



Asian Development Bank



Greater Mekong Subregion

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# Capacity Building for Efficient Utilization of Biomass for Bioenergy & Food Security in the GMS

TA7833-REG

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## PROGRESS REPORT (JULY-SEPT 2013)



## KEY DATA

<b>Name of Project:</b>	Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833-REG)
<b>Contractor(s):</b>	<b>Landell Mills Limited (LML)</b> , Bryer-Ash Business Park, Trowbridge, Wiltshire, BA14 8HE, UK. +44 1225763777 (landell-mills.com). <i>In consortium with:</i> <b>Practical Action Consulting (PAC)</b> , Schumacher Centre, Bourton-on-Dunsmore, Warwickshire CV23 9QZ, UK (practicalaction.org); <i>and:</i> <b>Nexus Carbon for Development (Nexus)</b> , #33 E3 Sothearos Blvd, Corner St. #178, Phnom Penh, CAMBODIA (nexus-c4d.org)
<b>Contracting Authority:</b>	Asian Development Bank (ADB)
<b>Start/End Date:</b>	15 Dec 2011 - 30 June 2014
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<b>Location:</b>	Greater Mekong Subregion (Cambodia, Lao PDR and Viet Nam)

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## ABBREVIATIONS AND ACRONYMS

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ADB	Asian Development Bank
APMB	Agricultural Project Management Board
AROS	Asian Regional Organic Standard
ASEAN	Association of Southeast Asian Nations
BEFS	Bioenergy and Food Security
CASP	Core Agricultural Support Program
CDM	Clean Development Mechanism
CEDAC	Centre d'Etude et de Développement Agricole Cambodgien
CER	Certified emissions reduction
CFA	Climate-friendly agriculture
CLV	Cambodia, Lao PDR and Viet Nam
IFOAM	International Federation of Organic Agriculture Movements
DAHP	Department of Animal Health and Production, MAFF Cambodia
DARD	Department of Agriculture and Rural Development (MARD Viet Nam)
DCP	Department of Crop Production (MARD Viet Nam)
DMF	Design and Monitoring Framework
EA	Executing Agency
EOC	Environmental Operations Centre
Eoi	Expression of interest
EU	European Union
FAO	Food & Agriculture Organization (United Nations)
GAP	Good Agricultural Practices
GBEP	Global Bioenergy Partnership
GHG	Greenhouse gas
GMS	Great Mekong Subregion
GOMA	Global Organic Market Access
GoV	Government of Viet Nam
IA	Implementing Agency
ICS	Improved cookstoves
ICT	Information and communication technologies
IFOAM	International Federation of Organic Agriculture Movements
LML	Landell Mills Limited
MAF	Ministry of Agriculture and Forestry (Lao PDR)
MAFF	Ministry of Agriculture, Forestry and Fisheries (Cambodia)
MARD	Ministry of Agriculture and Rural Development (Viet Nam)
MEM	Ministry of Energy and Mines
MFI	Microfinance institutions
MIME	Ministry of Industry, Mines and Energy
MOE	Ministry of Education
MoF	Ministry of Finance
MoIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MoST	Ministry of Science & Technology
MPI	Ministry of Planning & Investment
NBP	National Biogas Program
NDF	Nordic Development Fund

NFP	National Focal Point (of the Implementing Agency)
NGO	Non-Governmental Organization
NPI	National Project Implementation
PDR	People's Democratic Republic
PGS	Participatory Guarantee Systems
PPP	Public-private partnerships
PPTA	Project Preparatory Technical Assistance
PSC	Project Steering committee
PSD	Private sector development
RETA	Regional Technical Assistance
RfP	Request for Proposals (RfP)
SME	Small and Medium Sized Enterprise
SNV	Netherlands Development Organisation
SOP	Standard operating procedures
SRI	System of Rice Intensification
TA	Technical Assistance
TFP	Technical Focal Point (of the Implementing Agency)
ToR	Terms of Reference
UK	United Kingdom
US\$	United States Dollar
WB	World Bank
WGA	Working Group on Agriculture

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## 1. INTRODUCTION

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### 1.1. SUMMARY

The Greater Mekong Subregion (GMS) Working Group on Agriculture (WGA) oversees regional cooperation in agricultural development under a wider GMS regional cooperation program. In 2007, the WGA conducted a regional study on strategic options for biofuel and rural renewable energy development in the GMS. The study developed into a GMS Strategic Framework and Action Plan for Biofuels and Rural Renewable Energy, which was endorsed at the fifth annual WGA meeting in the People's Democratic Republic of Lao (Lao PDR) in 2008. To implement the framework, GMS countries requested Asian Development Bank (ADB) assistance for bioenergy development, including technology transfer from more advanced countries in the GMS to Cambodia, Lao PDR, and Viet Nam, to diversify the region's energy options while ensuring food security.

In response, the ADB confirmed the 'Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion (TA7833)' project financed with a grant from the Nordic Development Fund (NDF). This grant is administered by the ADB alongside the agriculture ministries of Cambodia, Lao PDR and Viet Nam in the form of a project for implementation during a period of 42 months (July 2011 to December 2014). The project concept was presented and endorsed by the GMS countries at the annual meeting of the WGA in Viet Nam in 2010. A fact-finding mission in early 2011 concluded broad agreement on the concept paper. TA7833 primarily focuses on Cambodia, Lao PDR and Viet Nam (CLV). The project intends to lay the foundations for potential investment projects to subsequently scale-up successful outcomes.

In December 2011, ADB contracted a consortium of consulting firms led by Landell Mills Ltd (LML) of the United Kingdom to provide technical assistance (TA) to support project implementation by the agriculture ministries. The TA Design and Monitoring Framework is provided in APPENDIX 1:

By June 2012 the agricultural ministries of CLV, in their respective roles as TA7833 Implementing Agencies (IA), had nominated counterpart government staff and resources to lead implementation of TA7833 with support from the Consultants. During the same period, project start-up was mostly concluded with the CLV governments providing office accommodation, etc.

The early TA activities focused on mapping existing implementation structures in CLV for efficient utilization of biomass for bioenergy and food security. The three national workshops were held during February and March 2012 within which key topics for potential studies and pilot projects were prioritized and agreed, along with recommendations on the advantages and disadvantages of both existing and new implementation structures.

Potential implementation partners such as national and international non-government organizations (NGOs), enterprises, public and private centers of excellence and public-private partnership (PPP) modalities have been identified. In each country, potential implementation partners for capacity development have been identified and shortlisted. In addition, pre-selection criteria have been drawn up for TA7833 to identify suitable public and private institutions as: i) distance learning partners, and; ii) project implementation partners.

This period provided significant input to understanding the current status of priority technologies, policies and standards, in addition to highlighting existing capabilities, priorities and future plans of both Government and key stakeholders. These assessments were built upon the inception workshops and stakeholder meetings in each capital city, initial tri-country missions involving TA experts and the *1<sup>st</sup> GMS Regional Forum on Harmonization of Standards in Bioenergy and Food Security* in Nanning, China from 1 to 6 July 2012 (see **Report on Proceedings**)<sup>1</sup>.

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<sup>1</sup> <https://docs.google.com/open?id=0B1wKP1C0cX-jb1gxbm1zVks3c0U>

However, the extended inception phase of the TA and lack of progress on pilot project implementation resulted in the replacement of the TA Team Leader in November 2012. There followed an intensive review process covering work completed to date, development of a comprehensive workplan and schedule and extensive restructuring of the consultant TA team / inputs. These were presented in the revised Inception Report submitted in March 2013.

The following progress report provides a review of the work up to the end of September 2013.

## **1.2. PROJECT OVERVIEW**

TA7833 is a regional capacity development technical assistance project. The project's impact will be to improve the efficient utilization of biomass in Cambodia, Lao PDR and Viet Nam within the wider context of bioenergy and food security. The outcome will be efficiently operating pilot projects in biomass determined by to the following outputs:

### **i) Output One: Enhanced regional cooperation on bioenergy development to foster and safeguard food security.**

The output will be achieved through a regional approach to climate-friendly agricultural development and mechanisms for harmonizing regulations and ensuring their compatibility with international trade obligations. The TA will support national level working groups to define a road map and policy framework for the introduction of standards and certification for national priorities. The process seeks to build and then support a regional policy sharing dialogue as a step towards supporting shared learning and to understand the potential benefits of moving towards common sets of bioenergy standards, certification and accreditation systems, alongside a traceability and eco-labeling system. A common method of assessing greenhouse gas (GHG) emissions will also be explored. International and regional forums will facilitate progressively higher level dialogue within the region on bioenergy and food security policy issues and encourage the exchange of information and skills in the use of novel technologies. In addition, options for minimizing the cost of certification and traceability for both small-scale producers (households) and end users of products will be analyzed.

### **ii) Output Two: Climate-friendly, gender-responsive biomass investment projects, pilot tested through implementation in Cambodia, Lao PDR, and Viet Nam.**

Candidate technologies include, but will not be limited to: biogas & bioslurry; improved cook stoves; biochar production and application, and; climate friendly agriculture value chains. Feasibility studies will be completed for priority topics and used to define pilot projects based on technologies successfully tested on a smaller scale. In addition, business model case studies will be completed for successful projects as a means of identifying potential upscaling modalities. The pilot projects will be used to define future investment options for upscaling in terms of technologies and business modalities if they are identified as being feasible and viable.

### **iii) Output Three: Enhanced capacity for the efficient utilization of biomass.**

The output will raise awareness of the biomass resources and their potential uses amongst officials and policy makers as well as decentralized agencies and supporting civil society groups to enable potential investment options to be fully understood. Gender-sensitive capacity-building will be provided to participating central and local governments, service providers, communities and women's groups. Activities will strengthen institutional and technical capacity to expand biomass investments and ensure sustainable uptake by rural communities. Distance learning methods will be implemented to reach more rural communities and capacity building support will be offered to project stakeholders. Capacity building for ADB safeguards, feasibility assessment and project approval due diligence will be provided.

