid but integrated way to assess the typical C stock value at a sub-national and national level based with associated land use change. This tool helps to measure C-stocks falling into 'tier 2' and permit to know also the longer term properties of the forest land uses.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the ex ante scenarios (for PIN and PDD development) and monitoring carbon change phases.
How does it work? What are the main steps?	It is designed to provide a basic level of locally relevant knowledge to assist in such discussions between relevant stakeholders. It introduces a scientifically sound methodological framework of accounting carbon sinks, while focusing on activities that can improve local livelihoods and alleviate rural poverty. The purpose of RACSA is to provide a cost effective and time-bound (within 6 months) appraisal that: 1. provides reliable data on C stocks in a defined landscape, its historical changes and the impact of ongoing land use change on projected emissions, with or without specific interventions to increase or retain C stocks 2. identifies the primary issues in the local trade-off between C stocks and livelihoods and the opportunities to achieve more sustainable development pathways 3. enhances shared understanding between stakeholders as step towards Free Prior and Informed Consent in contracts to increase or retain C stocks Activities conducted under RaCSA approach include 6 practical steps as following: 

What are the requirements for using this tool in terms of data and equipment?	It is estimated that 10 k$ are needed for a 20*20 km landscape done by a local university team.
What are the strengths/ weaknesses/ areas for improvement?	RaCSA has been going through many years of tests and has been through different stages of improvement, with various related publications including the very recent one for field guide recently published [ALLREDDI website]. It has been proven as an efficient tool which is rapid but comprehensive. What might be relevant and useful for a test is comparison of different other similar tools in the same area and to check the uncertainty of the results. In combination of the other tool such as ALUCT, for stock-difference methods of carbon accounting, it ensures legend consistency between various data and information by prior consolidation of legend attributes between land cover and ground/plot carbon measurements
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

Wood Density database	
Developer	ICRAF
What is it used for?	The tool can be used to assist in measuring the tree biomass where wood density data is required. Current allometric relations require estimates of wood density at tree species level. A searchable database provides overview of literature values that can be used.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the PDD development for carbon stock assessment.
How does it work? What are the main steps?	
What are the requirements for using this tool in terms of data and equipment?	**Species (latin) name is required to see the wood density and moisture content from the database.**
What are the strengths/ weaknesses/ areas for improvement?	For most species, the literature gives a range with low, medium and high values. In this database, quantitative information from a number of public available sources was collected. Nevertheless, there is no standardisation of the moisture content of the ('air dry') wood in the densities reported, and some conversions may be needed.
How to access it?	http://www.icraf.cgiar.org/sea/Products/AFDbases/WD/

Procedures for carbon stock assessment in Latin America	
Developer	ICRAF – Latin America
What is it used for?	The method is not new per se by synthesizing the existing literature from internet available in the years 2008 and 2009, using the Good Practice Guidance of the IPCC. It was published in Spanish and Portuguese for the users in Latina America. There are guidelines for Carbon Assessment of in Small Rural Properties in Latin America on above ground biomass assessment, below ground biomass assessment, biomass assessment in dead organic matter and soil carbon assessment. There is a procedures for selection and generation of allometric equation biomass.
Where does it fit in the REDD/REALU project cycle?	This is used in the ex ante scenarios (for PIN and PDD development) and monitoring carbon change phases.
How does it work? What are the main steps?	The first process "planning for carbon stocks assessment" are following 5 main steps: 

	The biomass and carbon soil assessment are following steps. The guide recommends different sizes and designs for plot and presents allometric equations for the context of the region.
What are the requirements for using this tool in terms of data and equipment ?	In terms of data needed, there is need for determination of allometric equations as well as to determine (i) Project Area (Boundaries); (ii) kinds of pools and (iii) frequency of measurements. It is also essential to have a well trained field work group. In terms of equipment, there is need for an hypsometer for measuring height or altitude, a calliper used in measurement so that diameter is read directly from the trees and a compass to show directions and to establish the plots.
What are the strengths/ weaknesses/ areas for improvement?	The guide does provide electronic spreadsheets, costs of such carbon stock assessment procedures and allometric equations for all land uses.
How to access it?	http://www.worldagroforestry.org/downloads/publications/PDFs/B16293.PDF

PEAT – Peat Emission Assessment Tool	
Developer	ICRAF-South East Asia & 2 IPB PhD students
What is it used for?	The Peatland Emissions Assessment is used for carbon stock change estimation in peatlands.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the ex ante scenarios and Monitoring Reporting and Verification phases.
How does it work? What are the main steps?	The Peatland Emissions Assessment is a tool applied through triangulation of methods to estimate carbon loss: a) Direct flux measurement (snapshot in time scaled up to yearly flux); b) Subsidence = compaction + a C-loss (yearly measurement); c) Ash increase indicates carbon loss. The bulk density and ground water are used to estimate the total of emissions losses.
What are the requirements for using this tool in terms of data and equipment?	There is need for a peat auger. Peat carbon content can be measured by the relatively simple 'loss on ignition' (LOI) method, provided a correct conversion factor is used
What are the strengths/ weaknesses/ areas for	Peat access is a challenge. In addition, there are still high uncertainty in carbon stock estimates for peatlands due to the following challenges: 1. Soil maps include peat soils as separate category only where peat

improvement?	depth exceeds 50 cm, with various other wetland soil categories that include shallower peat layers that still can lead to substantial emissions when cleared 2. Inaccuracies in soil maps 3. Short-range variation in peat depth 4. Lack of data on bulk density and ash content of peat profiles 5. Bias in older bulk density data due to use of augers that compact soil samples
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/ (forthcoming)

FBA – Functional Branch Analysis	
Developer	ICRAF-South East Asia
What is it used for?	Trees come in various shapes, grow at different rates and interact with their neighbours during development. Yet, many of the properties of an individual tree can be predicted if we know the diameter of its stem. The relationship between this diameter and properties such as tree height, tree biomass, leaf area and harvestable timber are called 'scaling rules'. Empirical allometric scaling equations (the most generic form is Y = a D) for tree biomass Y on the basis of stem diameter D are often used in forest inventories and assessment of carbon and nutrient stocks in vegetation. This tool is used to determine allometric scaling equations for above as well as belowground parts of trees and visual extrapolation and to identify misbehaving trees.
Where does it fit in the REDD/REALU project cycle?	This tool should be used as part of a RACSA – RApid Carbon Stock Appraisal if there are suspicions that current allometric equations are not appropriate.
How does it work? What are the main steps?	The Functional Branch Analysis protocol and program are designed to efficiently describe the architecture and key properties of a tree, and to use the derived parameters to reconstruct trees with simple, repetitive ('fractal') rules and derive scaling rules that relate stem and/or proximal root diameter to total biomass and other properties. Fractal branching models repeatedly apply the same equations to derive subsequent orders of the branching process ('self-repetition rule'). For practical applications, a rule is added for stopping when a certain minimum size is reached. The rules can refer to the diameter, length and/or orientation of the next order of branches. The combinations of the various parameters can be used to predict total size (weight, surface area, length, height, lateral extent) and the allometric scaling equations between these. The tool need to go through link-level data, use of spreadsheet to eventually get the allometric generator.
What are the requirements for using this tool in terms of data and equipment?	A measurement tape is needed. The observation protocol should be followed.
What are the strengths/ weaknesses/ areas for improvement?	The main weaknesses are the angles and visualization.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

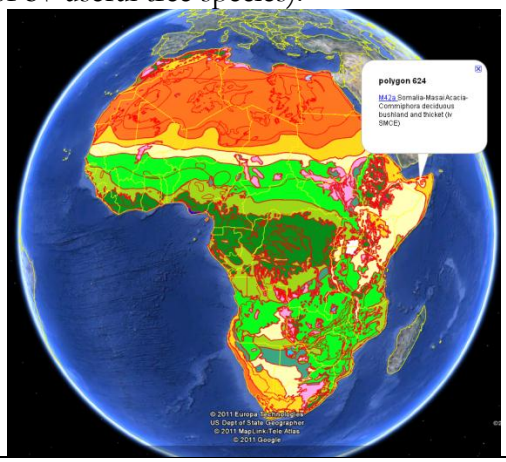
Allometric equations for W. Kenya developed by Carbon Benefit Project	
Developer	ICRAF-Nairobi and Jomo Kenyatta University of Science and Technology
What is it used for?	**It is a** common generic equation for estimating total tree biomass (above- and belowground) in agricultural landscapes.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the ante and post scenarios (development of a carbon baseline analysis) to have a total tree biomass in agricultural landscapes in total, it is not specific to particular types of land uses.
How does it work? What are the main steps?	The development of this tool was based on a comprehensive field measurement protocol and semi-randomized sampling on the landscape scale. Destructive field sampling field sampling led to a rich database on above- and belowground biomass distributions. Valid statistical analysis led to a set of robust allometric equations applicable to a variety of trees in managed agroforestry landscapes based on measurements in Western Kenya. Allometric equations are a useful tool for estimating biomass by deriving tree biomass from easy-to-measure non-destructive parameters such as diameter at breast height. Applying the equations is very simple: It requires measurements of the diameter at breast height of any given tree in an agroforestry context that is higher than 2 m. Subsequent analysis is species independent and converts the diameter (or circumference measured with a simple measuring tape) into biomass and in a further step into carbon. Deriving new allometric equations using the protocol is more time consuming and costly and is recommended in landscapes where land use types or ecological parameters are distinctly different from Western Kenya and where no generic data exist. This is the case in many managed land use types of the humid tropics.
What are the requirements for using this tool in terms of data and equipment?	Requirements for executing the full measurement cycle is the full equipment for tree harvesting, root excavation and a set of balances and a drying oven, before data analysis can commence. Total requirement depending on salary levels 10,000-40,000 USD and 6 months.
What are the strengths/ weaknesses/ areas for improvement?	The strength of this tool is to provide a common generic equation for estimating total tree biomass (above- and belowground) in agricultural landscapes without the intermediate steps of determining above- and belowground portions. Indeed, while equations have been developed for separately assessing above- and belowground biomass for conventional areas such as forests, assessment of total tree biomass in agricultural landscapes has remained a great challenge because of lack of accurate, reliable and cost effective methods for monitoring carbon storage in trees in these landscapes. So far, it has been tested in western Kenya for dry areas and still needs to be tested for rainforests.
How to access it?	http://www.goes.msu.edu/cbp/allometry.pdf

II.3. Economics of land – use tools

OppCosts: Analytical methods to estimate synergies, tradeoffs and opportunity costs of REDD	
Developer	ASB Partnership for tropical forest margins
What is it used for?	Avoiding deforestation conserves carbon and many other benefits that forests provide, such as water services and biodiversity. But it foregoes the benefits of alternative land uses, such as production of timber, crops, and livestock. These opportunity costs are often the largest component of the costs of REDD. Therefore, knowledge of opportunity costs at a national or regional level is important before developing policy priorities and entering into REDD agreements.
Where does it fit in the REDD/REALU project cycle?	Opportunity costs are just one part of the costs of REDD. This is the basic minimum accepted and can vary according to stakeholders.
How does it work? What are the main steps?	Based on medium-density satellite imagery and pixel-by-pixel analysis of current land use, land use change, change in time-averaged carbon and change in the net present value, the data is aggregated across the landscape for all carbon emitting land use changes, to produce estimates of the magnitude of carbon-sequestering and carbon emitting land use changes as well as an opportunity cost curve. The national or regional REDD opportunity cost diagram, which is generated, helps to identify least-cost sites for REDD implementation. A REDD opportunity cost diagram shows the potential emission reduction against the opportunity cost for each land use conversion. It helps answering questions: 1. What land uses have the lowest opportunity costs? (land use change data) 2. What quantity of CO2e emissions reduction will be possible at a compensation price of $X/CO2e? (Carbon data) 3. Where in the country are the least-cost opportunities for REDD projects? (Profitability data) A GIS component can indicate spatially the different land uses and the opportunity costs in the target area. In addition, the tool helps to : 1. Analyze the potential implications of forest co-benefits at the sub-national level, 2. Review effect of changes in policy and technical coefficients on the opportunity cost curve (sensitivity analysis), 3. Provide tips for interpreting opportunity costs analysis and tradeoff results.
What are the requirements for using this tool in terms of data and equipment?	The Abacus software is needed.