### **iv) Output Four: Development and dissemination of knowledge products.**

Using output from the Global Bioenergy Partnership (GBEP), the TA will develop a common methodology for assessing the supply of biomass and prioritizing its use for enhancing energy and food security. Knowledge products will be developed to promote knowledge transfer and



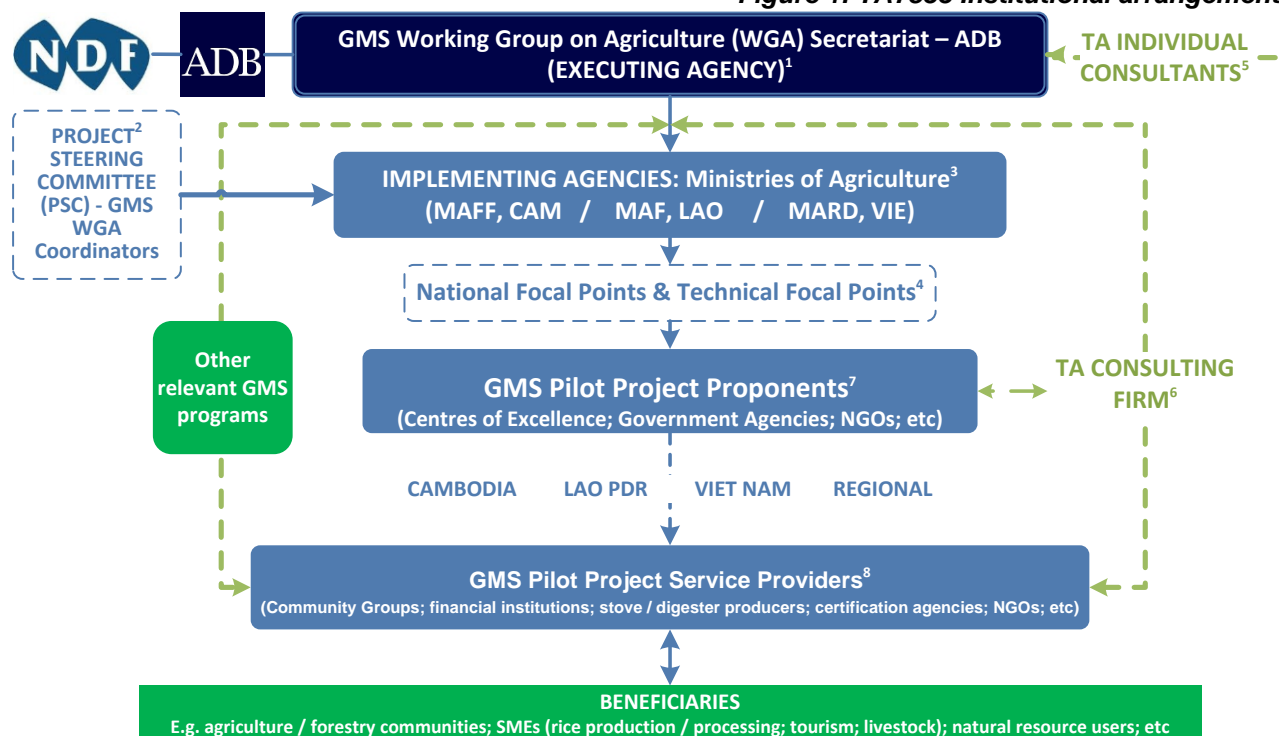
cooperation between more advanced GMS countries and CLV. Baseline surveys will be carried out and a monitoring system established.

### 1.3. IMPLEMENTATION ARRANGEMENTS

As presented in the figure below, the *Executing Agency (EA)* for this project is the GMS Working Group on Agriculture (WGA) Secretariat, supervised by staff from the ADB's Southeast Asia Department<sup>2</sup>. High-level project supervision function is provided by the National Coordinators of the GMS WGA from Cambodia, Lao PDR and Viet Nam, which together form the TA7833 Project Steering Committee (PSC).

The Ministry of Agriculture, Forestry and Fisheries (MAFF), Cambodia; Ministry of Agriculture and Forestry (MAF), Lao PDR; and Ministry of Agriculture and Rural Development (MARD), Viet Nam are the official Implementing Agencies (IA).

Figure 1: TA7833 Institutional arrangements



The GMS Environmental Operations Center (EOC), Bangkok supports administration of the TA and provides access to regional data and information. The EOC seeks to identify synergies and collaboration with other GMS-wide initiatives such as the ADB's Core Environment Program and Biodiversity Corridor Initiatives.

As of July 2012, each IA (MAFF / MAF / MARD) had identified and officially nominated *national focal point* (NFP) agencies or individuals to lead implementation of TA7833's project activities on behalf of each country according to the wider arrangements detailed in the figure above. In further discussions with each IA and based on initial lessons learned from TA7833 coordination under project implementation, additional *technical focal point* (TFP) personnel were identified and recommended to take the lead in technical coordination of country-level activities (see the table below).

<sup>2</sup> Dr. Sununtar Setboonsarng, TA7833 Project Officer & Principal Natural Resources and Agriculture Economist, Environment, Natural Resources and Agriculture Division, Southeast Asia Department, ADB



**Table 1: Government counterpart agencies and personnel for TA7833**

<b>ROLE</b>	<b>NAME</b>	<b>POSITION</b>
<b>Cambodia</b>		
WGA Coordinator	H.E. SAN Vanty	Under-Secretary of State, Ministry of Agriculture, Forestry & Fisheries (MAFF)
WGA National Secretariat Support Unit (NSSU) National Focal Point	Mr. Prum Somany	Deputy Director, Department of International Cooperation, Ministry of Agriculture, Forestry and Fisheries (MAFF)
National Focal Point (NFP)	Dr. Sar Chetra	Department of Animal Health & Production, MAFF
Technical Focal Points (TFP)	Biogas - Dr. Sar Chetra	Deputy Director of DAHP
	Biochar - Dr. Chan Saruth	Director of Department of Agricultural Engineering of General Directorate of Agriculture, MAFF
	Biofuel - Mr. Iv Phirun	Deputy Director of Department of Industry Crop of General Directorate of Agriculture, MAFF
	ICS - Mr. Khorn Saret	Deputy Director of Forestry & Community Forestry of Forestry Administration, MAFF
	Standards - Mr. Chheng Uddara	Director, Standards Development, Training & Consultancy Dep., Institute of Standards, Ministry of Industry, Mines & Energy (MIME) <sup>3</sup>
<b>Lao PDR</b>		
WGA Coordinator	H.E. Phouang Parisak Pravongviengkham	Vice Minister, Ministry of Agriculture and Forestry (MAF)
WGA National Secretariat Support Unit (NSSU) National Focal Point	Mr. Inthadom AKKHARATH	Deputy Director International Cooperation Division Department of Planning, MAF
National Focal Point (NFP)	Mr. Inthadom AKKHARATH	Deputy Director International Cooperation Division Department of Planning, MAF
Technical Focal Points (TFP)	Biogas - Mr. Nivat PHANAPHET	Deputy head of Livestock Management Center, Department of Livestock & Fisheries, MAF
	Biochar - Mr. Lattana PHASAYSOMBATH	Director of Agro-Forestry Training Centre (NAFES), MAF
	Biofuel - Mr. Khamphone MOUNLAMA	Deputy Director of Research Management Division (NAFRI)
	ICS - Mr. Boualom XAYSANAVONG	Technical staff, Ministry of Energy & Mines (MEM)
	Standards - Ms. Nisith KHAMMOUNHEUANG	Head of Standards Division, Ministry of Science & Technology (MoST)
<b>Viet Nam</b>		
GMS-WGA Coordinator	Mr. Tran Kim Long	Director General, International Cooperation Department, Ministry of Agriculture and Rural Development (MARD)
WGA National Secretariat Support Unit (NSSU) National Focal Point	Mr. Nguyen Thanh Dam	Deputy Head in charge, Multilateral Cooperation Division, International Cooperation Department, Ministry of Agriculture and Rural Development (MARD)

<sup>3</sup> [www.isc.gov.kh](http://www.isc.gov.kh)

ROLE	NAME	POSITION
National Focal Point (NFP)	Mr. Nguyen The Hinh	Agricultural Project Management Board (APMB), MARD
Technical Focal Points (TFP)	Biogas - Ms. Nguyen Quynh Hoa	Official, Livestock Environment Division, Department of Livestock Production, MARD
	Biochar - Mr. Vu Tien Dung	Deputy Director of AST project, APMB, MARD
	Biofuel - Mr. Nguyen Tu Hai	Official, Department of Crop Production, MARD
	ICS - Mr. Tran Ngoc Tue	Deputy Head, Biomass Energy Division, Forestry Science Technique Application Centre, MARD
	Standards – TBD	Awaiting approval by MARD

In addition to the Consultant firm, ADB contracted a *Regional Cooperation and Trade Facilitation Specialist* and *Regional Knowledge Management Specialist* as individual consultants located in the WGA Secretariat that will work with the Consultants during TA7833 implementation, starting from June 2012.

The GMS EOC in Bangkok serves as the facility for administering TA7833 and offers access to regional data and information of relevance. In addition, the EOC plays a key role in identifying synergies with and fostering collaboration with other GMS-wide initiatives such as the ADB's Core Environment Program and Biodiversity Corridor Initiatives

#### 1.4. PROJECT SCOPE AND DEFINITION

Biomass provides a locally available, and renewable, source of energy, particularly in rural areas in CLV, where biomass based energy remains the predominant energy source. In areas endowed with forest and/or agricultural, food processing, agro-industrial and domestic organic residues, bioenergy production is increasingly cost effective and a competitive energy alternative.

The TA terms of reference scope includes the need to improve the quality of country-level data on biomass resources and to strengthen national and institutional capacities to collect, analyze and disseminate information related to efficient utilization of biomass for energy and food security, by focusing on key technologies that contribute to both. TA scope is limited to pilot biomass utilization technologies that use small-scale technology operating at the household and the community level. Institutional and regulatory frameworks, capacity development and knowledge management will reflect the wider biomass utilization subsector needs.

The TA supports the continued strengthening of cooperation between member countries, acting as a catalyst for building development dividends not always possible at the national level. The TA will support dialogue between regional actors (top-down), as well as support the scaling-up of local community-based initiatives (bottom-up). At the regional level, the project facilitates high-level dialogue on a common approach to bioenergy development for pro-poor climate change mitigation, energy self-sufficiency and food security. The project also works with local governments and stakeholders to put in place the human and institutional capacity to increase adoption of technologies to promote the efficient use of biomass for the benefit of rural poor while enhancing food security.