What are the strengths/ weaknesses/ areas for improvement?	The main strength of the Opportunity cost tool is that it relies on spatially explicit data which enable that the loss and gain or carbon and the profitability per unit is clear. The spatial analysis can be done quite easily in terms of a simple excel model or in a GIS. The method is based on ground data collection and not on default values. The tool is targeted to policy makers and land users who can make judgment also about it where they stand from different land uses. The weaknesses are related to the substantial data inputs needed such as local data, carbon measurement, land use analysis. It also requires substantial coordination between the different disciplines involved. Another limitation of the tool is that it does not look at management and transaction cost aspects. It does not allow to predict potential future opportunity costs as it is not a scenario model. A next step could be to use scenarios from FALLOW to bring back those in the model to be able to have a prospective analysis .
How to access it?	http://www.asb.cgiar.org/PDFwebdocs/OppCostsREDD_Manual_v1.3.pdf

TALAS (Trees, agroforestry, land) scenario analysis with FALLOW Model (Forest, Agroforest, Low-value Landscape or Wasteland)	
Developer	ICRAF-South East Asia
What is it used for?	TALAS/FALLOW might be used for Op_Cost scenarios, to validate retrospective and anticipate forward looking modes. It can be used to assess the ecological and economical impact of the application of measures. As such it can be used as a stakeholder exercise. TALAS/FALLOW allows comparing scenarios with alternative management options (trade-offs) for Carbon and Costs (included, if needed other ES- additionalities) to assess the changes in drivers levels and the way in which agents adapt to it.
Where does it fit in the REDD/REALU project cycle?	Applications of Fallows models are used to generate dynamic land use change scenarios for ex-ante assessment of scenarios for trees, agroforestry and other land use options. It also can be used for the assessment of leakage.
How does it work? What are the main steps?	The main issues in evaluating development strategies for rural agro-forested landscapes in developing countries are related to non-linear baseline trajectories, trade-offs between economic utilities and environmental services, and so forth. The FALLOW model has been developed as a tool to identify the likely shifts of some scenarios on such strategies from the baseline. The strategies may imply losses in both economical and ecological values (collapse); gains in economical value but loss in ecological value; gain in ecological value but loss in economical value (conservation); or gains in both economical and ecological values. The general idea is based on the DRIVERS>AGENTS >LAND COVER model, considering economic and environment related variables (carbon, biodiversity etc.).
What are the requirements for using this tool in terms of data and equipment?	The tools ALUCT, RAFT, RACSA provide necessary background for FALLOW/TALAS.
What are the strengths/ weaknesses/ areas for improvement?	FALLOW model is a generic model of land use change that simulate farmer's decision in managing their lands, which includes choosing type of crop/tree systems and location of plots to cultivate. This allows the model to simulate magnitude of land use change as well as location of changes. It is also able to simulate dynamically farmers learning process and response to new information and/or historical cropping systems performance. Hence it provides platform for scenario analyses. Currently FALLOW perform well in simulating rural or periurban landscape where land based economy is dominant. Application beyond that, might not be suitable. Further development in FALLOW would be developing a generic module for off-farm livelihood options that is able to think dynamically with on-farm activities. An improvement in population module is also desirable particularly an interlink between migration and potential labour. Further details in Agent Based Models would be needed.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

Useful Tree Species for Africa	
Developer	ICRAF and Landscape Denmark (under the UNEP-GEF Carbon Benefits Project)
What is it used for?	The Useful Tree Species for Africa is a web-based decision support tool for selecting indigenous tree species to plant in forestry, agroforestry and smallholder carbon sequestration projects.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the definition of activities of the project (PIN and PDD development).
How does it work? What are the main steps?	The Useful Tree Species for Africa is an interactive map that is displayed in the Google Earth environment. In a first step, the user identifies the natural vegetation type of the project site. In a second step, the user obtains a list of indigenous tree species that are known to occur naturally within the vegetation type of the project site. In an optional third step, the user can select a subset of tree species based on the desired products and environmental services that these species are known to provide. The below figure shows a screen print from the Useful Tree Species for Africa tool. It is a zoomable map of Africa with vegetation zones superimposed. Clicking the vegetation map gives information on the vegetation type (in the example, Somalia-Masai Acacia-Commiphora deciduous bushland and thicket). The tool provides lists of tree species for each vegetation type (for the example, following the link of M42a leads to information for 57 useful tree species). 
What are the requirements for using this tool in terms of data and equipment?	All information can be obtained with freely available data and software. The user needs to install Google Earth and have a reasonably fast internet connection (permanent connectivity to the internet is not required, however, as the tool can also work with cached data). Guidelines for using the tool (such as navigating and zooming in within Google Earth, or selecting a subset of tree species from interactive spreadsheets) are available from its website.

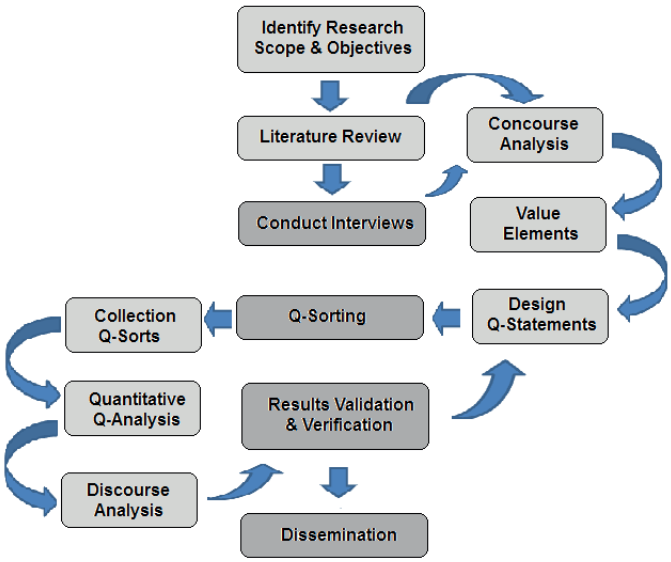
What are the strengths/ weaknesses/ areas for improvement?	The main strength of the tool is that an intuitive method is provided that allows a user to select a suite of species that are adapted to the ecological conditions of the intended project sites of REDD/REALU projects. An additional strength is that – by providing the identities for several useful tree species and information on the range of products and services that these species can provide to local communities – users are encouraged not to promote monoculture plantations. Some of the limitations of the tool include: • Since the original map was prepared at a scale of 1 : 5,000,000, boundaries between mapping units may not be precisely represented when zooming in deeply into the interactive maps (moreover, not all vegetation types may have sharp boundaries but have transition zones such as ecotones or mosaics). If possible, verify that the natural vegetation of your area of interest corresponds to the description of vegetation of the mapping unit where your area is mapped - or whether the vegetation of your area of interest corresponds better to the vegetation of a nearby mapping unit. • Most of the tree species that are listed are indigenous. This does not imply that we do not recommend planting of exotic tree species, but this simply was a result from having compiled lists of species assemblages from what were mainly descriptions of natural vegetation types (*i.e.* as available from White 1983). However, when you would decide to introduce exotic species, we strongly recommend that you adhere to biosafety guidelines - such as not to introduce species that could become invasive. • When documenting species composition, we generally did not make a distinction between a general description of a vegetation type or a description of a vegetation type from a specific location (we thus assumed that species that occur locally are suitable throughout the mapped range of the vegetation type). • Lists of "useful tree species" include tree and shrub species that are expected to be species that are useful for farming or pastoral communities. Although these species are known or expected to be good candidate species to be integrated in agroforestry systems, several species require shading (as provided by a closed canopy) for their regeneration. • Uses of woody species are limited to those that were described in the references that we consulted. The VECEA (Vegetation and Climate Change in Eastern Africa) project has recently addressed the problem of relatively low resolution of the ***Useful Tree Species for Africa*** by building on higher resolution maps that were available for seven countries in eastern Africa and modern geospatial data sets http://sl.life.ku.dk/English/outreach_publications/computerbased_tools/vegetation_climate_change_eastern_africa.asp. Documentation of the higher resolution maps enabled to expand species assemblages. Similar approaches as developed by VECEA can be used for other areas in Africa – or beyond this continent – to increase the resolution of the maps.
How to access it?	http://www.worldagroforestrycentre.org/our_products/databases/useful-tree-species-africa. See also http://www.worldagroforestrycentre.org/downloads/africamap/AfricaVeg_Main.pdf for details.

Agroforestree Database	
Developer	ICRAF
What is it used for?	The Agroforestree Database provides information on the management, use and ecology of a wide range of tree species which can be used in agroforestry. The Agroforestree (AFT) Database is a species reference and selection guide for agroforestry trees. In the context of the database, agroforestry trees are those that are deliberately grown or kept in integrated land-use systems and are often managed for more than one output. They are expected to make a significant economic or ecological impact, or both.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the definition of activities of the project (PIN and PDD development).
How does it work? What are the main steps?	The main objective of the database is to provide detailed information on a number of species to field workers and researchers who are engaged in activities involving trees suitable for agroforestry systems and technologies. It is designed to help them make rational decisions regarding the choice of candidate species for defined purposes. Information for each species covers species identity, ecology and distribution, propagation and management, functional uses, pests and diseases and a bibliography. To date, more than 500 species have been included. The specific aims of the database are to: • enable quick and efficient access to a consolidated pool of information on tree species that can assume useful production or service functions, or both; • provide a tool that will assist with the selection of species for use in agroforestry and related research using factors that are relevant to the chosen agroforestry technologies; • help researchers assess potential agroforestry trees for uses other than those commonly known, such as timber; • provide indicators for the economic assessment of species through yield information on tree products.
What are the requirements for using this tool in terms of data and equipment?	Internet equipment is required to access the website.
What are the strengths/ weaknesses/ areas for improvement?	The AgroforestTree data base should be updated to include socioeconomic information (farmer preference, adoption, economics, marketing) into the data base, which is primarily bio-physical.
How to access it?	http://www.worldagroforestrycentre.org/resources/databases/agroforestree

Rapid Appraisal of agroForestry practices, systems and Technology (RAFT)	
Developer	ICRAF-South East Asia
What is it used for?	The RAFT framework provides guidelines for the description and analysis of the ways trees are used and of use to rural livelihoods. The objectives of RAFT are to: • Provide clarity in terminology on agroforestry practices, systems and technology appropriate for local use and open to global comparisons. • Describes the relation between 'domestication' from perspectives of trees as biological resource, control over access to resources and knowledge/belief systems. • Initiate more detailed data collection on input and output streams in various phases of the lifecycle of an agroforestry system. • Appraise strength, weaknesses, opportunities and threats jointly with the main stakeholders to plan for applied research and development support.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the PDD development for Economics of land-use.
How does it work? What are the main steps?	The main steps in RAFT are: 1) Terminology 2) Use of trees in space and time 3) Tree management and domestication 4) Local ecological knowledge and IPR 5) Component interactions 6) Input/output relations and profitability assessment 7) Tree and land tenure and policy issues 8) SWOT of the AF technology
What are the requirements for using this tool in terms of data and equipment?	There is need for main tree-based system and agricultural commodity, profitability data, FGD, and SWOT analysis.
What are the strengths/ weaknesses/ areas for improvement?	RAFT is an efficient approach to define the priority options for technology intervention. As it also considers multi aspects within the analysis such as the utilization of trees for local livelihoods, RAFT implementation could also help to minimize risks of the farmers in losing their source of livelihood by maintaining the systems for long term sustainable harvest. However, to give more details on what kind of technology that would be appropriate for the farmers, this would require further assessment or somehow would depend on available documentation or experimentation result.
How to access it?	http://worldagroforestry.org/sea/projects/tulsea/inrmtools/RAFT

II.4. Social guidance and community engagement tools

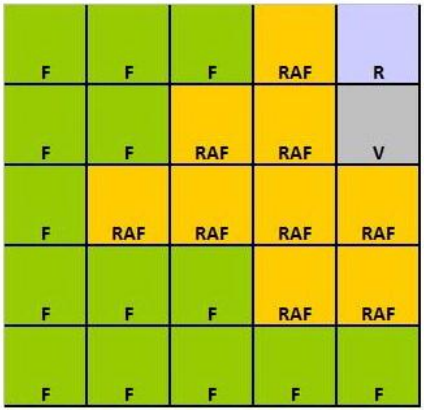
RATA – RApid land Tenure claim Assessment	
Developer	ICRAF-South East Asia
What is it used for?	Land tenure conflicts are common in many developing countries where traditional land rights are often not codified, leaving local populations defenseless against a change in the legal status of their traditional lands as though they were open access lands. RaTA approach can help explore in depth the nature of those competing claims. It aims to seek and reveal the competing perceived legal claims among the stakeholders, who hold different rights and interests.
Where does it fit in the REDD/REALU project cycle?	RATA will analyze the tenure claims and history of policies that gave rise to claims and conflicts about them. It also focuses to power relationship among the disputants that may cause the changes of land tenure and governance. The tool can be used for PIN and PDD development.
How does it work? What are the main steps?	As an analytical framework, RaTA offers guidance on the important things in locating and obtaining initial data necessary for policy makers/mediators to develop conflict resolution mechanism based on policies. As a tool, RaTA consists of six steps. Different techniques such as Participatory Rural Appraisal (PRA), stakeholders analysis and exploration of legal policies/laws are amongst the methods that have been taken account in different phases of RaTA. Using policy study for analyzing the roles of policies to the land conflicts and competing claims, RaTA can provide a policy options and intervention is given as an alternative solution to settle the land conflicts. This method will provide key results for both 'fairness' and 'efficiency' dimensions, as it clarifies the rights of various stakeholders and the nature of current conflicts that may need to be reduced (if not resolved) before emission reduction can be achieved.
What are the requirements for using this tool in terms of data and equipment?	Several questions and guidelines must be followed along with hypotheses and theoretical framework on tenure claims and conflicts. Nevertheless, the researcher who use RaTA can adapt it depending on local situations.
What are the strengths/ weaknesses/ areas for improvement?	RATA is an efficient tool to assess the frictions and conflicts and in utilizing participatory approach which provides the strength on the comprehensiveness of the assessments. However, the limitation of this tool is the lack of conflict resolution capacity.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