The efficient utilization of biomass requires technologies that transform agricultural and forestry residues, which create environmental problems and pollute waterways when left to decay, to produce bioenergy, biochar and organic fertilizers<sup>4</sup>. Currently, technologies and the required skills for the conversion of agricultural and forestry residues into bioenergy carriers like biogas, wood or

<sup>4</sup> ADB's *Technical Assistance Report 44474-01, Capacity Building for the Efficient Utilization of Biomass for Bioenergy and Food Security in the Greater Mekong Subregion* (ADB, 2011)

straw-based pellets / briquettes and biochar have been promoted by national and international NGOs with mixed results and on a limited scale.

Bioenergy can be generated from biomass either directly or indirectly converted in either: solid, liquid or gaseous forms. Modern bioenergy relies on efficient conversion technologies which are increasingly available. The project defines bioenergy as: *“...renewable energy from plants and animals. Organic matter containing bioenergy is known as biomass that can produce heat ... or be modified to create cellulosic ethanol. Since almost all bioenergy can be traced back to solar energy, bioenergy has the advantage of being a renewable energy source, and should be harnessed in a sustainable manner.”*

ADB's bioenergy policy states that it can only support bioenergy sourced from non-food crops and 'agro-waste'. The TA scope is defined by this policy which requires: (i) the feedstock is not a food crop; (ii) any land involved in bioenergy development is unsuitable for food crops; (iii) no deforestation is associated with bioenergy development, and; (iv) the net energy balance is positive. The scope of the TA excludes liquid bioenergy for transportation (transport biofuel as bioethanol or biodiesel).

The scope of biomass feedstock for bioenergy is further limited by CLV government representatives to include only (i) rice husks, (ii) straw, (iii) bamboo, (iv) nut shells, (v) fruit waste, (vi) non-food oil bearing plants, (vii) animal manure and (viii) other agro-waste wherever these are abundant with the potential to create environmental problems<sup>5</sup>.

The development of skills required for production of bioenergy carriers like biochar, briquetting and plant oil targets households and small community-based enterprises as the development of a viable bioenergy market is not possible without the involvement of the private sector. Therefore counterparts and key informants sought by the project include public and private sector enterprises, as well as research centers, universities and vocational training centers in the TA stakeholder group.

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<sup>5</sup> WGA meeting, 12 July 2012, Nanning, China

## 2. SUMMARY OF PROGRESS AGAINST OUTPUTS

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
<p><b>OUTPUT 1: ENHANCED REGIONAL COOPERATION IN BIOENERGY DEVELOPMENT TO FOSTER AND SAFEGUARD FOOD SECURITY</b></p> <p>Mechanism tested for harmonizing at least three bioenergy standards<sup>6</sup> and certification systems, and a common method of assessing greenhouse gases</p>	See below.	See below	See below
<p>1.0 Holding of regional forums to facilitate high-level dialogue within the region on bioenergy and food-security policy issues</p>	<p>1st GMS Forum for was successfully accomplished in Nanning in July 2012 and reported in the IR and the <b>'Report on Proceedings'</b></p>	<p>TORs prepared and agreed for policy working groups to prepare policy road maps for standards, certification and labeling for biomass related technologies and climate friendly agriculture based on the national forums completed during this progress period – see 1.1.</p> <p>Proposed working groups were not formed due to the lack of ADB systems for participation payment. Follow up mission by ICS expert planned for August- September was delayed due to the lack of working groups.</p>	<p>WGs formed and develop policy roadmaps for each country (Q4 2013)</p> <p>Roadmaps to be presented at 2<sup>nd</sup> GMS Regional Forum on Harmonization of Standards in Bioenergy – date to be confirmed, scheduled for Q4 2013 or Q1 2014, depending on WG approval.</p>
<p>1.1 Testing of mechanisms to facilitate adoption of common set of sustainable indicators, bioenergy and trade standards, certification systems an eco-labeling</p>	<p>Harmonization Roadmap devised and agreed at 1st GMS Forum as initial mechanism for facilitating dialogue and ultimate adoption of common standards. See p12 of <b>'Report on Proceedings'</b></p> <p>3 National policy forums (May 2013) -</p>	<p>Reports on the 3 national policy forums submitted</p> <p>Report on 'Introduction to Standards, Certification and Labelling Systems for Sustainability' submitted to TL for review</p>	<p>Report on 'Introduction to Standards, Certification and Labelling Systems for Sustainability' finalized (Oct 2013)</p> <p>Participatory Guarantee Systems Report to be finalized (Nov 2013)</p> <p>Report on National Legislation and</p>

<sup>6</sup> Including standards set by such organizations as the Global Alliance on Clean Cookstoves and the Roundtable on Sustainable Biofuels, along with quality assurance from regional quality assurance centers to be established for biogas, improved cookstoves, bio-char, etc.

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
	<p>one in each country, which involved a more intensive mechanism for national-level dialogue for wider harmonization. The forums provided a venue for policymakers and public officials to discuss policies and opportunities relevant to their country, and engage with other stakeholders and experts. The forums provided a process for developing policy strategies that will be presented at the 2<sup>nd</sup> regional forum.</p>		<p>Policy Review to be finalized (Nov 2013)</p>
<p>1.2 Holding of annual international workshop on household bioenergy and food security to foster exchange of information, particularly between more advanced Greater Mekong Subregion countries and Cambodia, the Lao PDR, and Viet Nam</p>	<p>None. Planned to coordinate with FAO-BEFS but postponed to 2013 by order of ADB to focus on PP implementation.</p>	<p>Agenda for conference prepared. Arrangements are being revised to reflect ADB comments</p>	<p>Conference held (Nov or Dec 2013)</p>
<p><b>OUTPUT 2: PILOT TESTED CLIMATE FRIENDLY BIOMASS INVESTMENT PROJECTS FOR WIDER IMPLEMENTATION</b> Construction of at least 500 bio-digesters, 600 biochar kilns, 75,000 improved cookstoves; and introduction of at least 300 farmers to sustainable certification standards</p>	<p>See below.</p>	<p>See below.</p>	<p>See below.</p>
<p>2.0 Conduct biomass assessment and development of criteria for selection of pilot project areas by 2012</p>	<p>Regional biomass resource assessment under preparation.</p>	<p>Regional biomass resource assessment submitted. Options for integrating this within a multi-criteria decision support tool linked to life cycle analysis have been developed and are being reviewed. It is proposed to use these as an integral part of the compendium on biomass under Output 4</p>	

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
<p>2.1 Implementation of pilot projects in lower cost biogas technologies as investment options involving use bioslurry for high vale crop production</p>	<ul style="list-style-type: none"> <li>- Priority topics by country agreed</li> <li>- Terms of reference for feasibility studies prepared and approved by ADB and IAs.</li> <li>- Expression of interest for feasibility studies in Viet Nam and Cambodia received and evaluated. Laos PDR had no national EOI despite a second round of advertisement although an EOI was received from a Viet Nameese contractor for Bioslurry and Biochar work but was not approved by government</li> <li>- WB, AUSAID and GERES/EU have completed reviews of ICS sector for the purpose of undertaking pilot upscaling investments – raises the need for FS and or pilot in ICS for Laos</li> <li>- FS in Cambodia and Viet Nam contracted</li> <li>- Proposed value chain focus in biochar linked to aggregated biomass sources such as rice husk and cashew shells identified for Cambodia and Viet Nam.</li> <li>- Value chain business models for potential upscaling case studies identified</li> </ul>	<ul style="list-style-type: none"> <li>- 4 FS studies completed and reported – 2 FS finalized, 2 drafts have been commented and are being revised</li> <li>- 2 are late in submission due to Cambodian – elections delaying field work</li> <li>- Procurement using a shopping and RFP modality approved by ADB</li> <li>- TORs approved for proposed pilots - 1 TOR awaiting Govt approval</li> <li>- Case studies for climate friendly rice value chain business models - initial draft prepared and commented on awaiting final draft for circulation.</li> <li>- Biochar piloting in VN does not look feasible – probable that a biochar demonstration using field based rice straw pyrolysis will be demonstrated as part of SRI demonstration programs</li> <li>- Bioslurry pilots – initial reports raise concern over the likely feasibility of slurry management due to the high labor costs, mechanization is being assessed currently</li> </ul>	<ul style="list-style-type: none"> <li>- Rapid appraisal of options undertaken in Laos</li> <li>- FS Reports Finalised</li> <li>- Business model reports finalized</li> <li>- Pilot projects contracted and underway (may require no-cost time extension to contract)</li> <li>- Social baselines finalized from pilot and Pilot FS, triangulated with secondary data and SPRSS prepared</li> </ul>
<p>2.2 Conduct of reviews to identify appropriate biochar, ICS and biofuel investment modalities by 2012 and implementation of pilot project by 2014</p>	<p>Summary reviews of ICS, Biochar and carbon emissions, the private sector, financing modalities, and the institutional frameworks in CLV completed.</p> <p>Technology commercialization status assessment based on NASA's</p>	<ul style="list-style-type: none"> <li>- ICS review drafted and distributed for review</li> <li>- Biochar Technologies review drafted – awaiting final editing</li> <li>- Financing modalities for biomass technology – drafted awaiting final editing</li> </ul>	<ul style="list-style-type: none"> <li>- ISC review finalised</li> <li>- Biochar testing undertaken</li> <li>- Biochar technology report finalized</li> <li>- Financing modalities report finalised</li> </ul>

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
	<p>Technology Readiness Levels (TRL) completed and included in inception report – highlighting the immature nature of biochar and bioslurry technologies for widespread up-scaling.</p> <p>Biofuel technology has been dropped based on TA team findings and CLV Government skepticism.</p>		
<p><b>OUTPUT 3: ENHANCED CAPACITY FOR EFFICIENT USE OF BIOMASS</b> Increased capacity for gender-sensitive investment among at least 500 government officials, 400 service providers, and 3,000 lead farmers (i.e., at least 55% of those to be trained will be women and at least 70% of those trained will have increased capacity)</p>	See below	See below	See below
<p>3.0 Development of gender- sensitive training programs including distant learning activities, use of these for training local and central govt officials, farmers organization and womens groups (30% women by 2013)</p>	<ul style="list-style-type: none"> <li>- Awareness-raising activities were initiated through inception workshops (Cambodia and Lao PDR) and a stakeholder meeting in Viet Nam in February 2012. Participation at these events totaled 121 government and non-government stakeholders (32% women) from across the GMS.</li> <li>- In September 2012, TA7833 provided support for attendance of the TFP-Biochar from CLV (total 3 participants; 0% women) at the International Biochar Initiative (IBI) Congress in Beijing, China.</li> <li>- From 04-07 March 2013, TA7833 hosted the <i>Regional Workshop &amp;</i></li> </ul>	<ul style="list-style-type: none"> <li>- Awareness program developed</li> <li>- FS will develop a capacity building proposal for each pilot that will be developed and delivered during the pilot implementation</li> <li>- 1<sup>st</sup> Brief (Spotlight) developed giving a project overview - completed but not yet disseminated</li> </ul>	<ul style="list-style-type: none"> <li>- Distance-learning activities start to be developed based on KPs and briefs (see 3.2)</li> <li>- KPs developed and disseminated in the following topics:               <ol style="list-style-type: none"> <li>1. Climate Change, Food Security &amp; Bioenergy</li> <li>2. Biochar</li> <li>3. Biogas / Bioslurry</li> <li>4. Climate-Friendly Soil Amendments</li> <li>5. Climate-Friendly Agricultural Value-Chains</li> <li>6. Improved Cookstoves</li> </ol> </li> <li>- Briefs developed and disseminated in the following topics:</li> </ul>



OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
	<p><i>Study Tour on Efficient Utilization of Biomass for Biochar Production &amp; Application Biochar in Siem Reap, Cambodia. The event was attended by 33 government and non-government CLV stakeholders (19% women). See Report on Proceedings.</i></p>		<ol style="list-style-type: none"> <li>1. Overview</li> <li>2. Climate change &amp; agriculture</li> <li>3. Bioenergy &amp; food security</li> <li>4. Biomass resource availability</li> <li>5. Biomass resource priority use options</li> <li>6. Improved Cookstoves: Overview</li> <li>7. Improved Cookstoves: Technology options &amp; readiness levels</li> <li>8. Biogas: Overview</li> <li>9. Biogas: Technology options &amp; readiness levels</li> <li>10. Biogas: Efficient bioslurry management</li> <li>11. Biochar: Overview</li> <li>12. Biochar: Technology options &amp; readiness levels</li> <li>13. Biochar: Applications</li> <li>14. Biochar: TA7833 test results</li> <li>15. Climate-friendly soil amendments#1</li> <li>16. Climate-friendly soil amendments#2</li> <li>17. Climate-friendly value chains</li> <li>18. Organic agriculture#1</li> <li>19. Organic agriculture#2</li> </ol>
<p>3.1 Conduct training in the implementation of the investment project by 2014</p>	<p>None</p>	<p>None</p>	<p>None</p> <p>Training to be implemented in 2014 as part of the finalization of subprojects for the loan project. Training to be provided on:</p> <ul style="list-style-type: none"> <li>- Innovative financing</li> <li>- ADB project preparation and implementation training</li> </ul>
<p>3.2 Conduct of training in the use of biomass to enhance food security and</p>	<p>Biochar/ICS study-tour and training – see 3.0 above</p>	<p>None</p>	<p>Study-tour and training on biochar in PRC (Oct/Nov)</p>

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
soil carbon sequestration by 2014			KPs (see above) Briefs (see above)
<b>OUTPUT 4: DEVELOPMENT AND DISSEMINATION OF KNOWLEDGE PRODUCTS</b> Methodology for assessing and prioritizing the use of biomass for bioenergy and food security  Compendium of good practices in biomass use  Booklets on different models of improved cookstove, biochar kiln, and biodigesters	See below	See below	See below
4.0 Development of methodology for assessing and prioritizing the use of biomass for energy and food security by 2012 and dissemination of the methodology through regional forums, training, and capacity building by 2014	Existing resource assessments for CLV have been compiled. international assessment methods identified and a proposed assessment framework is being reviewed	Draft high level assessment completed and submitted	None
4.1 Establishment of baseline information and monitoring and evaluation system for pilot projects by 2012	Baseline requirements specified in the pilot feasibility study ToR	<ul style="list-style-type: none"> <li>- FS reports as finalized include social baselines for proposed pilots</li> <li>- Rapid Appraisal underway for Laos pilots</li> </ul>	<ul style="list-style-type: none"> <li>- Baselines established for each pilot</li> <li>- Multi-stakeholder, user-focused evaluation forums used to complete and review each of the pilot studies.</li> </ul>
4.2 Conduct key studies such as life cycle assessments, least cost options, and eco-labeling by 2013	None	<ul style="list-style-type: none"> <li>- Options have been outlined for using the pilot projects as case studies for lifecycle and least cost assessments and how these could be combined with the biomass assessment framework within a multi-criterion decision framework.</li> </ul>	None
4.3 Publication of compendium of good practices in biomass use and booklets	None	List of KPs to be produced developed	A number of KPs produced – see 3.0 above

OUTPUTS & ACTIVITIES	PROGRESS DEC 2011 – JUNE 2013	PROGRESS THIS PERIOD (JULY-SEPT 2013)	PLANNED ACTIVITIES (OCT-DEC 2013)
containing information on different models of ICS biochar kilns and bio-digesters by 2014			
4.4 Analysis of potential climate change scenarios and their likely impact on the availability of different type of biomass and assessment of need for the development of alternative biomass sources by 2013	None	None	None

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### 3. DETAILS OF PROJECT PROGRESS & PERFORMANCE

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#### 3.1. PROJECT IMPLEMENTATION PROGRESS

##### 3.1.1. Output 1: Mechanisms for enhancing regional cooperation and development of bioenergy and food security harmonized

The 1<sup>st</sup> GMS Regional Forum on Harmonization of Bioenergy Standards was held in Nanning, China in July 2012. The Forum provided the opportunity to prepare and agree a harmonization roadmap mechanism to engage all the three implementing countries in agreed priorities and procedures for strengthening national and regional institutional co-alignment in the twin areas of bioenergy and food security. The Nanning plan is being enacted and elaborated through ongoing efforts and a series of national forums that were completed in May 2013.

These national forums addressed building knowledge and understanding of standards and certification and will be followed up through a series of national level processes (planned for October – December 2013 depending on ADB approval) that will identify national priorities, conduct of awareness-raising, and, where necessary, preparation of national standards, policies and institutional framework options. The roadmaps will include prioritization for building standards and the necessary elements for advancing the implementation of priority programs including the development of policy and regulatory support. Each national roadmap will provide input to the GMS Regional Forum and future national forums. The proposed establishment of policy working groups has not been possible due to date due to ADB declining support for participation payments to government officials. A revised model that will provide far narrower input to the policy dialogue and will necessitate greater reliance on external consultants and the TA 7833 resulting is less development of local capability and distinctly less ownership of the findings.

The national forums will also be informed from a national review of laws, regulations, policy and plans. Initial drafts were used as input to the 2013 national forums. During the 2013 national forums it was agreed that national priorities would be identified along with a policy action matrix as part of building standards, certification and labeling roadmap and action plan to be presented at the 2013 regional forum. The forums will be reported to regional stakeholders in the 2<sup>nd</sup> GMS Regional Forum, planned for December 2013 or January 2014. It is envisaged that related activities within the TA will be adjusted to the scope of the national roadmap including the inspectorate development, traceability studies, national guideline development and labeling development.

The study into participatory guarantee schemes (PGS) has collected initial data sets for the case studies. Over the last quarter no activity was completed due to the uncertainty over the use of policy working groups due to ADB inability to pay for participation. It is envisaged that the PGS case studies will be picked up starting mid-October and will be finalized with the finding aligned to the roadmap priorities. The study will be used to inform the 2<sup>nd</sup> GMS regional forum to enable participants to consider the role of voluntary schemes within the national processes.

The review of international standards and certification has been drafted and is currently being reviewed and commented on by team members. The study continues need to further input and clarification which should be completed by October 30<sup>th</sup> for final submission. The report will be presented to the proposed regional forum.

The national guidelines for sustainability has an initial review of the GBEP and BFES indicators and will undertake a comparative study against current indicators for national public sector investment feasibility. The comparative study will provide a set of recommended options for strengthening national feasibility guidelines to reflect the elements of sustainability in food security and biomass energy programs. The current status is that the indicators for GBEP and sector

indicators for Cambodia and Viet Nam have been collated and organized. Sector indicators for Laos are currently being collated.

### **3.1.2. Output 2: Mechanisms for scaling-up biomass investment projects for bioenergy and food security demonstrated through pilot projects**

During the inception stage technologies and options for biomass use were identified and prioritized. Draft assessments have been prepared for ICS technologies, biochar production / applications and biogas / bioslurry technologies and their supporting value chains. These assessments are in final editing and will be distributed to stakeholders and partners for use as well as included in awareness-raising, distance-learning and knowledge products.

A review of the private sector and financing modalities has been completed, with the options paper in a final edit stage. Other papers related to Biochar and ICS reviews have been completed but require finalization before submission. The financial assessment reviews identified numerous innovative options but is light on the basis for integration of options within the relevant value chains in each country. As such, the report will be strengthened with more input to provide the necessary public-private sector context within which the range of options and technologies could operate. The shortfall will be addressed through the feasibility studies to be completed for each pilot project and the review of business models, where after the report will be circulated for peer review and comments before dissemination.

Country-wise stakeholder consultation in December 2012 identified each country priorities for pilot investments to be implemented by the TA. According to these priorities, concept papers were prepared for the follow-on pilots and used to confirm government commitment. In January 2013 the procurement procedures were negotiated with ADB to enable Consultant Qualification Selection (CQS) procurement procedures to be used, recognizing the highly specific nature of the work required, short time-intervals involved and few potential qualified service providers available.

EOIs were sought in both Cambodia and Viet Nam in February 2013 via ADB's website and local newspapers. Cambodia EOIs were reviewed in the last week of March while Viet Nam evaluations were completed in February and the ranking outcomes presented to Government for confirmation.. The contracting of these feasibilities was completed in May and June 2013 with the FS being scheduled for completion in September and October.

As at September 30<sup>th</sup> the VN FS drafts have been reviewed and the ICS FS finalized. A draft TOR has been shared with ADB and has been revised for Govt approvals. The quality of the feasibility study was high.

The Biochar feasibility study in Viet Nam was rejected and is currently being updated at the contractor's cost. There are significant issues over feedstock availability (rice husk is definitely inadequate due to competing uses), however the rice straw biochar whilst less proven is an increasingly important option due to the Government program to move to SRI rice as the conversion of straw to biochar offers one of the most significant reduction in GHG emissions (MARD, 2012) along with water management. The option of moving the biochar pilot to SRI demonstration sites and using these as demonstrations of field based pyrolysis of rice straw are currently being reviewed.