Using Q-Methodology in Social Science Research	
Developer	James Hutton Institute and Environmental Network Ltd (REDD-ALERT project partner)
What is it used for?	The Q-Methodology employs input from psychology and action research to analyse subjective perceptions that are difficult to quantify with other methods. The Q-method enables researchers to reveal and explain attitudes and perspectives; provide insights into preferences; identify criteria that are important; explain factors influencing attitudinal diversity; outline areas of consensus and conflict; and to specify, select and evaluate policy options. In the particular setting of this research, the Q-method is used to identify and explain existing attitudes towards REDD+ and towards policy interventions to alleviate deforestation, with further consideration of opportunities and challenges to implement the policy measures on the ground.
Where does it fit in the REDD/REALU project cycle?	This tool can be used during consultation with stakeholders and could also be incorporated with the FERVA tool.
How does it work? What are the main steps?	The following figure stresses the main steps in the methodology:  The technique starts with the consultation with stakeholders through survey and/or focus groups. Q-statements concerning strategy, objectives, policy directions, and implementation measures and instruments are designed through concourse analysis and in line with the research main goals. After pre-testing of the statements and improving them, the Q-sorting enables to obtain responses to a statement from strongly agree to strongly disagree; rank order the responses, placing the statements in the normal distribution chart. Then, through the sequential application of correlation and factor analysis of the results of the survey, the research results in typologies of views that prevail in a given situation. These resulting 'factors', i.e. typical Q-sorts, represent the beliefs people have, allowing researchers explain heterogeneity of existing attitudes and perceptions, and why people have their beliefs. The final steps include

	interpretation of the social discourses uncovered by the quantitative analysis; contrasting the value outputs with the socio-economic backgrounds of respondents and verification/communication of the results with/to stakeholders.
What are the requirements for using this tool in terms of data and equipment?	The equipment needed is the PC Programme Q-Method.
What are the strengths/ weaknesses/ areas for improvement?	Q-tool is a useful tool for public engagement in consultation, identification and explanation of public priorities and support of decision-making. It can serve to capture multi-scale perceptions/understanding. However, rewording is needed for different types of respondents at the national, subnational or local level.
How to access it?	http://www.qmethod.org http://www.rz. unibwmuenchen. de/~p41bsmk/qmethod http://dx.doi.org/10.1016/j.landurbplan.2008.03.007. http://dx.doi.org/10.1016/j.landusepol.2008.03.001

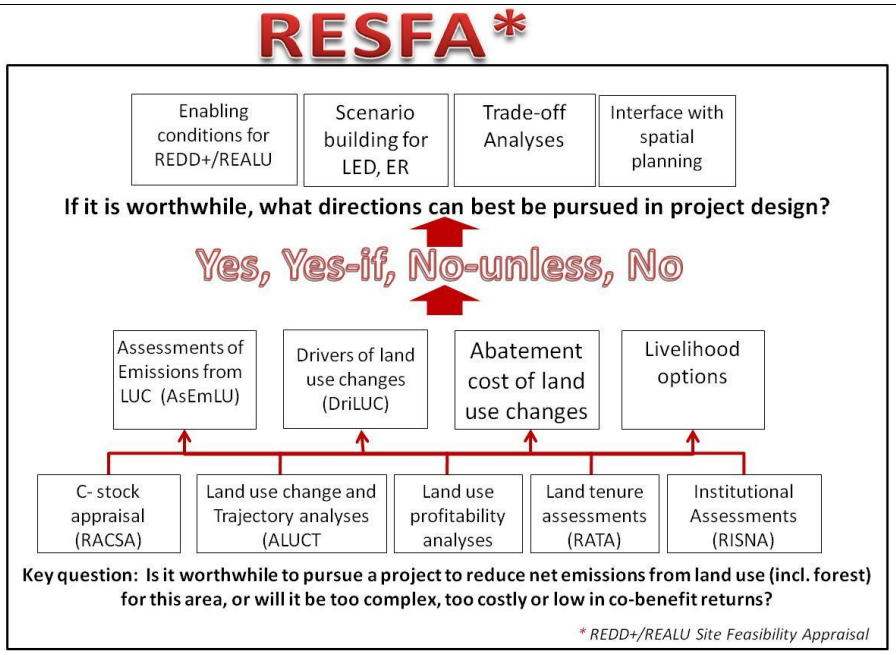
<table>
<tr><th colspan="2">Participatory Analysis of Poverty, Livelihoods and Environment Dynamics (PAPOLD)</th></tr>
<tr><td>Developer</td><td>It is a refinement of the Stages of Progress (SoP) developed by Anirudh Krishna of Duke University in the USA. In Vietnam, it was modified by ICRAF team in collaboration with Ministry of Labour, Invalids and Social Affairs and Vietnam Institute of Economics in 2007 to better address links between poverty and environment in Vietnam.</td></tr>
<tr><td>What is it used for?</td><td>Poverty, people's livelihood strategies, and the natural environment are inter-linked in both space and time. Some of those inter-linkages are distinctly spatial phenomena, which can be measured using household surveys and remote sensing technologies and mapped using geographic information systems, while other inter-linkages are more context-specific and difficult to observe. The method of Participatory Analysis of Poverty, Livelihoods and Environment Dynamics (PAPOLD) was developed to capture local specific issues of these inter-linkages.</td></tr>
<tr><td>Where does it fit in the REDD/REALU project cycle?</td><td>The tool can be used in the PDD development for Social guidance and community engagement.</td></tr>
<tr><td>How does it work? What are the main steps?</td><td>
<table>
<tr><th>Step</th><th>Objectives</th><th>Specific questions/ tasks</th></tr>
<tr><td>1</td><td>To understand viewpoints of the local people and stakeholders on poverty and environment.</td><td>1.What is poverty, what are the causes of poverty, and who are the poor?
2.How do people conceive of their environment, and what are their environmental concerns?</td></tr>
<tr><td>2</td><td>To understand Stages of progress and livelihood activities in the area</td><td>1.What are the livelihood assets/capital that people use in pursuit of their livelihood activities?
2.What are the natural and environment-related livelihood assets and the dynamics/ changes of those assets?
3.List of communal livelihood activities.
4.Indications, changes of life (escape from poverty line, fall back into poverty, rich, etc.) in relation to key livelihood activities.
5.Rank the importance of respective livelihood activities.</td></tr>
<tr><td>3</td><td>To identify impacts of natural resources and environment on livelihood activities and strategy and vice-versa</td><td>1.How do people use natural resources for their livelihood activities?
2. How do livelihood activities interact with environment? (Use tool to analyze the value chain).</td></tr>
<tr><td>4</td><td>To identify shocks, risks, vulnerability, regarding the environment and natural resources.</td><td>1.What are the sources of natural and environment-related shocks and risks for livelihood?</td></tr>
<tr><td>5</td><td>To understand Institutional and policy-related issues</td><td>1.To what extent are the livelihood activities influenced by policies and institutional arrangement that relate to natural resources?</td></tr>
</table>
</td></tr>
<tr><td>What are the requirements for using this tool in terms of data and equipment?</td><td>There is need for maps, secondary data, depth-interview and focus group discussion to have household and livelihood data.</td></tr>
<tr><td>What are the strengths/ weaknesses/ areas for improvement?</td><td>The method is asserted to be more comparative than other methods because it is participatory, dynamic and comparable. By integrating PAPOLD with sustainable livelihood approach, poverty and environmental linkages are seen in a comprehensive way.</td></tr>
<tr><td>How to access it?</td><td>http://worldagroforestry.org/sea/projects/tulsea/inrmtools/PAPOLD</td></tr>
</table>

Rewarding Upland Poor for Environmental Services (RUPES) Game	
Developer	ICRAF South East Asia
What is it used for?	This game is used to assess and understand the perceptions and behavior of rubber agroforest farmers under existing conservation agreements as a step toward institutionalized reward schemes for agro-biodiversity.
Where does it fit in the REDD/REALU project cycle?	This game could be used during the project planning stages, specifically for PIN and PDD development. Although specifically targeted towards rewarding poor for environmental services in a rubber farming context, this type of game could be easily modified to account for land use change from REDD+ or REALU projects. It could serve as a useful communication and knowledge sharing interface, as well as an engagement tool to ascertain public attitudes towards project scenarios.
How does it work? What are the main steps?	The game involves six types of players, a game board and a score sheet. Each type of player has individual roles and objectives: - **Villagers**: The villagers' target is to maintain a minimum of 1 Rupee per year for each person living in the village to sustain themselves. - **Buyer 1**: A logging company agent for pulp wood and paper who wants to make a deal with the villagers to convert natural to logged forest and who is offering an attractive price. - **Buyer 2**: An oil palm company agent who promises to convert any type of land to oil palm that will give a negotiable net benefit in the third year after conversion. - **"Save the Tiger" (NGO) agent:** offers negotiable rewards to villages who still have at least 10 plots of continuous forest cover. - **Watershed Protection Board Officer**: offers some rewards for intact forest. - **Buyer 3**: A "green rubber" company representative looking for sustainable rubber production. The players choose roles. Not explicitly knowing each other's role description beyond what agents disclosed in discussions is considered part of the game design. Conflicting and contradictory roles are left to find innovative solutions within the games' context. Following rounds of negotiations, the villagers and buyers check their incomes and targets on the score sheet. Successive game rounds introduce additional exogenous changes as scenarios or stressors in the game, complicating the players' attempts to meet targets.
What are the requirements for using this tool in terms of data and equipment?	Three land-use game boards with 5 x 5 grids (with dimension of 5 x 5 cm2 per grid) marked with different land-cover types are used. Each sub-watershed (or game board) has one village (V), one unit of paddy field (R), nine units of rubber agroforest plots (RAF), and 14 units of forest (F).

	 A score-sheet squaring total numbers of plots with income from various land use choices. Land-use type | Income per year | Number of plots/units[1] | Income Y0 Y1 Y2 Y3 Y4 Y5 Y0 Y1 Y2 Y3 Y4 Y5 Forest 1 14 14 14 14 11 11 14 14 14 14 11 11 Logged forest 0 0 0 0 0 0 0 0 0 0 0 0 0 Agroforest 4 9 9 9 9 9 9 36 24 20 20 20 10 Ricefield 10 1 1 1 1 1 1 10 10 10 10 10 10 Village 15 1 1 1 1 1 1 15 15 15 15 15 15 Total 25 25 25 25 22 22 75 83 67 65 62 55 Required 75 75 75 90 90 90 No. of stickers 7 8 6 - 10
What are the strengths/ weaknesses/ areas for improvement?	This game is an innovative way to integrate local populations into project planning and decision making. However, the current iteration is highly context specific, and as such, does not immediately lend itself to other applications.
How to access it?	This game is not currently accessible beyond a description in a scientific article. It is expected that the game would be developed in accordance with local contexts.

II.5. Institutional setting / policy related tools

RESFA – REDD+ Site level Feasibility Appraisal	
Developer	ICRAF-South East Asia
What is it used for?	The framework covers the relevant livelihoods, land-use change, carbon stocks, land tenure issues, scenario development and testing for carbon emission and livelihood development and attempts to answer the basic question of whether a REDD+ project can/will reduce net emission while addressing the needs of local communities.
Where does it fit in the REDD/REALU project cycle?	RESFA fits as an overall feasibility framework for landscape assessments prior to the design and implementation of potential REDD+ project. It assesses various landscape components prior to defining project boundary or site selection, it also functions to identify relevant baselines.
How does it work? What are the main steps?	The framework has five key components: A: Livelihoods; B: Land tenure and policy history; C: Carbon stock; D: Land-use change analysis; and E: Scenario testing. The assessments are structured in hierarchies, where some assessments serve as basic and primary assessments while others as the subsequent integrated ones.These key components include questions such as: • What is the current carbon stock of the system? What other environmental services does the system provide? • What are the driving factors and threats that lead to reduction in carbon stock (increase in C emission)? • What is the dependency of the local people on the system? • Is there a problem on tenure security and land claims? • What are the possible scenarios and what is the potential carbon stock increase or decrease under these scenarios? • What are the implications of these scenarios for livelihoods, institutions and equity? What are the opportunity costs, both financial and social? What about additionality, leakage and permanence issues? • How can the benefits of REDD/REALU be shared or distributed equitably? Who will benefit and who will suffer? RESFA is like an umbrella which encompasses a number of TUL-SEA tools (described in this document) which can be combined to make an initial assessment.

	
What are the requirements for using this tool in terms of data and equipment?	Various different TUL-SEA tools constitute RESFA and are needed as parts of RESFA. Data requirements follow the requirements from the individual tools.
What are the strengths/ weaknesses/ areas for improvement?	The RESFA strength is mainly a strategic planning framework or appraisal to answer all feasibility questions but it is not as a tool per se. As a framework it needs guidelines in incorporating different inputs. Area of improvement relates to how to optimize this framework as an aggregated appraisal tool. It is a process that costs considerable time and investment and needs to have a reasonable probability of success to justify such investments.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

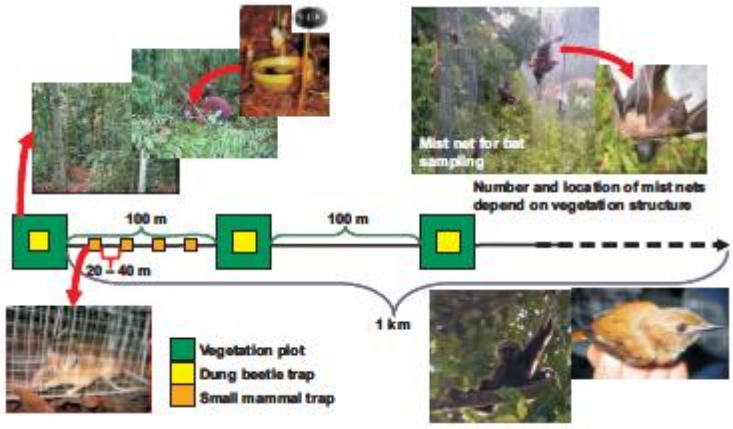
FERVA – Fair & Efficient REDD value chains allocation	
Developer	ICRAF-South East Asia
What is it used for?	FERVA can analyze the perceptions on fairness and efficiency, within the institutional setting and emerging rules for investment in emission reduction ('C markets') Effectively 'reducing emissions from deforestation and degradation in developing countries' (REDD) depends on stakeholder cooperation. There is a need to balance efficiency (actual emission reduction per unit incentive, engagement in places with high emission baselines) with fairness (poverty reduction, environmental justice, rewarding forest protection). The participatory 'fair and efficient REDD value chain allocation' (FERVA) method analyzes stakeholders' views as step in the negotiation process. This method is not for collecting the quantitative data but it is more for guiding the stakeholder to make a consensus on the issue of fairness and efficiency in the REDD scheme that was principal to successful implementation. FERVA is an interesting tool to engage different stakeholders into the process of the initial steps of REDD.
Where does it fit in the REDD/REALU project cycle?	The FERVA method was designed to help in the REDD process in order to see how to combine efficiency and fairness. Scenario models can explore 'business as usual' trends and scenarios that are within (or just beyond) the 'plausible' domain for with/without project developments. It should be used at the beginning of the REDD process and during the consultation with stakeholders.
How does it work? What are the main steps?	A middle ground and combination of policy instruments is needed to actually reduce emissions and also stimulate sustainable livelihood options and development pathways. In order to reach this objective, FERVA is based on 'focus group discussions' with different stakeholder groups in order to adjust different examples to local context. This tool is based on several steps as the following figure shows: 

What are the requirements for using this tool in terms of data and equipment?	The use of this tool especially requires a good facilitator who understands the context of REDD+ and climate change issues.
What are the strengths/ weaknesses/ areas for improvement?	FERVA is a useful tool for stimulating discussion among stakeholders. It is a learning process to reach agreements for first steps to be conducted in REDD mechanism. The challenge for this tool however is on finding the right individuals that can represent the voice of the varied stakeholders and the local context as a whole and have understanding about REDD. From a community perspective it can be challenging.
How to access it?	http://www.worldagroforestrycentre.org/sea/projects/tulsea/

II.6. Biodiversity and other ecosystem services impacts tools

Rapid Hydrological Appraisal (RHA): An Integrated Approach to Assess Watershed Functions and Management Options	
Developer	ICRAF-South East Asia
What is it used for?	Rapid Hydrological Appraisal (RHA) is a tool that aims to provide such clarity, providing answer on (i) how the watershed function is provided; (ii) who could be responsible for providing this service; (iii) how watershed function is being impacted upon at present; and, (iv) how rewards can be channelled to effectively enhance or at least maintain the function. RHA can help to bridge the gaps of knowledge that may exist between the various watershed stakeholders. This approach hopefully leads to a situation where all knowledge systems are integrated and linked.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the PDD development for biodiversity assessment and other ecosystem services impacts.
How does it work? What are the main steps?	The approach is based on the following activities that can be carried out in less than six months: • Land cover/land use change analysis. • Exploration of stakeholders' local knowledge (LEK) and expectations on hydrological functions, water movement and consequences of land use options on the landscape. • Exploration of public and policymakers' local knowledge (PEK) and expectations on hydrological functions, water movement and consequences of land use options on the landscape. • Compilation and analysis of existing hydrological data and modelling (e.g. using GenRiver) the water balance for the watershed, including scenario analysis of plausible land cover change and its likely impact on watershed functions.
What are the requirements for using this tool in terms of data and equipment?	There is need for hydrologic data, climatic data e.g. rainfall, Local Ecological Knowledge data (survey), spatial data, maps (landcover, soil, DEM), PEK (survey/ FGD).
What are the strengths/ weaknesses/ areas for improvement?	The RHA method enables to explore (1) local and public ecological knowledge of hydrological situation of watershed based on perspective of multiple users; and (2) the impacts of the land cover change, rainfall variation, soil type and topography on hydrological situation of watershed. However, long-term rainfall and hydrological data are sometimes hardly available which is a challenge to be able to prove the affect of land cover change on hydrological situation quantitatively (mentioned by local and public stakeholders).
How to access it?	http://worldagroforestry.org/sea/projects/tulsea/inrmtools/RHA

Rapid Agro-Biodiversity Appraisal (RABA) in the context of Environmental Services Rewards	
Developer	ICRAF-South East Asia
What is it used for?	RABA is a tool designed to appraise the perspectives of concerned stakeholders related to biodiversity conservation and the feasibility of a compensation or reward for environmental services (RES) in any area or landscape of interest. RABA uses different techniques and tools from Rapid Rural Appraisal, Stakeholder Analysis and exploration of Local Ecological Knowledge approaches. It captures the perspectives of seller, buyer and intermediaries and generates initial data necessary for sellers, intermediaries and buyers to engage in developing a reward system. RABA is not a stand-alone tool for assessment of detailed biodiversity richness. Selection of an area for potential RES mechanism is normally based on existing credible information about the richness or uniqueness of existing biodiversity that may be verified through local consultations. For areas where reliable biodiversity data are unavailable but necessary, the Quick Biodiversity Survey of indicator flora and fauna can be used as a complementary tool. Objectives of RABA • Assist potential investors in agro-biodiversity conservation to explore the potential benefits. • Assist the managers of agro-biodiverse rich landscapes to understand their key 'selling ponts'. • Provide cost-effective approach to intermediaries.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the PDD development for biodiversity assessment.
How does it work? What are the main steps?	RABA has four stages for sellers and buyers to engage in arranging a RES mechanism, namely scoping, identifying potential partners, negotiating agreements and monitoring and evaluating compliance and outcomes. RABA itself is designed to cover the stages of scoping out the domain and identifying partners who will be engaged in the transactions. As an analytical framework, RABA offers an insight into and guidance on the important elements that should considered in developing a RES mechanism.
What are the requirements for using this tool in terms of data and equipment?	There is need for land cover map, biodiversity data (Quick Biodiversity Survey result), Local Ecological Knowledge survey and SWOT analysis.
What are the strengths/ weaknesses/ areas for improvement?	RABA approach was developed as an analytical framework to identify the information necessary for providers and beneficiaries of biodiversity protection to engage in environmental service agreements, while comprehensive biodiversity assessments are time consuming and can be conducted only by trained and experienced biologists.
How to access it?	http://worldagroforestry.org/sea/projects/tulsea/inrmtools/RABA

Quick Biodiversity Surveys (QBS) GUIDELINE	
Developer	ICRAF-South East Asia
What is it used for?	The Quick Biodiversity Survey or QBS tool was developed for the purpose where detailed recent biodiversity data are unavailable or where previous information on biodiversity may need to be validated. Then, a rapid biodiversity survey of indicator plant and animal groups may provide sufficient information necessary for a RABA.
Where does it fit in the REDD/REALU project cycle?	The tool can be used in the PDD development for biodiversity assessment.
How does it work? What are the main steps?	QBS uses indicator animal groups − dung beetles, bats, small mammals, primates, birds − in addition to plants. The animal groups can be modified depending on their importance in the locality, but the survey technique should be maintained for consistency and data comparison. The entire field work can be conducted in two weeks while the species identification should be done in consultation with experts. A local guide who is knowledgeable about local plants and animals is necessary for the field work. Indicator animals and plants are surveyed along one- km long transects; the layout and frequency of sample points are determined by the animal groups being surveyed. Time and other resources permitting, the number of transects can be increased to improve the accuracy of survey data. In general, the survey, identification, data analysis and reporting can be completed in about six weeks. 
What are the requirements for using this tool in terms of data and equipment?	Binoculars, hand counter, notebook, digital camera, sound recorder, compass, GPS (Global Positioning Satellite) equipment, altimeter, thermometer, vernier caliper, plastic rope, yellow bowl 750 ml capacity, plastic bottle 90 cc, pin set, scissors, machete, plastic box, plastic bags, alcohol 70 per cent, light detergent, saline, naphthalene, chloroform, balance, mist net 30-32 mm mesh (6 m x 2.7 m and 10 m x 2.7 m), kasmin trap made from iron (26 cm x 13 cm x 13 cm size), bait (burnt coconut, salted fish or red oil palm fruit), measuring tape, plastic rope (10 mm diameter) and fabric bags.

What are the strengths/ weaknesses/ areas for improvement?	The QBS can provide quick biodiversity information in a land use system. However, the information is not exhaustive as this would require a full biodiversity survey with specific experts.
How to access it?	http://worldagroforestry.org/sea/projects/tulsea/inrmtools/QBS

III – Visual representations of current set of tools and discussion

A preliminary inventory and assessment of tools and methods for the development of REDD+ and REALU projects has yielded the following set of tools. This section presents graphic representations of these tools sets, legends to articulate acronyms, and discussions of overlaps and gaps. The tools are organized by project phase and thematic area. Some project phases, such as Approvals, Validation and Registration and Verification and Issuance were not included as they were not direct tasks of project developers but rather the responsibilities of third party auditors. We also deliberately merged the phase of Project Design and Planning with Development of Project Design Document (Carbon accounting) because they require the use of similar tools. Many of the tools are useful across different project phases, and extend across phase boundaries in the table. This was done to provide a graphic representation of where tools cover similar territory, where different tools may be complementary, and when more tools for a given task may be available if difficulties are encountered.

III.1. Visual representation of workshop tools

Table 4 displays tools discussed during the workshop as outlined in Part II. The initial mapping of tools showed that some tools can be useful at different phases of REDD+/REALU cycle and for various thematic areas.

Regarding scale, it was mostly agreed that many of the tools are relevant for both scales, i.e., national and local or project-based activity. Generally speaking, the development and placement of these tools in the project cycle should be seen as a process that could tackle any scale, whether developing REDD+/REALU at village level, council level, district level or national level. Then, depending on the scale you are operating at, specific issues should be tackled as there are varying levels of accuracy for each tool at different levels.

The use of some tools at strategic points in the process determine whether the development of a REDD+/REALU project should stop or continue.

- For instance, if the analysis with RATA (A Rapid Land Tenure Assessment) shows there are too many conflicts and that the social context is very complex, this could be a warning indicator against starting any project for the area other than efforts to clarify rights and reduce conflict.
- If land use cover and carbon stock emissions analyses demonstrate that there is no deforestation in the targeted area, the project can be ineligible for REDD.
- If the opportunity cost analysis shows that the potential for carbon emission reduction is low in comparison with high opportunity costs, the project should likely be stopped.

Table 4: Workshop Tools for the Development of REDD+/REALU Projects

	Phase 1: Project Idea and Preliminary Assessment	**Phase 2**: Project Design/Planning and Development of PDD	**Phase 3:** Development of PDD Implementation Strategy	**Phase 4:** Financing and Investment	**Phase 5:** Implementation and Monitoring
Land use and cover	WNoTree	DRILUC	FALLOW		
	ASB matrix	ALUCT			
		OppCosts			
Carbon stocks and emission assessment		RACSA	PCM		
		FBA			
		Allometric eq.			Allometric eq.
		Wood density			
		PEAT	Nested REL		
		Land HS			Land HS
		Procedures for C stock Ass in LA			
		OppCosts			
Economics of land use		RAFT			
		Aftree Database			
	UTS Africa				
Social guidance and community engagement	RATA		FALLOW		
		OppCosts	NSS-tool		
		PAPOLD	NSS-FPIC		
	Q methodology				
Institutional settings	RESFA		Abatement cost		
	LU change	FERVA	Multi-criterion option weighting		
	RUPES Game				
Legal guidance					
Biodiversity and Ecosystem Services Impacts		RHA	Multi-criterion option weighting		
		RABA			
		QBS			
		AfTree Database			
	UTS Africa				

Strategic point

NSS-tool: Tools for future development (as identified by ICRAF)

Acronyms

WNoTree	Barrier Analysis for Tree Enhancement: WNoTree Analysis of reasons for shortage of trees in the landscape
DRILUC	Drivers of Land use change
FALLOW	FALLOW Model (Forest, Agroforest, Low-value Landscape or Wasteland)
ASB matrix	Land use systems and their key attributes
ALUCT	Analysis of Land Use Change and Trajectories
OppCosts	OppCosts: Analytical methods to estimate synergies, tradeoffs and opportunity costs of REDD
RACSA	RApid Carbon Stock Appraisal Tool
FBA	Functional Branch Analysis
Allometric eq.	Allometric equations for W. Kenya developed by Carbon Benefit Project
Wood density	Wood Density database
PEAT	Peat Emission Assessment Tool
Land HS	Land Health Surveillance Framework
Procedures for C stock Ass in LA	Procedures for carbon stock assessment in Latin America
Nested REL	Nested Reference Emissions Level
RAFT	Rapid Appraisal of agroForestry practices, systems and Technology
AFtree Database	Agroforestree Database
UTS Africa	Useful Tree Species for Africa
RATA	RApid land Tenure claim Assessment
PAPOLD	Participatory Analysis of Poverty, Livelihoods and Environment Dynamics
Q Methodology	Using Q-Methodology in Social Science Research
RESFA	REDD+ Site level Feasibility Appraisal
LU change	Land Use change
FERVA	Fair & Efficient REDD value chains allocation
RUPES Game	
RHA	Rapid Hydrological Appraisal (RHA): An Integrated Approach to Assess Watershed Functions and Management Options
RABA	Rapid Agro-Biodiversity Appraisal (RABA) in the context of Environmental Services Rewards
QBS	Quick Biodiversity Surveys (QBS) GUIDELINE

III.2. Discussion of gaps and key elements for workshop tools

- **The main gaps identified**

An assessment of the existing tools which are considered key for the REDD+ cycle as well as from the perspective of a landscape analysis (REALU) enabled to emphasize the main limitations or constraints. This is an important step to improve existing tools, or consider whether there is room for new tools to be developed.