The Viet Nam biogas pilot feasibility study was submitted but the proposed pilot activities were not acceptable (being based on construction of slurry canals). The contractor is reviewing the option of slurry composting options, however again their maybe inadequate incentives to achieve sustainability.

The Cambodia ICS feasibility study was reviewed and significant gaps identified and the scale of the proposed pilot was asked to be reviewed within the context of the TOR. The feasibility study is only adequate. The Cambodia bioslurry pilot has just been reviewed and there are interesting

findings and a range of differing piloting options that are beyond the scope of the TA. These are currently being prioritized, however options for integration with biochar/ rice millers look interesting and will require the Cambodian biochar FS to be reviewed before finalization.

In Laos the request for EOIs to complete the FSs did not attract any expression of interest. In discussion with the NFP the EOI request was repackaged by combining the Biogas and Biochar FSs and increasing the level of inputs. No national EOIs were received, however one was received for the biochar /biogas FS from a Viet Nameese Consulting group. The NFP indicated a Government approval was needed to proceed with the EOI. To date no decision has been communicated to the TA so the FS has been abandoned.

On-going work in Laos PDR by the World Bank and AusAid has completed a review of the ICS and Biogas sector in terms of its current status, and identified proposed business models for upscaling the use of existing and new ICS technology. The outcome of this work is a proposed pilot for a revised ICS upscaling business model (total cost of nearly USD 1 million) that will provide proof of concept for a follow-on upscaling investment. In the biogas sector the assessment found significant issues relating to the viability of upscaling due to the cost of digesters, access to other fuel sources, and the cost of appliances. A recommended leasing instrument is proposed to increase the affordability of the technology, however this does not address other constraints in upscaling the biogas sector in Laos PDR. Further funding is proposed by the EU for upscaling of ICS in Laos.

Given the lack of EOIs from Laotian firms, and the significant pipeline of funding into ICS the TA questions the value of the TA including ICS as a pilot. Likewise the findings on biogas suggest upscaling will be severely limited by a range of factors regarding the lack of value of gas to the households. These issues have been raised with the NFP for consideration of the Government. It was subsequently decided that a single rapid assessment will be undertaken using a cluster approach to biomass management that includes and links biomass, bioslurry, biochar and ICS in a specific location to be piloted. The rapid assessment is currently being completed.

### **3.1.3. Output 3: Strengthened capacity of project stakeholders for the efficient use of biomass**

The TA7833 capacity building program applies a blended approach to activities such as public awareness campaigns, distance-learning methodologies, in-situ and field demonstrations during project implementation. The focus of capacity development generally falls on the agreed priorities of ICS, biochar and biogas/bioslurry.

The institutional mapping exercise carried out during the inception phase identified a list of existing training service providers relating to biomass-to-energy technologies and improved food production in the GMS (see Inception Report).

#### **i) Awareness-Raising**

TA7833 aims to raise awareness of the critical nexus of climate-friendly agriculture, soil quality, bioenergy and food security through a series of macro-level initiatives to drive interest and awareness within key stakeholder groups in the GMS.

Awareness-raising activities were initiated through inception workshops (Cambodia and Lao PDR) and a stakeholder meeting in Viet Nam in February 2012. Participation at these events totaled 121 government and non-government stakeholders (32% women) from across the GMS. In addition to an overview of TA7833 expected impacts, outcomes, outputs and planned activities, the following awareness-raising sessions were presented by the ADB, IAs, TA Team or key resource persons:

- Interrelation of bioenergy and food security sectors;
- Overview of bioenergy technologies (biochar, biogas/bioslurry, ICS and liquid biofuels);
- National status & perspectives on efficient utilization of biomass for bioenergy & food security;

- Working group sessions: a) Sustainability indicators for bioenergy & food security; b) Private sector participation and financing modalities for bioenergy & food security; c) Policy & regulatory coherence for bioenergy & food security.

By 31 March 2013, the TA team had collated and screened a large selection of relevant awareness-raising materials covering these interrelated topics.

Significant awareness-raising activities targeted at rural communities will be incorporated into the pilot project terms of reference.

The wider awareness program will utilize knowledge products hard copy and electronic newsletters (bio briefs/spotlights) that will provide facts and updates on key technologies and their use in the GMS. A number are planned for the period Oct-Dec 2014. These will be consolidated onto DVDs for wider distribution, and will be used for a distance learning programme in 2014.

It was planned that the above would be complemented through a series of expo days in each country during Q4 2013 and Q2 2014 where a range of existing awareness materials would be structured into posters and video presentation that will be provided at each of the IAs or an equivalent location. Outside providers would also be invited to the expo days. Counterparts have rejected the expo concepts however.

## ii) Training

In September 2012, TA7833 provided support for attendance of the TFP-Biochar from CLV (total 3 participants; 0% women) at the International Biochar Initiative (IBI) Congress in Beijing, China. The participants benefitted from presentations and intensive discussions surrounding: a) the application potential of biochar in an agricultural-dominant country; b) biochar and soil processes; c) biochar and climate change mitigation, and; d) biochar production in bigger scale.

From 04-07 March 2013, TA7833 hosted the *Regional Workshop & Study Tour on Efficient Utilization of Biomass for Biochar Production & Application Biochar* in Siem Reap, Cambodia. The event was attended by 33 government and non-government CLV stakeholders (19% women). Training included topics covered: the production of biochar from rice husks, bamboo and other feedstocks, including at the household level; demonstration of a range of biochar production technologies ranging from small kilns, retorts and multi-purpose ICS that produce biochar as a by-product, and; the integration of biochar / ICS technologies to rural household energy and food production systems. In working groups, the participants explored the opportunities and costs for adapting technology to fit a rural household's resources in the GMS and how the knowledge and experience from the workshop could be integrated into TA7833 activities. The participants shared their individual and collective experiences from existing biochar programs, including that of the Japanese Biochar Association (JBA) on behalf of the "Cool Vege" initiative and from each of the three CLV countries. Finally, the group's learning was consolidated with a field trip to assess trial demonstration technologies and rice / vegetable production plots utilizing biochar.

TA7833 aims to further develop analytical capacity in government stakeholders in CLV countries through training in the application of the FAO's Bioenergy and Food Security (BEFS) Analytical Framework and Tool Box<sup>7</sup>. At the request of the NFPs, the Consultant initiated dialogue with FAO to provide regional trainings to government officials and technical staff on the BEFS tools. Specifically the training will introduce the role of BEFS and its capacity to build planning scenarios and strategies as well as how the framework can support the identification of priority investment programs. The training will be linked to the 2013 regional conference.

Additional training will be delivered on the following subjects (i) Biochar supply chain development – PRC (planned for Oct-Nov 2013), (ii) AROS/Organic Agriculture, (iii) Biomass Resource Assessments and the use of technology (possibly with the Thailand Land Development

<sup>7</sup> [www.fao.org/bioenergy/foodsecurity/befs](http://www.fao.org/bioenergy/foodsecurity/befs)



Department), (iv) Sustainability indicators, (v) Innovative financing systems, and (vi) ADB investment processing and loan readiness systems.

### iii) Distance Learning

Distance learning activities will be focused on 2014 to enable the materials developed during the implementation of TA7833 to be incorporated.

The distance-learning program will build course materials using a web based platform and distributed through DVD – the program will be developed by the TA and piloted in each of the Pilot Provinces. The pilot distance learning will be evaluated and then transferred to each Government for their future use. The option of an institute hosting the distance learning courses into the future will be reviewed and the TA will share these with the WGA in 2014. It is proposed to certificate graduates and those graduates excelling from the first programs will participate in a WGA graduation ceremony attached to a regional WGA meeting in 2014. Participants will be identified via TFP nomination and expo days. Knowledge management products will be tailored as resource materials and guidebooks for the courses.

#### 3.1.4. Output 4: Knowledge products developed and disseminated

To date the structure of the biomass compendium is emerging with a desire to have it established as a multi-criteria decision support tool. The concept would use the compendium to build the data sets for the means to assess feedstocks and the use of the feedstock through technically-focused chapters. These chapters would be integrated with lifecycle analysis, least-cost assessment frameworks and social impact assessment and then concluded with a multi-criterion decision support framework.

The biomass resource assessment priorities have been agreed and the experts collated existing assessments of biomass in the countries as well as from the wider region. These were reviewed and then consolidated into the biomass review – high level assessment report. Based on the proposed framework an initial feedstock assessment will be developed using mostly secondary data sources and data collected during the feasibility studies.

Knowledge products for biochar and other topics are in preparation, with others planned as follows:

- Climate Change, Food Security & Bioenergy – draft submitted to TL for review
- Biochar – in preparation
- Biogas / Bioslurry – in preparation
- Climate-Friendly Soil Amendments – planned for Nov
- Climate-Friendly Agricultural Value-Chains – planned for Dec
- Improved Cookstoves – in preparation
- Certification & Standards – Q1 2014
- GHG Assessment & Carbon Finance – Q1 2014
- Innovative Business Models and Financing Mechanisms Efficient Utilization of Biomass – Q1 2014
- Sustainability Indicators - Q1 2014

## 3.2. PROJECT MANAGEMENT

### 3.2.1. Summary of Consultant TA team

The first of the international consultants were mobilized in December 2011 and the others thereafter as shown in the table below.

**Table 2: International staff engaged on TA7833 (30 Sept 2013; contract variation#2)**

NAME	SPECIALIST POSITION	INPUTS UTILIZED* (MONTHS)	INPUTS REMAINING (MONTHS)

<b>SAUNDERS*</b>	Team Leader	9.05	5.65
<b>BARACOL-PINHÃO</b>	Legal Standards & Certification Specialist	3.75	2.15
<b>MUNFORD**</b>	Capacity Building & Distance Learning Specialist	1.0	3.0
<b>BLOOMFIELD</b>	Improved Cookstove Specialist	0.75	0.25
<b>YAPP</b>	Private Sector Development Specialist	4.67	1.33
<b>SHACKLEY</b>	Biomass / Biochar Technology Specialist	0.82	3.38

\*Mr. SAUNDERS replaced Mr. Heinz-Peter MANG in October 2012

\*\*Mr. MUNFORD replaced Mrs. Elizabeth HUBA in June 2013

Note that inputs utilized are based on timesheets submitted by staff to date.