The general gaps identified were:

- With regards to the project cycle, the current tools available are mostly for the first three project phases. Research institutions such as ICRAF and ASB are more useful in supporting the planning and preliminary assessment phases of the REDD+/REALU project cycle, and can also be involved in the development of tools for supporting Monitoring and

Verification. Other phases of the REDD+/REALU project cycle such as financing and investment fall into the business development domain (such as transactions between buyers and sellers) which may explain the lack of tools developed in this specific phase by research institutions.

- There are geographical gaps as some tools may be applicable only in some regions due to the specific nature of the tool, the type of data required and the type of REDD+/REALU process.

The specific gaps identified were:

- Legal guidance is a major gap, as in many countries the discussion on rights and obligations is still at an early stage of development. Going beyond the workshop tools, there are new guidelines which cover key regulatory issues for forest carbon projects, including carbon ownership; project governance and fund management considerations; key components of forest carbon purchase agreements; and efficient allocation of legal expenditures throughout different stages of the project development cycle (Hawkins, Slayde, 2011). However, tools and methods need to be reinforced in this respect.
- Negotiation support is needed, but there is currently a lack of negotiation support tools, especially for Social guidance and community engagement..
- One specific tool that has potential is a modeling tool that relates scenario development in terms of actions and preferences by local stakeholders to plausible outcomes for increases or reductions of emissions.
- MRV tools should be scientifically valid and conform to the existing IPCC guidelines and the National MRV strategies but should also be oriented towards use by the local community, both to increase legitimacy of the data and to reduce the transaction and monitoring costs.
- MRV-related tools might miss or be biased in the assessment of the additionality and leakage component because boundaries for project implementation and boundaries for their impact in terms of monitoring emission reductions do not necessarily coincide. Tools or methodologies to fully capture leakage and additionality at various scales and geographic levels have to be developed.
- Management tools are needed in order to estimate the costs and benefits of running biocarbon projects.
- The abatement cost curve analyses needs complementary tools to address the analysis of transaction costs[3] of establishing and operating a REDD+ program.

[3] Transactions costs are incurred throughout the process: REDD+ program identification, transaction negotiation, monitoring, reporting, and verifying the emission reductions. Transactions costs arise from (1) different parties involved in a REDD+ transaction, such as the buyer and seller or donor and recipient, and (2) external parties such as a market regulator or payment system administrator that oversee compliance of stated emission reductions (White, D. & Minang, P., 2011).

- **Key elements for mapping tools**

The key element of any mapping tool is the legend. It is very important to consider how a mapping tool is compatible with legends of different degrees of detail. The same land use system could be classified/allocated to different classes depending on the criteria used to define these classes, hence a classification legend would require an explanation of the criteria applied. This would explain why and how criteria defining land use classes can depend on the purpose of the classification and the map production, so ultimately on the stakeholders/audience by whom and for whom the land use map is meant to be relevant.

The early stages of developing a legend would thus have to focus on the context in which the landscape should be see, classified and analyzed.

- Legend is ultimately the result of a negotiation process aimed at harmonizing multiple functions and stakeholders' perspectives.
- It must be understandable and suitable for carbon stock baseline, economic baseline, social baseline, etc.
- It must be flexible to allow for aggregation/disaggregation depending on the purpose and the audience.
- It must integrate principles for translation and conversions to be locally appropriate and globally compatible.

The use of standardized hierarchical classification systems such as LCCS (land cover network at FAO-ISO) or Global Land Cover Network web site (www.glcn.org) is encouraged. LCCS allows the user to establish an interface between locally defined and standardized global classes. The systems of classifiers allow enough flexibility to integrate any type of existing legend or build locally meaningful classes in a hierarchy. This could be the first step towards a system that could tailor the type of map displayed to different audiences.

- **Key elements for carbon measurement and monitoring tools**

In carbon measurement and monitoring, the key elements to consider are: (i) measurement method, (ii) level of accuracy (number of plots related to the project scale), (iii) allometric equations, (iv) kinds of pools considered and (v) frequency of measurements.

- Measurement methods: There are different tools for carbon measuring and monitoring. The Carbon Benefit Project has been developing an advanced carbon stock assessment which differs considerably from the conventional forest inventory methods used by the Rapid Carbon Stock Appraisal (RaCSA) for instance. There is need for further exploration on the scientific quality of C stock assessments using different approaches (i.e. upscaling from inventory data vs. downscaling using remote sensing). The results also need to be estimated for their cost efficiency (i.e. cost-benefit analysis). It would be relevant to compare all current carbon measurements practices and to review existing methods, in particular alternative ones

(such as Skutsch's participatory methods). Carbon measuring and monitoring methods should also be assessed in relation to IPCC guidelines.

- Level of accuracy: the minimum levels of accuracy required for projects in relation to costs and samples should be further explored as there are differences between sampling on the ground and sampling using a random approach.
- Allometric equations: The Carbon Benefit Project developed allometric equations for Western Kenya. Whether they apply for other vegetation types needs to be verified. It is also important to look at wood density when assessing carbon stocks. Forest inventory methods used for timber are also used in carbon assessment. These methods could be used in Indonesia and Cameroon if data from National Forestry Inventory are made available. The work should be reviewed while examining other available data. In addition, allometric issues should be reconsidered: to what extent should allometric equations be defined, and what are the tradeoffs related to allometric equations?
- Kind of pools considered: the level of precision depends on how many pools are included, and on the different definitions of forest and forestry approaches among countries.

III.3. Visual representation of external tools and discussion

Table 5 displays a matrix of external tools and toolkits gathered from a preliminary search of currently available resources in order to help in the development of REDD+/REALU projects. This table was compiled to outline additional tools that may prove helpful in different project stages.

Table 5 is not exhaustive, but rather serves to provide a summary overview of the wide range of different resources provided by different organizations. Appendix 1 provides a brief description of the tools detailed below. Tools are labeled in black, while toolkits (understood as anything providing a series or agglomeration of a number of tools) are presented in red. The tools were gathered from a survey of currently available resources, including a substantial report series on Forest Carbon projects produced by Forest Trends (2011, refer to bibliography for a comprehensive list). A wide range of guidelines and best practices for REDD+ and REALU project assessment and development are currently available. Although not necessarily containing specific tools, many of these guidelines provide useful insight into project development, implementation and monitoring. A list of these guidelines can be found in appendix 2.

Many of the tools are applicable across thematic area, as well as project phase. This has not been represented in the interests of clarity. Tools were allocated to their most relevant thematic area. We acknowledge that many of the tools, particularly those related to Economic of Land Use, pertain to information about carbon stocks, land use and cover, regulatory status and project finance. Tools in Land Use and Cover are also highly relevant for Biodiversity and Ecosystems services impacts.

Table 5: External Tools for the Development of REDD+/REALU Projects

	Phase 1: Project Idea and Preliminary Assessment	**Phase 2:** Project Design/Planning and Development of PDD	**Phase 3:** Development of PDD Implementation Strategy	**Phase 4:** Financing and Investment	**Phase 5:** Implementation and Monitoring
Land use and cover	GLOBIOM				
	HCVF-T				HCVF-T
	WDPA				
	TE-GIS Data				
		DINAMICA-EGO			
		PolSARPro			
		NEST			
		MAPREADY			
		SAR-Tpro			
Carbon stocks and emission assessment	EX-ACT				
	FC-CALC				
	CASFOR-II				
	GOFC-GOLD				GOFC-GOLD
		VCS VM0006			VCS VM0006
		VCS VM0007			VCS VM0007
		VCS VM0009			
Economics of land use	FCI				
	OSIRIS				
	AFOLU-NPRT				
	REDD-FFT				
	LULUCF PIN-Temp				
		C-REV			
		VCS VT0001			
	ENCOFOR ECON				
Social guidance and community engagement	CIFOR PTFC				
	LOAM				
	PARMAP				
	MSIA-T				
	PF-LINK				PF-LINK
		HLSA			
	GEN-AGRI				
		LS-CDAM			
Institutional settings	GFI-IND				GFI-IND
	PGA-LIP				
Legal guidance				PES-CMC	
				CON-FCPA	
				CERSPA-Temp	
Biodiversity and Ecosystem Services Impacts	IBAT				
		MIBAF			
	RED-LIST				

Black text: Individual Tools Red text: Toolkits

Acronyms

GLOBIOM	**Global Biomass Optimization Model (International Institute for Applied Systems Analysis)**
HCVF-T	The High Conservation Value Forest Toolkit (Proforest, 2003)
WD PA	The World Database on Protected Areas (IUCN & UNEP, 2010)
TE-GIS data	Terrestrial Ecosystems GIS Database (WWF, 2011)
DINAMICA	Dinamica Environment and Geoprocessing Objects (DINAMICA Project)
PoISARPro	Polarimetric SAR Data Processing and Educational Tool Version 4.2 (European Space Agency, 2011)
NEST	Next ESA SAR Toolbox (European Space Agency, 2011)
MAP READY	MapReady Version 2.3.17 (Alaska Satellite Facility, 2010)
SAR-Tpro	SAR Training Processor Version 1.1.10 (Alaska Satellite Facility, 2009)
EX-ACT	EX-Ante Carbon Balance Tool (FAO)
FC-CALC	Forest Carbon Calculator Tool (USAID and Winrock International)
CASFOR-II	CASFOR-II: Modeling Carbon Sequestration in Forest Landscapes (CO2FIX)
GOFC-GOLD	GOFC-GOLD REDD+ Sourcebook (GOFC-GOLD, 2010)
VCS VM0006	Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation (VCS, 2011)
VCS VM0007	REDD Methodology Modules (VMD001-VMD0015) (VCS, 2010)
VCS VM0009	Methodology for Avoided Mosaic Deforestation of Tropical Forests (VCS, 2011)
FCI	Forest Carbon Index
OSIRIS	Open Source Impacts of REDD+ Incentive Spreadsheet Tool for Comparative REDD Cost Assessment (Collaborative Modeling Initiative for REDD+ Economics)
AFOLU-NPRT	AFOLU Non-Permanence Risk Tool, VCS Version 3 (VCS, 2011)
REDD-FFT	REDD Financial Feasibility Tool (CCBA and SOCIAL CARBON)
LULUCF PIN- Temp	PIN Template for LULUCF Projects (BioCarbon Fund)
C-REV	Carbon Revenue Tool. (QUEST JiFor Program)
VCS VT001	VCS Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (VCS, 2010)
ENCOFOR ECON	Economic Module (ENCOFOR)
CIFOR PTFC	Guide to Participatory Tools for Forest Communities (CIFOR, 2006)
LOAM	Landscape Outcomes Assessment Methodology (WWF, 2007)
PARMAP	Participatory Mapping Toolbox (IAPAD)
MSIA-T	Manual for Social Impact Assessment: Part II – Toolbox of Methods and Support Materials (Forest Trends, 2011)
PF-LINK	Poverty-Forests Linkages Toolkit (PROFOR, 2009)
HLSA	Household Livelihood Security Assessments: A Toolkit for Practitioners. (CARE, 2002)
GEN-AGRI	Gender in Agriculture Sourcebook (World Bank, FAO, and IFAD, 2009)
LS-CDAM	Livelihood Surveys. A Tool for Conservation Design, Action and Monitoring (Wildlife Conservation Society)
GFI-IND	Governance of Forests Initiative Indicator Toolkit (World Resources Institute, 2009)
PGA-LIP	Participatory Governance Assessment/ Livelihood Improvement Plan (CARE)
PES-CMC	Katoomba Group-Legal Initiative: Online PES Contract Management Center (Katoomba Group)
CON-FCPA	Contracting for Forest Carbon: Elements of a Model Forest Carbon Purchase Agreement (Forest Trends, 2010)
CERSPA-Temp	Certified Emissions Reductions Sale and Purchase Agreement, Version 2.0 (CERSPA Initiative, 2009)
IBAT	Integrated Biodiversity Assessment Tool (IBAT For Business, 2008)
MIBAF	Monitoring Important Bird Areas: A Global Framework (BirdLife International, 2006)
RED-LIST	IUCN Red List of Threatened Species, Version 2010.1 (IUCN, 2010)

III.3. Visual representation of the two tools sets together

The table below (table 6) displays the two tools sets together, in order to outline key overlaps and gaps. This table emphasizes the range of tools available for the different project phases and thematic areas. In terms of gaps, there appears to be a lack of tools for legal guidance during early project phases. However many of the other tools, including those pertaining to institutional settings, and broadly applicable tools pertaining to economics such as OSIRIS and AFOLU NPRT, employ approaches that consider liability and risk to rate project viability in preliminary stages.

The apparent lack of tools for monitoring is an issue that warrants review. Many of the tools used in early project phases (especially those relating to carbon stock assessment and land use) require the establishment of baseline levels and ex-ante projections of emissions. The results of these planning activities can be used to develop effective and responsive monitoring plans. As such, the tools support the monitoring phase, but do not necessarily have built in monitoring components.

Table 6: Workshop and External Tools for REDD+/REALU Projects

		Phase 1: Project Idea and Preliminary Assessment	**Phase 2:** Project Design/Planning and Development of PDD	**Phase 3:** Development of PDD Implementation Strategy	**Phase 4:** Financing and Investment	**Phase 5:** Implementation and Monitoring
Land Use and Cover	Workshop Tools	WNoTree	DRILUC	FALLOW		
		ASB matrix	ALUCT			
			OppCosts			
	External Tools	GLOBIOM				
		HCVF-T				HCVF-T
		WDPA				
		TE-GIS Data				
			DINAMICA-EGO			
			PolSARPro			
			NEST			
			MAPREADY			
			SAR-Tpro			
Carbon stocks and emission assessment	Workshop Tools		RACSA	PCM		
			FBA			
			Allometric eq.			Allometric eq.
			Wood density			
			PEAT	Nested REL		
			Procedures for C stock Ass in LA			
			Land HS			Land HS
			OppCosts			
	External Tools	EX-ACT				
		FC-CALC				
		CASFOR-II				
		GOFC-GOLD				GOFC-GOLD
			VCS VM0006			VCS VM0006
			VCS VM0007			VCS VM0007
			VCS VM0009			
Economics of land use	Workshop Tools		RAFT			
			AfTree Database			
		UTS Africa				
	External Tools	FCI				
		OSIRIS				
		AFOLU-NPRT				
		REDD-FFT				
		LULUCF PIN-Temp				
			C-REV			
			VCS VT0001			
		ENCOFOR ECON				

		Phase 1: Project Idea and Preliminary Assessment	**Phase 2:** Project Design/Planning and Development of PDD	**Phase 3:** Development of PDD Implementation Strategy	**Phase 4:** Financing and Investment	**Phase 5:** Implementation and Monitoring
Social guidance and community engagement	Workshop Tools	RATA		FALLOW		
			OppCosts			
			PAPOLD			
		Q methodology				
	External Tools	CIFOR PTPC				
		LOAM				
		PARMAP				
		MSIA-T				
		PF-LINK				PF-LINK
			HLSA			
		GEN-AGRI				
			LS-CDAM			
Institutional settings	Workshop Tools	RESFA				
		LU change	FERVA			
		RUPES Game				
	External Tools	GFI-IND				GFI-IND
		PGA-LIP				
Legal guidance	Workshop Tools					
	External Tools				PES-CMC	
					CON-FCPA	
					CERSPA-Temp	
Biodiversity and Ecosystem Services Impacts	Workshop Tools		RHA			
			RABA			
			QBS			
			AfTree Database			
		UTS Africa				
	External Tools	IBAT				
			MIBAF			
		RED-LIST				

Conclusion

There are still possibilities of developing tools in stages of the project cycle where they are missing. One important step is also to refine tools as necessary for their use in landscape approaches to REDD+ at various land use planning scales.

In the near future, it is also important to identify and plan further development of these tools alongside improvements in communication and accessibility for the wider public.

Next steps required are a more in-depth assessment of these different tools in order to find out where they are complementary, where they overlap or if there are some inconsistencies. A valuable research initiative would be the definition of a series of criteria in order to rank the tools, and see which tools may be more or less applicable in a given context.

Next step for ICRAF/ASB is also to hold a global project methods workshop to get insights into key methodological challenges such as nesting and leakage as regards landscape level planning and implementation of REALU in relation to REDD and NAMAs at national level, as we consider these as the main challenges for switching from REDD+ to reducing emissions from all land uses REALU or AFOLU accounting.

Appendix 1 – Presentation of external Tools for REDD+/REALU Projects

The following table provides a brief overview of the external tools. As mentioned previously, these tools were compiled in order to provide a summary of some of the external resources available that may facilitate the development of REDD+/REALU projects, and fill gaps in the workshop tools outlined earlier in this report. It is important to note that this list is not exhaustive.

Table 7: Description of external tools for REDD+/REALU projects

Land Use and Cover Tools		
GLOBIOM	Name	Global Biomass Optimization Model (International Institute for Applied Systems Analysis)
	Phase	1-3
	Overview	GLOBIOM is a global dynamic equilibrium model integrating the agricultural, bioenergy and forestry sectors with the aim to provide insight on land use competition between production sectors. The model can help project developers forecast deforestation levels without REDD, the impacts of deforestation and forest degradation drivers, cost and efficiency of mechanisms to reduce deforestation and forest degradation, and impacts of these mechanisms on agricultural sectors and food markets.
	Source	http://www.iiasa.ac.at/Research/FOR/globiom.html
HCV-T	Name	The High Conservation Value Forest Toolkit (Proforest, 2003)
	Phase	1 – 3, 5
	Overview	This toolkit helps to identify High Conservation Value Forest areas, which are of great importance to REDD+ project feasibility assessments and planning. The assessment helps project developers understand forest cover and impacts of land use on forest areas through a variety of different assessments. Indicators for conservation value can help facilitate monitoring and evaluation of forest carbon projects.
	Source	www.proforest.net/publication/publication/pubcat.2007-01-19.4709481979
WDPA	Name	The World Database on Protected Areas (IUCN & UNEP, 2010)
	Phase	2, 3
	Overview	This interactive database maps protected areas around the globe, showing the delineation of parks, conservation areas, nature reserves, and other areas. The database provides information about specific protected areas, and is useful to understand the state of forest areas at local, national and regional scales.
	Source	http://www.protectedplanet.net
TE-GIS Data	Name	Terrestrial Ecosystems GIS Database (WWF, 2011)
	Phase	1-2
	Overview	This database contains a range of GIS information of different terrestrial ecoregions across the world. This free information can be quite helpful in developing a comprehensive understanding of forest ecosystems and land use easily at an early project stage.
	Source	http://www.worldwildlife.org/science/data/item6373.html

DINAMICA-EGO	Name	Dinamica Environment and Geoprocessing Objects (DINAMICA Project)
	Phase	2-3
	Overview	This software is a sophisticated platform for environmental modeling with capabilities to include nested iterations, multi-transitions, dynamic feedbacks, multi-region and multi-scale approaches, decision processes, and a series of complex spatial algorithms for the analysis and simulation of space-time phenomena. With the help of its graphical interface, one can create models by dragging and connecting algorithms representing various data elements, such as maps, tables, matrices, mathematical expressions, or constants.
	Source	http://www.csr.ufmg.br/dinamica/
PolSARPro	Name	Polarimetric SAR Data Processing and Educational Tool Version 4.2 (European Space Agency, 2011)
	Phase	2-3
	Overview	The European Space Agency has developed this free software toolbox with a comprehensive set of tutorials for experienced remote sensing practitioners. It is not meant for beginners but provides the tools and theory of advanced radar concepts.
	Source	http://earth.eo.esa.int/polsarpro/
NEST	Name	Next ESA SAR Toolbox (European Space Agency, 2011)
	Phase	2-3
	Overview	Besides PolSARPro, ESA distributes this toolbox, which offers functionalities, having been provided in the past by expensive radar extensions of standard remote sensing software. NEST comes with extensive manuals and tutorials, too.
	Source	http://nest.array.ca/web/nest
MAPREADY	Name	MapReady Version 2.3.17 (Alaska Satellite Facility, 2010)
	Phase	2-3
	Overview	MapReady is an excellent toolbox to pre-process, visualize, and geocode radar data. In addition, it calculates and masks out inherent relief distortions in radar images.
	Source	http://www.asf.alaska.edu/downloads/software_tools/mapready/version_history
SAR-TPro	Name	SAR Training Processor Version 1.1.10 (Alaska Satellite Facility, 2009)
	Phase	2-3
	Overview	ASF has also published the SAR Training Processor, a software tool and tutorial focusing on the preprocessing getting from raw radar data via single look complex, to geocoded mapping products.
	Source	http://www.asf.alaska.edu/downloads/software_tools/stp/version_history
Carbon Stocks and Emission Assessment Tools		
EX-ACT	Name	EX-Ante Carbon Balance Tool (FAO)
	Phase	1, 2
	Overview	EX-ACT is aimed at providing ex-ante estimations of the impact of agriculture and forestry development projects on GHG emissions and Carbon sequestration, indicating its effects on the Carbon balance. EX-ACT is a land-based accounting system, measuring C stocks and stock changes per unit of land, expressed in tCO2. Also, EX-ACT works at project level but it can easily be up-scaled at programme/sector level.
	Source	www.fao.org/tc/exact

FC-CALC	Name	Forest Carbon Calculator Tool (USAID and Winrock International)
	Phase	1, 2
	Overview	An online tool designed for providing a rough estimate for carbon benefits of different project types (reforestation, REDD, forest management, agroforestry) using drop-down menus and project-specific details.
	Source	http://www.usaid.gov/our_work/environment/climate/docs/forest_carbon_calculator_jan10.pdf
CASFOR-II	Name	CASFOR-II: Modeling Carbon Sequestration in Forest Landscapes (CO2FIX)
	Phase	1, 2
	Overview	This is a forest carbon sequestration software package developed by several research institutions with input data for a range of commercial timber species in tropical and temperate countries.
	Source	http://www.efi.int/projects/casfor/
GOFC-GOLD	Name	GOFC-GOLD REDD+ Sourcebook (GOFC-GOLD, 2010)
	Phase	1-3, 5
	Overview	This extensive sourcebook provides a consensus perspective from the global community of earth observation and carbon experts on methodological issues relating to quantifying the greenhouse gas (GHG) impacts of implementing mitigation activities related to REDD+ projects.
	Source	http://unfccc.int/files/methods_science/redd/methodologies/other/application/pdf/sourcebook_version_nov_2009_cop15-1.pdf
VCS VM0006	Name	Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation (VCS, 2011)
	Phase	2-3, 5
	Overview	This methodology quantifies the GHG emission reductions and removals generated by avoiding unplanned deforestation and forest degradation in a mosaic configuration. Deforestation and degradation can be reduced by strengthening land-tenure status, developing sustainable forest and land use management plan, protecting forest through patrolling of forests and forest boundaries, capacity building, preventing fire, and introducing fuel-efficient wood-stoves and mosquito nets for livestock.
	Source	http://www.v-c-s.org/methodologies/VM0006
VCS VM0007	Name	REDD Methodology Modules (VMD001-VMD0015) (VCS, 2010)
	Phase	2-3, 5
	Overview	This methodology provides a set of modules which when used together quantifying GHG emission reductions and removals by avoiding unplanned and planned deforestation and forest degradation. This methodology is applicable to forest that would be deforested or degraded in the absence of the project activity. Deforestation can be planned or unplanned and degradation is caused by extracting fuel wood.
	Source	http://www.v-c-s.org/methodologies/VM0007
VCS VM0009	Name	Methodology for Avoided Mosaic Deforestation of Tropical Forests (VCS, 2011)
	Phase	2-3
	Overview	This methodology quantifies GHG removals generated from avoiding mosaic deforestation caused by subsistence agriculture. With this methodology, external drivers of deforestation can be used to inform the rate of deforestation for the baseline scenario. This methodology is applicable to forests that would have been

		deforested in the absence of carbon finance. While developed for semi-arid ecosystems, this methodology is broadly applicable to avoided deforestation projects throughout the tropics.
	Source	http://www.v-c-s.org/methodologies/VM0009
Land Use Economics Tools		
FCI	Name	Forest Carbon Index
	Phase	1-4
	Overview	The Forest Carbon Index (FCI) is a tool which compiles and displays global data relating to biological, economic, governance, investment, and market readiness conditions for every forest and country in the world, revealing the best places and countries for forest carbon investments by comparing profit potential and risk.
	Source	http://www.forestcarbonindex.org
OSIRIS	Name	Open Source Impacts of REDD+ Incentive Spreadsheet Tool for Comparative REDD Cost Assessment (Collaborative Modeling Initiative for REDD+ Economics)
	Phase	1-2
	Overview	This tool is a free, transparent, open source Excel spreadsheet tool to support international discussions on designing a REDD+ mechanism. This tool allows users to compare the climate, deforestation and cost impacts of alternative approaches to REDD+ finance, scope and reference levels. Users can make adjustments to data inputs and assumptions surrounding REDD+ reference level design, carbon price, transaction cost, national readiness costs, soil carbon, institutional hurdles to country participation, global demand for frontier agriculture, and time period of REDD+ implementation.
	Source	http://www.conservation.org/OSIRIS
AFOLU-NPRT	Name	AFOLU Non-Permanence Risk Tool, VCS Version 3 (VCS, 2011)
	Phase	1-3
	Overview	This tool sets out the requirements for project proponents, partners and external bodies to assess internal, external and natural risks to determine an appropriate risk rating. The tool provides a useful framework for identifying key issues for project performance and long-term viability at an early stage, facilitating economic valuation issues and addressing land use change variables.
	Source	http://www.v-c-s.org/sites/v-c-s.org/files/AFOLU%20Non-Permanence%20Risk%20Tool%2C%20v3.0.pdf
REDD-FFT	Name	REDD Financial Feasibility Tool (CCBA and SOCIAL CARBON)
	Phase	1-2
	Overview	This tool helps evaluate the financial feasibility of REDD projects. Not a specific requirement of the CCB or SOCIALCARBON Standards, the tool is intended to help design projects that are likely to be financially viable.
	Source	http://www.climate-standards.org/projects/redd.html
LULUCF PIN-Temp	Name	PIN Financial Analysis for LULUCF Projects (BioCarbon Fund)
	Phase	1
	Overview	This template provides an easy to use financial feasibility analysis of a proposed forest carbon project, helping to determine feasibility early on in the project cycle.
	Source	http://wbcarbonfinance.org/Router.cfm?Page=DocLib&CatalogID=7110