### i) Cambodia

Cambodian national TA consultants were mobilized from December 2011. The TA7833 project office was set up at MAFF in Phnom Penh in a meeting room on the 3rd floor of the Inspection Department. The procurement of office equipment received ADB approval in March 2012 and was mostly delivered and installed by May 2012. Asset registers have been shared with ADB and the IAs. To allow the undisturbed parallel use of the meeting room for other office work, a room separator was also installed at the cost of the TA, along with minor renovations. This procurement procedure has been completed. Names and positions of the Consultant's Cambodian national staff are shown in the table below. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

**Table 3: Cambodian national staff engaged on TA7833 (30 Sept 2013; contract variation#2)**

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Mao Moni RATANA*	M	National Project Implementation Specialist (NPI)	16.0	7.5
Visal SOUN **	M	Legal, Standards and Certification Specialist	0.4	0.0
Bona SAM	M	Private Sector Development Specialist	2.18	0.82
Davuth DY***	M	Capacity Building & Distance Learning Specialist	1.5	0.0
Navy HAP****	F	Social Development Consultant	1.07	0.0
Sokheng KEO	M	Project Assistant	Full-Time	

\*Ms Mao Moni RATANA replaced Sovannarith HEM in June 2013

\*\*Mr. SOUN withdrew from the project in March 2012 and remaining inputs were reallocated during the TA team reformulation.

\*\*\*Mr. DY contributed in 2012 but remaining inputs were reallocated during the TA team reformulation.

\*\*\*\*Mrs. HAP contributed in 2012 but remaining inputs were reallocated during the TA team reformulation.

Note that inputs utilized are based on timesheets submitted by staff to date.

### ii) Lao PDR

The Lao PDR national TA team was mobilized from December 2011. The TA7833 project office was setup at MAF headquarters in Vientiane in February 2012. The procurement of office equipment was completed as planned. In September 2013 the team was moved to another office although this is not yet furnished. Names and positions of the Consultant's Lao national staff are shown in the table below. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

**Table 4: Lao PDR national staff engaged on TA7833 (30 Sept 2013; contract variation#2)**

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Bounthavy CHALEUNPHONH*	M	National Project Implementation	11.53	10.97
Mr. Phouvong CHITTANAVANH**	M	Legal, Standards and Certification	1.27	1.50

Bounthavy CHALEUNPHONH	M	Private Sector Development	2.00	1.00
Savengkith PHOMMAHACK***	M	Capacity Building & Distance Learning	0.33	0.0
Duangchith VIRAVONGSA****	F	Social Development Consultant	0.33	0.0
Somsanouk KHOUNTHIKOUMMANE	F	Project Assistant	Part-Time	

\*Mr CHALEUNPHONH replaced Mr Phonexay KHAMMAVONG in June 2013

\*\* Mr. Phouvong CHITTANAVANH replaced Mr. THONGDENG who resigned in Feb 2012

\*\*\*Mr. PHOMMAHACK resigned in June 2012 and Mr. CHALEUNPHONH and Mr. KHAMMAVONG took over these tasks until inputs were reassigned to other positions

\*\*\*\*Mr. VIRAVONGSA contributed in 2012 but remaining inputs were reallocated during the TA team reformulation.

Note that inputs utilized are based on timesheets submitted by staff to date.

### iii) Viet Nam

The Vietnamese national TA team was mobilized from December 2011 onwards. A TA7833 project office was set up on the 9th floor of the newly relocated APMB of MARD in Tay Ho, Hanoi and is in use since February 2012. The procurement of office equipment has now been completed. Names and positions of the Consultant's Cambodian national staff are shown in the table below. To support coordination TA7833 consultants plan to meet with the Implementation Agency every month.

**Table 5: Vietnamese national staff engaged on TA7833 (30 Sept 2013; contract variation#2)**

NAME	SEX	SPECIALIST POSITION	INPUTS UTILIZED (MONTHS)	INPUTS REMAINING (MONTHS)
Li Thi THOA*	F	National Project Implementation Specialist	11.0	10.0
NGUYEN Minh Bao	M	Legal, Standards and Certification Specialist	1.15	2.33
LINH Le Thi My	F	Private Sector Development Specialist	1.23	1.77
HO Lan Huong**	F	Capacity Building & Distance Learning	0.78	0.0
HA Huu Nga***	F	Social Development Consultant	0.3	0.0
VU Trang	F	Project Assistant	Part-Time	

\*Mrs. Li Thi Thoa replaced Dr. NGUYEN Tu Siem on 31 July 2012.

\*\*Mrs. HO contributed in 2012 but remaining inputs were reallocated during the TA team reformulation.

\*\*\*Ms. HA contributed in 2012 but remaining inputs were reallocated during the TA team reformulation.

Note that inputs utilized are based on timesheets submitted by staff to date.

### 3.2.2. Project Support

In order to provide increased support to the team, as of May 2013 a senior Director from Landell Mills (Simon Foxwell, Director, Asia/Pacific Division) has been appointed to provide day-to-day oversight, in conjunction with the team leader, and to act as the liaison person with ADB.

### 3.3. PROJECT DISBURSEMENT

**Table 6: Summary of TA7833-REG Project Disbursement Summary (30 Sept 2013) / US\$**

Category	Budget (VO#2)	Disbursed	Balance
1200 Equipment	90,000	15,700.79	74,299.21
1300 Seminars, Workshops & Training	560,000	44,699.18	515,300.82
1400 Studies, Surveys & Reports	925,000	0	925,000
<b>TOTAL</b>	<b>1,575,000</b>	<b>60,399.97</b>	<b>1,514,600.03</b>

#### 4. LESSONS LEARNT, STRATEGIC ISSUES & RECOMMENDATIONS

ISSUES ENCOUNTERED	RECOMMENDATIONS & REMEDIAL ACTIONS
<p><b>Regional cooperation</b> Lack of operational procedures for ADB implementation and procurement in Regional Technical Assistance Projects</p>	<p>WGA standard operating procedures (SOPs) covering the role of the public sector in Regional TA projects and the basis for their engagement for services supported by an ADB OSFMD agreement for the procurement systems and documentation is required.</p> <p>Other issues need to address: incentives for Government staff participation (as the team has faced various requests for fees to officials for providing services such as bid evaluations); translation and agreement of common language for RETAs (English); provision of project office facilities; etc.</p> <p>SOPs have been under preparation by the ADB TA7833 Regional Cooperation Specialist, but despite repeated requests the TA team has not yet received these.</p> <p>Significant delays were experienced with respect to clarifying ADBs procurement options for supporting public sector participation. The inability to pay for participation and the lack of government funding for participation will slow and minimize the value of policy work and counterpart participation</p>
<p><b>Implementing Agency engagement</b> Official IA counterpart staff nomination and resource allocation process was only completed on 08 June 2012, resulting in delays in completing the inception phase and commencing implementation. The ADB and Consultant have raised concerns about these initial delays in TA inception and implementation and their knock-on effect on the project performance – e.g. the DMF references milestones in 2011, even though the contract was not signed until December 2011.</p>	<p>Such constraints are to be expected due to the complex regional nature and innovative, pioneering approach of TA7833. All parties continue to work hard to recover the lost time.</p> <p>Enhancing opportunities for communication and collaboration are considered prime approaches for enhancing engagement.</p>
<p><b>TA Team leadership</b> TA7833 complexity (different perspectives on immature technologies; difficult regional cooperation and varying IA priorities; specification to use innovative financing mechanisms; etc.) led to a loss of direction by the TA Team Leader and a lack of project progress.</p>	<p>Team leader replaced and TA team and approach streamlined. Revised work plan elaborated and distributed to project partners. Extra backstopping resources provided through a Landell Mills Director.</p>
<p><b>Immature technologies</b> The ToR specify up-scaling of a wide range of technologies, however many of these are not sufficiently mature for up-scaling.</p>	<p>Liquid biofuels such as jatropha-derived biodiesel will not be included in TA activities due to key concerns about the feasibility of jatropha, lack of farmer / government commitment and interest and the broad-based questions regarding the potentially negative correlation between jatropha production and food security.</p> <p>Biochar and bioslurry technologies are also</p>

	<p>assessed to be too immature and as such the targets for their adoption in the DMF are considered too optimistic.</p> <p>Pilot projects will focus on demonstrating production and management of the more immature technologies and how these products can be integrated into greener value chains.</p> <p>The immaturity of technology has been highlighted in biochar and bioslurry. The need for both is to shift the focus from which technology to product development and formulation linked to fertilizer supply chains.</p>
<p><b>Scale of technology</b></p>	<p>The preference for household-level technology, while appropriate for ICS, may be inappropriate for biochar and to a lesser extent bioslurry. The financial viability of such technologies will determine the extent of their adoption.</p> <p>However TA findings and expert opinion currently suggests that the viability of small-scale technology that has adequate safeguards may be insufficient to generate viability and attract investment and adoption.</p> <p>Experience in Thailand and China suggest that the biochar and bioslurry sectors emerge from a demand for biofertilizer from specialist agents that collect from product catchment areas. Further discussion is ongoing on the correct scale for these two technologies as a part of the feasibility studies.</p>
<p><b>Donor crowding within the ICS sector</b></p>	<p>The ICS sector has a range of players many of whom offer subsidies and grants for the adoption of ICS technologies. The continued investment from the WB, EU and other ADB TAs that offer more concessional investment makes a purely commercial value chain less likely. The TA is focusing its ICS pilots on stove producer risk reduction through skill development, and demand aggregation through women's unions.</p> <p>ICS technology in GMS is highly visible however the gains from the technology are relatively small and with most improved stoves failing to address the durability of stoves it is questionable if significant gains are being achieved.</p>
<p><b>Innovative financing mechanisms</b></p> <p>The purpose of the TA is to pilot implementation mechanisms. The assumption being that innovative implementation mechanisms will support up-scaling initiatives more effectively. Numerous innovative financing mechanisms were identified by the TA in 2012 and provisionally endorsed by the ADB and team leadership in relation to proposed potential pilot implementation modalities. However, rigorous internal review has revealed that: (i) the nature of the modalities is not fully understood by all project</p>	<p>The TA has modified its position on innovative financing and will limit its modalities to a focus on the use of output-based financing to offset the business and market risk of stove producers. The financing modality for biogas and biochar will continue to emerge throughout the pilot Feasibility Studies and their implementation.</p> <p>Private-sector stakeholders and financing institutions will continue to be targeted for relevant</p>