C-REV	Name	Carbon Revenue Tool. (QUEST JiFor Program)
	Phase	2-4
	Overview	This tool aims to facilitate the choice between tCERs, lCERs, and VCUs as potential assets a forest carbon project could generate, based on their potential to generate project revenues.
	Source	http://quest.bris.ac.uk/JIFor/resources/C_revenue_tool.html
VCS VT0001	Name	VCS Tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities (VCS, 2010)
	Phase	2-4
	Overview	The tool provides a step-wise approach to demonstrate and assess additionality for AFOLU project activities. New and revised VCS methodologies may reference and required the use of the tool to demonstrate additionality of AFOLU project activities. This tool is adapted from the CDM Tool for the demonstration and assessment of additionality in A/R CDM project activities.
	Source	http://www.v-c-s.org/methodologies/VT0001
ENCOFOR ECON	Name	Economic Module (ENCOFOR)
	Phase	1-2
	Overview	This suite contains an economic module for use in forest carbon feasibility assessments, in addition to written guides to support financial, additionality, social, and environmental impact, and other compliance topics within various frameworks.
	Source	http://www.joanneum.at/encofor/tools/tool_demonstration/Economic_Module_PIN.html
Social Guidance and Community Engagement Tools		
CIFOR PTFC	Name	Guide to Participatory Tools for Forest Communities (CIFOR, 2006)
	Phase	1-3
	Overview	This toolkit describes how to use participatory research tools, such as participatory mapping, in a community forestry context. Many of the tools are widely applicable and are generally not resource intensive, allowing them to be replicated in a range of different context with ease.
	Source	http://www.cifor.org/publications/pdf_files/Books/BKristen0601.pdf
LOAM	Name	Landscape Outcomes Assessment Methodology (WWF, 2007)
	Phase	1-2
	Overview	This tool presents a participatory approach to indicator selection based on the sustainable livelihoods framework.
	Source	http://wwf.panda.org/what_we_do/how_we_work/conservation/forests/publications/?uNewsID=120980
PARMAP	Name	Participatory Mapping Toolbox (IAPAD)
	Phase	1-2
	Overview	This internet portal contains links and descriptions of a variety of useful participatory mapping tools, including Participatory GIS, Participatory 3D Modeling, Resource Mapping, Participatory sketch mapping, Transect diagramming, Social Mapping and Community Information Systems.
	Source	http://www.iapad.org/toolbox.htm

MSIA-T	Name	Manual for Social Impact Assessment: Part II – Toolbox of Methods and Support Materials (Forest Trends, 2011)
	Phase	1-3
	Overview	This Toolbox comprises Part Two of the Manual for Social Impact Assessment (SIA) of Land-Based Carbon Projects. It is divided into three main areas: SIA frameworks; data collection and analysis methods; and support material including a review and typology of social impacts, and further guidance on how to select appropriate indicators. The wide range of tools presented can be adapted and modified to different project contexts.
	Source	http://forest-trends.org/publication_details.php?publicationID=2437
PF-LINK	Name	Poverty-Forests Linkages Toolkit (PROFOR, 2009)
	Phase	1-3
	Overview	This toolkit presents a range of participatory methods for analyzing forest-poverty linkages. It is especially relevant in terms of wealth ranking and participatory valuation.
	Source	http://www.profor.info/profor/node/103
HLSA	Name	Household Livelihood Security Assessments: A Toolkit for Practitioners. (CARE, 2002)
	Phase	2-3
	Overview	This tool provides generic guidance on participator M&E methods; Annex XIV is very useful for stakeholder analysis.
	Source	http://pqdl.care.org/
GEN-AGRI	Name	Gender in Agriculture Sourcebook (World Bank, FAO, and IFAD, 2009)
	Phase	1-3
	Overview	This document is an extremely extensive sourcebook of tools and approaches for integrating gender in agricultural development. Although quite panoptic in scale, there are many sections that are directly applicable to integrating women in impact assessment and other social decision making processes, and sections pertaining to agricultural impacts on forest ecosystems.
	Source	http://www.fao.org/docrep/011/aj288e/aj288e00.htm
LS-CDAM	Name	Livelihood Surveys. A Tool for Conservation Design, Action and Monitoring (Wildlife Conservation Society)
	Phase	2-3
	Overview	This tool provides an overview of the design and execution of livelihood surveys, looking at village level factors like demographics, market access, and access to services as well as broader conservation factors. This tool can be applied as a social impact assessment tool that can also help increase public awareness through survey engagement.
	Source	http://www.wcslivinglandscapes.com/
Institutional Settings Tools		
GFI-IND	Name	Governance of Forests Initiative Indicator Toolkit (World Resources Institute, 2009)
	Phase	1-3, 5
	Overview	This toolkit consists of a conceptual framework for defining forest governance and a comprehensive set of indicators for measuring and assessing forest governance. The

		GFI Toolkit is unique in that it provides a common definition and conceptual framework for understanding the meaning of forest governance across different country contexts. a practical tool for civil society organizations to independently, systematically and comprehensively diagnose the integrity of institutions and processes that govern forests in their countries, as a basis to advocate for reform, and a set of measurable, reportable and verifiable indicators of good governance of forests.
	Source	http://pdf.wri.org/working_papers/gfi_tenure_indicators_sep09.pdf
PGA-LIP	Name	Participatory Governance Assessment/ Livelihood Improvement Plan (CARE)
	Phase	1-2
	Overview	These two practical field tools from CARE Nepal focus on improving local governance in community forestry. The governance assessment is useful in understanding how forest governance is occurring in a local context, and helps to facilitate livelihood planning around forestry projects.
	Source	http://www.careclimatechange.org/tools
Legal Guidance Tools		
PES-CMC	Name	Katoomba Group-Legal Initiative: Online PES Contract Management Center (Katoomba Group)
	Phase	4
	Overview	The Katoomba-CARE Online PES Contract Toolkit houses a growing collection of transactional resources for use by communities, project developers and lawyers interested in contracting for carbon and other ecosystem services. This includes template contracts, contract drafting and design guidance, and topical publications and links.
	Source	http://www.katoombagroup.org/regions/international/legal_contracts.php
CON-FCPA	Name	Contracting for Forest Carbon: Elements of a Model Forest Carbon Purchase Agreement (Forest Trends, 2010)
	Phase	4
	Overview	This document explains the clauses of an emission reductions purchase agreement (ERPA) used to buy and sell credits for carbon emission reductions. Sample contract clauses are presented to illustrate the discussion and provide examples of relevant contractual language.
	Source	http://forest-trends.org/publication_details.php?publicationID=2558
CERSPA-Temp	Name	Certified Emissions Reductions Sale and Purchase Agreement, Version 2.0 (CERSPA Initiative, 2009)
	Phase	4
	Overview	CERSPA is a free, open-source contract template for buying and selling Certified Emission Reductions (CERs) generated under the Kyoto Protocol's Clean Development Mechanism (CDM). An associated Guidance Document explains the terms contained in the CERSPA and provides alternate clauses that can be tailored to different transactions.
	Source	http://www.cerspa.com
Biodiversity and Ecosystems Services Impacts Tools		

IBAT	Name	Integrated Biodiversity Assessment Tool (IBAT For Business, 2008)
	Phase	1-3
	Overview	IBAT is an innovative tool designed to facilitate access to accurate and up-to-date biodiversity information to support critical business decisions. The tool contains a very useful web-based mapping component.
	Source	http://www.ibatforbusiness.org/
MIBAF	Name	Monitoring Important Bird Areas: A Global Framework (BirdLife International, 2006)
	Phase	2-3
	Overview	An especially thoughtful yet simple and practical monitoring framework developed for monitoring Important Bird Areas, with broad relevance. This framework facilitates quantification of qualitative data when only such data are available and is compatible with key existing monitoring tools such as the GEF Management Effectiveness Tracking Tool for protected areas.
	Source	http://www.birdlife.org/regional/americas/apm_documents/Background%20paper%2011.2_IBA%20Monitoring%20Framework.pdf
RED-LIST	Name	IUCN Red List of Threatened Species, Version 2010.1 (IUCN, 2010)
	Phase	1-2
	Overview	This list is the ICUN Red List of Threatened Species, which is the leading authority on species that are at varying levels of risk of extinction. The list contains a variety of risk levels, and other useful information for understanding biodiversity impacts at a number of scales.
	Source	http://www.iucnredlist.org

Appendix 2 – Guidelines for REDD+ and REALU Project Development

Land Use and Cover Guidelines	
Name	REDD+ at Project Scale: Evaluation and Development Guide
Source	ONF International, 2010
Phase	1-3
Overview	**This report** aims at supporting project promoters in developing REDD+ projects, and investors or funding agencies in their assessments of these projects. It offers insights into existing tools and key questions. On the basis of initial feedbacks from existing REDD+ projects and other more long-standing projects for natural resources management, the guide also deals with crucial aspects particularly the definition of project activities, legal and organizational issues and economic and financial assessments.
Download	http://www.onfinternational.org/en/publications/313-qguide-redd-a-lechelle-projetq-guide-devaluation-et-de-developpement.html
Name	REDD Project Development Guide
Source	TRANSLINKS, Wildlife Conservation Society, USAID, 2009
Phase	1-3
Overview	This report provides a comprehensive guide to the REDD+ project cycle. This review provides guidance on key issues in individual project phases, and a variety of useful checklist-based tools for quickly ascertaining feasibility, marketability, and impact assessment and monitoring.
Download	http://www.katoombagroup.org/documents/cds/uganda_2011/Key%20Elements/WCS%20REDD%20Project%20Guide.pdf
Carbon Stocks and Emission Assessment Guidelines	
Name	Good Practice Guidance for Land Use, Land-Use Change and Forestry
Source	Intergovernmental Panel on Climate Change, 2003
Phase	1-2
Overview	This document provides useful default values for carbon stocks and sequestration potential. This information, along with other useful best practices, is targeted towards LULUCF, but is still reasonably applicable to a preliminary assessment for a REDD+ or REALU project.
Download	http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/App_3a1_HWP.pdf
Name	The Land Use, Land-Use Change, and Forestry (LULUCF) Guidance for GHG Project Accounting
Source	World Resources Institute, 2006
Phase	1-2
Overview	The Land Use, Land-Use Change, and Forestry (LULUCF) Guidance for GHG Project Accounting (LULUCF Guidance) was developed by the World Resources Institute to provide more guidance, terminology and concepts to quantify and report GHG reductions from LULUCF project activities.
Download	http://www.wri.org/publication/land-use-land-use-change-and-forestry-guidance-greenhouse-gas-project-accounting
Name	Watson, Charlene. Forest Carbon Accounting: Overview & Principles
Source	UNDP and UNEP, 2009
Phase	1-2
Overview	This report presents the main principles, practices and challenges for carbon accounting in the

	forestry sector. In order to be accessible, the report is not overly technical and should not, therefore, be considered a stand-alone guide for forestry carbon accounting. It does, however, present guidance for good practice in accounting and indicates further sources of guidance.
Download	http://www.beta.undp.org/undp/en/home
Name	A Field Guide for Assessing and Monitoring Reduced Forest Degradation and Carbon Sequestration by Local Communities
Source	Project team Kyoto, 2009
Phase	1-3, 5
Overview	The field guide gives step-by-step guidance on the procedures and techniques needed at field level for REDD project activities. It is intended for use to train local communities in the use of standard carbon assessment. Although not directly targeted to REDD+ or REALU, this guide is useful in locally driven assessment and monitoring.
Download	http://www.mountainforum.org/en/node/13410
Name	Measurement Guidelines for the Sequestration of Forest Carbon
Source	USDA Forest Service, 2007
Phase	1-3, 5
Overview	These guidelines are intended to be a reference for designing a forest carbon inventory and monitoring system by professionals with a knowledge of sampling, statistical estimation, and forest measurements. This report provides guidance on defining boundaries; measuring, monitoring, and estimating changes in carbon stocks; implementing plans to measure and monitor carbon; and developing quality assurance and quality control plans to ensure credible and reproducible estimates of the carbon credits.
Download	http://www.nrs.fs.fed.us/pubs/3292
Economics of Land Use Guidelines	
Name	Back to the Future: State of the Voluntary Carbon Markets 2011
Source	Ecosystem Marketplace, 2011
Phase	1-2
Overview	Ecosystem Marketplace and Bloomberg New Energy Finance publish the State of the Voluntary Carbon Markets Reports to shed light on trading volumes, credit prices, project types, locations, and the motivations of buyers in this market. Clearly understanding the state of the market is essential for insightful planning and analysis of project feasibility and marketability.
Download	http://ecosystemmarketplace.com/
Name	State of the Forest Carbon Markets 2011
Source	Forest Trends, 2011
Phase	1-2
Overview	This is an extensive, must-read report on the state of the forest carbon market. The data and analysis in this report cover forest carbon activity in compliance carbon markets as well as voluntary carbon markets—such as the voluntary Over-the-Counter (OTC) market and the Chicago Climate Exchange (CCX). This information is extremely reticent when conducting planning and feasibility for a REDD+ or REALU project.
Download	http://ecosystemmarketplace.com/
Name	The Forest Carbon Offsetting Report 2010
Source	EcoSecurities, 2010
Phase	1-3

Overview	This report provides targeted market information from a survey of forest carbon buyers.
Download	http://www.ecosecurities.com/Standalone/Forest_carbon_offsetting_report_2010/default.aspx
Name	Bringing Forest Carbon Projects to the Market
Source	ONF International, 2010.
Phase	1-4
Overview	This comprehensive 165-page manual, available in English, Spanish, and French, focuses almost entirely on business and financial aspects of forest carbon project development, with five case studies.
Download	http://www.unep.fr/energy/activities/forest_carbon/pdf/Guidebook%20English%20Final%2019-5-2010%20high%20res.pdf
Name	Sustainable Forest Finance Toolkit
Source	Pricewaterhouse Coopers and World Council for Sustainable Development
Phase	1-3
Overview	This toolkit provides guidance on sustainable forest management, but does not have a specific focus on forest carbon projects or REDD+.
Download	http://www.pwc.co.uk/pdf/forest_finance_toolkit.pdf
Name	10 Years of Experience in Carbon Finance: Insights from working with the Kyoto Mechanisms
Source	World Bank, 2010
Phase	1-2
Overview	The World Bank Carbon Finance group reveals its lessons learned from financing carbon projects around the world. This knowledge is useful in project feasibility assessments and planning.
Download	http://siteresources.worldbank.org/INTCARBONFINANCE/Resources/10_Years_of_Experience_in_CF_August_2010.pdf
Name	Investing in Forest Carbon: Lessons from the First 20 Years.
Source	Forest Trends, 2011
Phase	1-2
Overview	This document provides a list of project screening criteria based on a review of forest carbon project investments. These criteria are useful in project feasibility assessments and planning.
Download	http://www.forest-trends.org/publication_details.php?publicationID=2677
Name	Community-based tree and forest product enterprises: Market Analysis and Development
Source	FAO, 2004
Phase	1-3
Overview	This document provides a range of marketing and business development analysis and guidance for community forestry enterprises. Much of the information presented here could be applied to REDD+ or REALU projects.
Download	http://www.fao.org/docrep/007/ae419e/ae419e00.htm
Social Guidance and Community Engagement Guidelines	
Name	Free, Prior, and Informed Consent in REDD+: Principles and Approaches for Policy and Project Development
Source	RECOFT and GIZ, 2011
Phase	1-3
Overview	This document provides a comprehensive analysis of FPIC and REDD+. This could prove very useful for project managers to understand FPIC, stakeholder engagement processes, and negotiation and

	decision-making techniques.
Download	http://www.recoftc.org/site/resources/Free-Prior-and-Informed-Consent-in-REDD-.php
Name	Free, Prior and Informed Consent: Making FPIC Work for Forests and Peoples
Source	The Forests Dialogue, 2010
Phase	1-3
Overview	This report provides a detailed discussion of key FPIC issues in a REDD+ context.
Download	http://environment.yale.edu/tfd/dialogues/free-prior-and-informed-consent/
Name	Social Assessment of Conservation Initiatives: A Review of Rapid Methodologies
Source	IIED, 2010
Phase	1-2
Overview	This extensive document provides a range of information on social assessment methodologies, many of which could be used for Forest Carbon projects. Chapter 6 discusses the strengths and weaknesses of a number of data collection methods.
Download	http://pubs.iied.org/14589IIED.html
Name	Breaking Ground: Engaging Communities in Extractive and Infrastructure Projects
Source	World Resources Institute, 2009
Phase	1-2
Overview	This report provides useful generic guidance for community engagement, but does not have a specific focus on Forest Carbon projects.
Download	http://www.wri.org/publication/breaking-ground-engaging-communities
Name	Free, Prior and Informed Consent and the Roundtable on Sustainable Palm Oil: A Guide for Companies
Source	Forest Peoples Programme, 2008
Phase	1-3
Overview	A good, practical guide on FPIC within the oil palm industry in Indonesia. Despite its geographical and investment-specific focus, it is a useful starting point for REDD+ projects.
Download	http://www.forestpeoples.org/sites/fpp/files/publication/2009/12/fpicandrspocompaniesguideoct08eng.pdf
Name	UN-REDD Programme Operational Guidance - Engagement of Indigenous Peoples & other forest dependent communities
Source	United Nations, 2009
Phase	1-3
Overview	The draft report provides background and context on the inclusion of Indigenous Peoples in UN programmes and activities, identifies the guiding principles in order to respect and support the rights of Indigenous Peoples and other forest dependent communities, and outlines the operational guidelines for the design and implementation of UN-REDD Programme activities at the global and national scale. The Guidance also provides best practice advice on how to consult with Indigenous Peoples and other forest dependent communities and links to resources for further information.
Download	http://www.un-redd.org/Portals/15/documents/events/20090309Panama/Documents/UN%20REDD%20IP%20Guidelines%2023Mar09.pdf
Name	Social and Biodiversity Impact Assessment (SBIA) Manual for REDD+ Projects: Core Guidance for Project Proponents (Version 2)
Source	Forest Trends, Climate, Community & Biodiversity Alliance, Rainforest Alliance and Fauna & flora International, 2011

Phase	1-3
Overview	This document is a user-friendly manual on how to conduct cost-effective and credible social and biodiversity impact assessment. The concepts described in this Manual will be relevant to a wide range of site-level land-based carbon activities, whether designed for compliance or voluntary markets. This report builds on previous versions addressing social impacts and biodiversity impacts individually, which contained an accompanying toolkit full of useful social impact assessment and engagement tools. This toolkit is detailed in the external tools appendix.
Download	http://www.forest-trends.org/documents/files/doc_2981.pdf
Name	Participatory Mapping as a tool for empowerment: Experiences and lessons learned from the ILC network.
Source	International Land Coalition, 2008
Phase	1-3
Overview	This document provides guidance on participatory mapping through a range of experiences and lessons learned. Useful lessons contained here could be applied to forest carbon project mapping.
Download	http://www.landcoalition.org/pdf/08_ILC_Participatory_Mapping_Low.pdf
Name	UNDP Resource Guide on Gender and Climate Change.
Source	UNDP, 2009
Phase	1-5
Overview	This summary document provides comprehensive gender analysis tools and concepts in a climate change context.
Download	http://www.undp.org/climatechange/library_gender.shtml
Name	Incentives+: How can REDD improve well-being in forest communities? (CIFOR Info Brief No. 21)
Source	CIFOR, 2009
Phase	1-2
Overview	This document provides brief but useful guidance on designing land use incentives for REDD+.
Download	http://www.cifor.cgiar.org/publications/pdf_files/Infobrief/021-infobrief.pdf
Name	Open Standards for the Practice of Conservation.
Source	Conservation Measures Partnership, 2007
Phase	1-3
Overview	This document explains how to develop a conceptual model as part of the Open Standards approach to the theory of change approach to social impact assessment. The open standards approach has a wide range of application and relevance, and can be applied to REDD+ or REALU projects.
Download	http://www.conservationmeasures.org/wp-content/uploads/2010/04/CMP_Open_Standards_Version_2.0.pdf
Name	Participatory Impact Assessment: A Guide for Practitioners
Source	Feinstein International Center Report, Tufts University, 2008
Phase	1-3
Overview	This document explains participatory methods for exploring attribution in the context of humanitarian aid.
Download	http://wikis.uit.tufts.edu/confluence/display/FIC/Participatory+Impact+Assessment
Name	A Guide to Learning about Livelihood Impacts of REDD+ Projects
Source	CIFOR, 2010
Phase	1-3
Overview	This guide offers an extensive discussion of attribution issues for REDD+ projects, especially when

	using matching methods.
Download	http://www.profor.info/profor/sites/profor.info/files/docs/CIFOR-learningREDD.pdf
Institutional Setting Guidance	
Name	Introduction to Organizational Capacity Development
Source	Pact, 2010
Phase	1-3
Overview	Provides a good summary of organizational development and capacity building of NGOs and CBOs. Capacity building can extend beyond the project planning phase, through implementation and financing to monitoring, however, this document does not specifically address any individual REDD+ or REALU project phase.
Download	http://www.pactworld.org/galleries/resource-center/Intro%20to%20OD%20First%20Edition.pdf
Name	Nested Approaches to REDD+: An Overview of Issues and Options
Source	Forest Trends and Climate Focus, 2011.
Phase	1-3
Overview	This document discusses the technical, legal, and policy aspects of different nesting approaches and includes an overview on relevant REDD compliance schemes beyond UNFCCC.
Download	http://forest-trends.org/publication_details.php?publicationID=2762
Legal Guidance Guidelines	
Name	Forest Carbon – Law and Property Rights
Source	Conservation International, 2009
Phase	1-4
Overview	This guide is designed to help community members, government leaders, lawyers, treaty negotiators, NGO advocates, and carbon investors understand forest carbon as property in order to support and develop sustainable forest carbon projects. This report aims to help all actors exercise the due diligence necessary to realize forest carbon investments' multiple, synergistic benefits. A range of case studies are presented, and recommendations for law and property rights schemes are discussed.
Download	http://www.conservation.org/Documents/CI_Climate_Forest-Carbon_Law-Property-Rights_Takacs_Nov09.pdf
Name	Doing Business – Measuring Business Regulations
Source	World Bank Group, 2011
Phase	1-2
Overview	Available for many countries, this guide is a good place to start when assessing the availability and feasibility of property or title registration in the host country.
Download	http://www.doingbusiness.org/
Name	Legal Frameworks for REDD: Design and Implementation at the National Level
Source	IUCN, 2010
Phase	1-3
Overview	This publication identifies and analyzes critical issues in the formulation and implementation of national and sub-national legal frameworks for REDD activities. It is based on substantive findings from four national case studies (Brazil, Cameroon, Guyana and Papua New Guinea) chosen for their varying geographies, forest cover and deforestation rates, and stages of REDD preparations. The study concludes that although legal clarity is an essential prerequisite for successful national REDD regimes, such clarity does not necessarily require that countries rewrite their existing legislative and regulatory frameworks.

Download	http://www.iucn.org/unfccc/events/2010_cancun/publications/?uPubsID=3943
Biodiversity and Ecosystem Services Impacts Guidelines	
Name	Monitoring Forest Biodiversity: Improving Conservation through Ecologically-Responsible Management
Source	Earthscan, 2010
Phase	1-2, 5
Overview	This document provides a good introduction to, and overview of, monitoring forest biodiversity.
Download	www.earthscan.co.uk/?tabid=102271
Name	Guidelines for Biodiversity Assessment and Monitoring for Protected Areas
Source	KMTNC and UNEP, 2005
Phase	1-2, 5
Overview	Offers an excellent explanation of monitoring protected areas, which has many similarities with monitoring forest carbon projects. This set of guidelines also provides useful overall guidance on selecting project-/site-specific indicators, methods, and timing relevant to biodiversity targets and their threats.
Download	http://www.unep.org/tools/default.asp?ct=assess2
Name	Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems
Source	IUCN, 2007
Phase	1-2
Overview	This document provides a good explanation of Key Biodiversity Areas and their function in protected area systems.
Download	http://data.iucn.org/dbtw-wpd/edocs/PAG-015.pdf
Name	Developing a logic model: Teaching and training guide
Source	University of Wisconsin, 2008
Phase	2-3, 5
Overview	This presentation provides a thorough guide to causal or logic models. Such models are very useful in linking impacts to values, and formalizing action planning around specific objectives for project development. This material is very relevant to attribution and reference scenarios in project planning.
Download	www.uwex.edu/ces/pdande/evaluation/pdf/lmguidecomplete.pdf
Name	Impact Evaluations and Development: NONIE Guidance on Impact Evaluation
Source	World Bank, 2009
Phase	3, 5
Overview	This comprehensive document is perhaps the best overview of impact evaluation, including propensity scoring and double difference methods.
Download	www.uwex.edu/ces/pdande/evaluation/pdf/lmguidecomplete.pdf
Biodiversity leakage	
Name	Noel Kempff Mercado Climate Action Project: A Case Study in Reducing Emissions from Deforestation and Degradation
Source	The Nature Conservancy, 2009
Phase	2-3
Overview	This report explains thoughtful measures to combat the issue of leakage, albeit of deforestation. The type of action development process described here may be useful for other types of leakage resulting

	from Forest Carbon projects.
Download	http://www.nature.org/ourinitiatives/urgentissues/climatechange/placesweprotect/noel_kempff_case_study_final-1.pdf
Name	Wildlife and Biodiversity Metrics in Forest Certification Systems
Source	National Council for Air and Stream Improvement, 2003
Phase	1-3, 5
Overview	This document provides a thorough review of forestry monitoring. There are extensive descriptions of biodiversity indicators, and guidelines for an indicator framework development process.
Download	www.ncasi.org/Publications/Detail.aspx?id=81
Name	Biodiversity Indicators for Sustainable Forestry
Source	Manomet Center for Conservation Sciences, 2003
Phase	1-3, 5
Overview	This document presents a similarly comprehensive review of indicators for sustainable forestry. The report is also linked to a web-based tool for sustainable forestry monitoring, which can be found at www.manometmaine.org/indicators
Download	www.manometmaine.org/documents/HaganandWhitmanJForestry2006.pdf
Name	Expedition Field Techniques
Source	Royal Geographic Society, London, 1998
Phase	3, 5
Overview	This is a comprehensive compendium of practical scientific methods for biodiversity surveying and monitoring. Much of the information presented can be applied to forestry and biodiversity monitoring, however, it focuses more on techniques rather than framework development.
Download	http://biology.kenyon.edu/courses/biol229/fieldmanual%20birds.pdf
Name	“Learning while doing: Evaluating impacts of REDD+ projects,” in Realising REDD+ National Strategy and Policy Options
Source	CIFOR, 2009
Phase	5
Overview	This article outlines a number of important issues specific to monitoring REDD+ projects. The material presented here is very relevant to monitoring processes, and provides a useful review of certain monitoring considerations that should be understood throughout the project development process.
Download	http://www.cifor.cgiar.org/nc/online-library/browse/view-publication/publication/2871.html

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