<p>parties; (ii) the complex institutional requirements for options including revolving funds and social merchant banking are not in place; (iii) the constraint of timelines for outcome-based funding would ensure that the TA would be closed prior to outcomes being achieved, making financing impossible; (iv) the TA resources are too limited to adequately finance the required investment funds including development bonds and social merchant banks at sufficient scale; (v) the risk averse nature and novelty factor of national and regional private sector stakeholders for engaging in such innovative modalities, and; (vi) the questionable performance of some of the proposed mechanisms, across a range of scenarios (e.g. Nepal), and the degree to which critical success factors are represented within the GMS – e.g. social merchant banking is a mix of financing modalities that individually are used in other ADB loan projects, many of which require 1-2 years to establish.</p>	<p>awareness-raising and capacity building activities so as to raise the profile and confidence levels of potential future investors re. TA7833-relevant themes.</p> <p>One option of output based funding is for new product formulation for biochar supply chain development.</p>
<p><b><i>Laos capacity for Feasibility studies</i></b></p>	<p>The continued lack of expression of interest in Laos Feasibility along with the range of donor feasibility and upscaling in ICS and Biogas suggests that movement direct to piloting of technology will be necessary</p> <p>NFP and TA7833 have agreed to use a cluster approach where biochar, bioslurry, and ICS will all be included - a baseline rapid assessment is currently being used to assess the feasibility of this.</p>



## APPENDIX 1: DESIGN & MONITORING FRAMEWORK

Design Summary	Performance Targets & Indicators with Baselines	Data Sources & Reporting Mechanisms	Assumptions and Risks
<p><b>Impact</b></p> <p>Improved use of biomass in Cambodia, the Lao PDR, and Viet Nam</p>	<p>By 2020:</p> <p>5% increase in production of clean bioenergy from biomass (2011 baseline: 0.1%)</p> <p>5% increase in use of by-products of bioenergy systems (bio-slurry and biochar) (2011 baseline: 0%)</p>	<p>Project baseline and benchmark surveys</p> <p>Periodic surveys and annual reports of agriculture and energy ministries of Cambodia, the Lao PDR, and Viet Nam<sup>8</sup></p>	<p><b>Assumptions</b></p> <p>The governments of Cambodia, the Lao PDR, and Viet Nam remain committed to regional cooperation in clean bioenergy and food security.</p> <p><b>Risk</b></p> <p>Private sector investment is constrained by over-regulation.</p>
<p><b>Outcome</b></p> <p>Efficiently operating pilot projects in biomass use</p>	<p>By 2014:</p> <p>At least two investment modalities for biogas and bioslurry (Cambodia and the Lao PDR); three for biochar (Cambodia, the Lao PDR, and Viet Nam); two for improved cookstoves (the Lao PDR and Viet Nam); and three for inclusive supply chain of certified biofuel and organic crops in (Cambodia, the Lao PDR, and Viet Nam)</p>	<p>Project completion report</p> <p>Annual reports from agriculture ministries of Cambodia, the Lao PDR, and Viet Nam</p>	<p><b>Assumptions</b></p> <p>The central and provincial governments remain committed to working with the poor in remote areas.</p> <p><b>Risk</b></p> <p>Pilot projects are not successfully implemented.</p>

<sup>8</sup> a Ministry of Agriculture, Forestry and Fisheries (Cambodia); Ministry of Agriculture and Forestry (Lao PDR); and Ministry of Agriculture and Rural Development (Viet Nam)



<p><b>Outputs</b></p> <p><i>1. Enhanced regional cooperation in bioenergy development to foster and safeguard food security</i></p> <p><i>2. Pilot-tested climate-friendly biomass investment projects for wider implementation</i></p> <p><i>3. Enhanced capacity for efficient use of biomass</i></p> <p><i>4. Development and dissemination of knowledge products</i></p>	<p>By 2014:</p> <p>Mechanism tested for harmonizing at least three bioenergy standards<sup>9</sup> and certification systems, and a common method of assessing greenhouse gases</p> <p>Construction of at least 500 bio-digesters, 600 biochar kilns, 75,000 improved cookstoves; and introduction of at least 300 farmers to sustainable certification standards</p> <p>Increased capacity for gender-sensitive investment among at least 500 government officials, 400 service providers, and 3,000 lead farmers (i.e., at least 55% of those to be trained will be women and at least 70% of those trained will have increased capacity)</p> <p>Methodology for assessing and prioritizing the use of biomass for bioenergy and food security</p> <p>Compendium of good practices in biomass use</p> <p>Booklets on different models of improved cookstove, biochar kiln, and biodigesters</p>	<p>Consultants' reports and document records of agriculture ministries of Cambodia, the Lao PDR, and Viet Nam</p> <p>Agricultural household survey reports of Cambodia, the Lao PDR, and Viet Nam</p> <p>Benefit and impact monitoring reports</p> <p>Project review missions</p>	<p><b>Assumptions</b></p> <p>The consulting team is given timely access to records, information, personnel, and relevant geographic sites.</p> <p>Local officials, technicians, and lead farmers are available to participate in training</p> <p>Development partners and the private sector are keen to participate in the TA activities.</p> <p><b>Risks</b></p> <p>Cambodia, the Lao PDR, and Viet Nam cannot agree on harmonized standards and certification systems</p>
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<sup>9</sup> b Including standards set by such organizations as the Global Alliance on Clean Cookstoves and the Roundtable on Sustainable Biofuels, along with quality assurance from regional quality assurance centers to be established for biogas, improved cookstoves, bio-char, etc.

Activities with Milestones	Input
1.0 Holding of regional forums to facilitate high-level dialogue within the region on bioenergy and food-security policy issues, by 2011	Total cost: \$4.6 million equivalent
1.1 Testing of mechanisms to facilitate adoption of common sets of sustainable indicators, bioenergy and trade standards, certification systems, and eco-labeling systems, by 2012	
1.2 Holding of annual international workshop on household bioenergy and food security to foster exchange of information, particularly between more advanced Greater Mekong Subregion countries and Cambodia, the Lao PDR, and Viet Nam	
2.0 Conduct of biomass assessment and development of criteria for the selection of pilot project areas, by early 2012	
2.1 Implementation of pilot projects in lower-cost biogas technologies as investment project with a component involving the use of bio-slurry for high-value crop production, by 2012	
2.2 Conduct of reviews to identify appropriate biochar, improved cookstove, and biofuel investment modalities, and implementation of pilot project, by 2013	
3.0 Development of gender-sensitive training programs, including distant learning modalities, and use of these programs in the training of central and local government officials, farmers' organizations, women's groups, and service providers (of which at least 30% are women), by 2012	
3.1 Conduct of training in the implementation of the investment project, by 2013	
3.2 Conduct of training in the use of biomass to enhance food security and soil carbon sequestration, by 2013	
4.0 Development of methodology for assessing and prioritizing the use of biomass for energy and food security, by 2011, and dissemination of the methodology through regional forums, training, and capacity building by 2012	
4.1. Establishment of baseline information and monitoring and evaluation system for pilot projects, by 2012;	
4.2 Conduct of key studies, such as studies on life-cycle assessments, least-cost options, and eco-labeling, by 2013	
4.3 Publication of compendium of good practices in biomass use and booklets containing information on different models of improved cookstoves, biochar kilns, and bio-digesters, by 2014	
4.4 Analysis of potential climate change scenarios and their likely impact on the availability of different types of biomass, and assessment of need for the development of alternative biomass sources, by 2013	

## APPENDIX 2: PROJECT WORK PLAN

Tasks and Activities	2012				2013												2014						
	Q1	Q2	Q3	Q4	Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
<b>Output 1: Enhanced regional cooperation in bioenergy development to foster and safeguard food security</b>																							
<b>1.1 Identify &amp; recommend policy, standards and indicators for bioenergy technologies &amp; climate-friendly agriculture</b>																							
<i>i</i> <b>Facilitation of national forums on policy and standards for bioenergy technology and climate-friendly agriculture</b>																							
ToR preparation																							
Cambodia / Lao PDR / Viet Nam																							
Activity/Forum report																							
National roadmap elaboration (through a task force to be set up with help of NFP/TFP/NPIs)																							
<i>ii</i> <b>Facilitation of regional dialogue on policy and standards for climate-friendly agriculture, bioenergy &amp; food security</b>																							
GMS Forum on Policy, Standards & Indicators for Bioenergy, Food Security & Climate-Friendly Agriculture																							
Development / update of a roadmap for regional dialogue																							
Training of national staff and key stakeholders																							
<i>iii</i> <b>Development of national guidelines on sustainability indicators</b>																							
Review national sustainability requirements for public sector investment (social/economic/environment)																							
Comparative analysis with GBEP with recommendations/guidelines for strengthening national guidelines (feeds)																							
<b>1.2 Establish systems to support eco-product development &amp; cross border trade</b>																							
<i>i</i> <b>Establishment of national pools of capable standards quality control inspectors</b>																							
Collate national databases of existing and potential inspectors / bodies for priority commodities from roadmap																							
Conduct training needs assessment & prepare training plan for approval																							
Contract and deliver training																							
Training evaluation																							
<i>ii</i> <b>Study on the feasibility of a CLV traceability system</b>																							
Review need for traceability for priority commodities (done by task force as part of roadmap prep)																							
ToR preparation/approval/contract																							
Implementation																							
Delivery of final report																							
<i>iii</i> <b>Study of need for labels</b>																							
Review need for labels (or just chain of custody) for priority commodities (from roadmaps)																							
If no existing label, and a need, provide training/guidelines on what a good label should include																							
<b>1.3 Inform &amp; enhance biomass, bioenergy &amp; food security policy dialogues relating to standards operationalization &amp; quality control</b>																							
<i>i</i> <b>Review of international standards and certification systems on bioenergy and climate-friendly agriculture</b>																							
Prepare outline of review for team comments																							
Initial draft for team inputs/comments																							
Delivery of knowledge product																							
<i>ii</i> <b>Review of Voluntary Certification Systems (incl. PGS) as a tool for upscaling in CLV</b>																							
Preparation of study outline/methodology for team review																							
Desk study of international experience																							
Desk study of country level secondary sources																							
Field study																							
Consolidation of findings																							
Draft paper for review																							
Completion / Submission of case studies																							
Delivery of final report (feeds into roadmap and vice-versa (1.1) as to what is possible + use as part of upscaling - feeds into 2.4)																							
<i>iii</i> <b>Review of relevant national laws, regulations, policies and plans</b>																							
Study implementation (take from inception report and updates/extras from NPIs)																							
Initial comments																							
Recommendations and completion																							
Delivery of knowledge product (feeds into gaps for policy matrix/roadmap)																							

Tasks and Activities	2012				2013												2014						
	Q1	Q2	Q3	Q4	Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
<b>Output 2: Pilot-Tested Climate Friendly Investments for wider Implementation</b>																							
<b>2.1 Selection of Priority Technologies</b>																							
<i>i</i>	<i>Review current situation / status</i>																						
<i>ii</i>	<i>Identify and assess existing technology</i>																						
<i>iii</i>	<i>Counterpart ranking of technologies</i>																						
<i>iv</i>	<i>Technology readiness Assessments</i>																						
<i>v</i>	<i>Country Agreement on priority technology pilots</i>																						
<i>vi</i>	<i>Country level consultations</i>																						
<b>2.2 Pilot Feasibility studies and due diligence</b>																							
<i>i</i>	<i>Identify scope and output for pilot concepts</i>																						
<i>ii</i>	<i>Identify potential stakeholders and partners</i>																						
<i>iii</i>	<i>Prepare feasibility study terms of reference</i>																						
<i>iv</i>	<i>Procure service provider</i>																						
<i>v</i>	<i>Feasibility study implementation (including government consultation at start)</i>																						
<i>vi</i>	<i>Specify due diligence (incl sustainability safeguards) and social baselines for pilot projects (and follow-on investment projects)</i>																						
<i>vii</i>	<i>Business model case studies focusing on climate-friendly value-chains</i>																						
<b>2.3 Pilot implementation and monitoring</b>																							
<i>i</i>	<i>Definition of terms of reference</i>																						
<i>ii</i>	<i>Procure/approve/contract implementation service providers (CQS/SSS)</i>																						
<i>iv</i>	<i>Pilot implementation (will include a training element for farmers/communities/gov)</i>																						
	- stakeholder awareness																						
	- supply side programs																						
	- demand creation and aggregation																						
	- sales and capacity building																						
	- monitoring and evaluation																						
<i>v</i>	<i>Final Report Review and Consultation</i>																						
<b>2.4 Regional investment subproject model formulation</b>																							
<i>i</i>	<i>Stakeholder Meeting to review each subproject</i>																						
	- lessons learned proposed outputs																						
	- draft DMF																						
	- subproject model specification, implementation arrangements																						
<i>ii</i>	<i>Regional meeting to share lessons and approaches</i>																						
<i>iii</i>	<i>Final preparation of core subprojects for follow-on investment programs</i>																						
<b>2.5 Development of a social baseline for the proposed investment project</b>																							
<i>i</i>	<i>Incorporation in Feasibility Terms of Reference</i>																						
<i>ii</i>	<i>Social survey completed by FS service providers</i>																						
<i>iii</i>	<i>Consolidation of social survey findings, plus secondary data, into pilot TORs</i>																						
<i>iv</i>	<i>Draft SPRSS report for each investment loan (TBD)</i>																						

Tasks and Activities	2012				2013												2014					
	Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun				
	Q1	Q2	Q3	Q4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
<b>Output 3: Enhanced Capacity for Efficient Use of Biomass</b>																						
<b>3.1 Develop and deliver awareness-raising program</b>																						
<i>i Develop &amp; deliver awareness-raising material on efficient use of biomass for bioenergy &amp; food security</i>																						
Collation and consolidation of existing resources																						
Finalise list of target agencies and individuals																						
Plan awareness-raising program strategy and plan																						
Prepare and disseminate briefs/spotlight on...(taken from KPs - see 4.3)																						
Review what videos...etc are available at int/national level																						
Incorporate lessons learned & key resources into compendium (4.2)																						
<b>3.2 Develop and deliver capacity building program</b>																						
<i>i Training, Workshops and Study Tours</i>																						
Biochar - IBI Congress, Beijing																						
Biochar study tour - Siem Reap																						
ICS - GACC Forum, Phnom Penh																						
Biochar study tour - PRC (and follow-on events in each country led by study-tour participants)																						
BEFS Approach - w. conference 2013, Viet Nam																						
AROS/Organic agricultural value chains, Lao PDR?																						
Biogas, bioslurry & CFA (SRI) - Viet Nam?																						
Biomass resource assessment - Land Development Dept, Kasetsart Uni, Thailand?																						
Sustainability indicators - w. conference 2014, Lao PDR?																						
Innovative financing mechanisms / Private sector engagement																						
ADB investment project readiness & implementation																						
Incorporate lessons learned & key resources into compendium (Output 4)																						
<i>ii Distance learning for Provincial Officers</i>																						
Prepare DL courses and modules with self-learning plus on-line test (based on KPs and 3.1 materials)																						
Identify participants																						
Send DVD to provinces where have pilots. Test on-line																						
Evaluate and provide (project/GMS) certification																						
Package-up and offer to AIT, ADBl...etc. as future hosts																						
Training of inspectors (see Output 1) - TBD if distance learning																						
<b>3.4 Organize annual international conference on household bioenergy and food security</b>																						

Tasks & Activities	2012				2013												2014							
	Q1	Q2	Q3	Q4	Jan	Feb	March	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>OUTPUT 4: DEVELOPMENT &amp; DISSEMINATION OF KNOWLEDGE PRODUCTS</b>																								
<b>4.1 Studies and Assessments for Development and Dissemination of Knowledge</b>																								
<i>i</i> Agricultural Biomass Resource Assessment in CLV																								
<i>ii</i> Complete a least costs assessment of available biomass technologies (feeds into compendium)																								
<i>iv</i> Conduct a lifecycle assessment for alternative biomass resources and technologies (feeds into 4.2 and 2.4)																								
<b>4.2 Compile compendium of best practice in efficient utilization of biomass</b>																								
Develop a proposed scope and outline of compendium																								
Update scope based on comment																								
Identify international, regional and national best practices (examples) for inclusion																								
Review examples and select for inclusion write up																								
Distribute for reviews and include comments																								
Peer review draft																								
External peer review																								
Finalise and distribute																								
<b>4.3 Develop &amp; disseminate knowledge products to support efficient biomass utilization technology (Resource books feed into awareness raising (flyers/videos/distance learning))</b>																								
Devise knowledge product development and dissemination plan																								
#1 Climate Change, Food Security & Bioenergy - Greg																								
#2 Biochar - Simon Shackley																								
#3 Biogas / Bioslurry - Jason Yapp/Thoa																								
#4 CF Soil Amendments - Simon/BounthavyBona																								
#5 CFA value chains - Lindsay																								
#6 ICS - Ewan/Sam																								
#7 Certification / standards - Greg from 1.3 (i)																								
#8 Carbon Assessment & Finance - Sam																								
#9 Innovative Financing Mechanisms for Upscaling - Jason/Lindsay																								
#10 Sustainability Indicators - Jason/Simon - see 1.1 (iii)																								

### APPENDIX 3: LIST OF PROPOSED PILOT PROJECTS & FEASIBILITY STUDIES

SUBJECT	FEASIBILITY STUDY	PILOT PROJECT
<b>CAMBODIA</b>		
Improved Cook Stoves (ICS)	Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Adoption of Improved Cook Stoves in Cambodia	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biogas / Bioslurry	Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Proven Biogas Technology and Efficient Bioslurry Management Practices	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biochar	Feasibility Study for a Pilot Investment Project Demonstrating the Production and Use of Biochar as a Soil Amendment	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
<b>LAO PDR</b>		
Improved Cook Stoves (ICS)	Feasibility Study for a Pilot Investment Project to Scale-Up or Build Efficient Value Chains for Improved Cookstoves	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biogas / Bioslurry	Feasibility Study for a Pilot Investment Project to Scale-Up Efficient Bioslurry Management Practices within the Lao PDR National Biogas Program	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biochar	Feasibility Study for a Pilot Investment Project to Demonstrate Rice Mill / Farmer Association Joint Ventures for Biochar & Climate-Friendly Rice Production	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biomass	Feasibility Study for a Pilot Investment Project to Scale-Up Integration of Eco-Friendly Biomass in the Organic Vegetable Value Chain	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
<b>VIET NAM</b>		
Improved Cook Stoves (ICS)	Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Improved Cook Stove Use	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biogas / Bioslurry	Feasibility Study for a Pilot Investment Project to Scale-Up Efficient Bioslurry Management Practices within the Viet Nam National Biogas Program	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations
Biochar / Climate-Friendly Rice Production	Feasibility Study for a Pilot Investment Project to Scale-Up the use of Biochar from Rice Husks in Climate-Friendly Rice Production	As described in FS ToR. Exact focus to be determined based on feasibility study recommendations



## Status of Feasibility Contracts

SUBJECT	CONTRACTOR & CONTACT	START DATE	DELIVERABLE DEADLINES	BUDGET (US\$)
<b>CAMBODIA</b>				
#1: Feasibility Study for a Pilot Investment Project Demonstrating the Production and Use of Biochar as a Soil Amendment	<b>CelAgrid</b> - Mr. KHIEU BORIN [khieu_borin@celagrid.org; +85512828942; +85523223640].	16 July 13	<ul style="list-style-type: none"> <li>▪ 23/07: Inception/WP</li> <li>▪ 27/08: Draft Final</li> <li>▪ 19/09: Final Report</li> </ul>	19,955
#2: Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Adoption of Improved Cook Stoves in Cambodia	<b>Mekong TT</b> - Mr. PROM NGA [ngaprom@mekongthinktank.com]; +855 12 345 222	08 July 13	<ul style="list-style-type: none"> <li>▪ 15/07: Inception/WP</li> <li>▪ 19/08: Draft Final</li> <li>▪ 10/09: Final Report</li> </ul>	21,270
#3: Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Proven Biogas Technology and Efficient Bioslurry Management Practices	<b>Mekong Carbon</b> - Mr. Sar Samnang [sarsamnang7@gmail.com; +85512481169].	12 July 13	<ul style="list-style-type: none"> <li>▪ 19/07: Inception/WP</li> <li>▪ 23/08: Draft Final</li> <li>▪ 17/09: Final Report</li> </ul>	22,081
<b>VIET NAM</b>				
Feasibility Study for a Pilot Investment Project to Scale-Up the use of Biochar from Rice Husks in Climate-Friendly Rice Production	<b>VIDECO</b> - Mrs. Le Thi Khue [info@videco.vn; +84 4 37186457]	12 July 13	<ul style="list-style-type: none"> <li>▪ 19/07: Inception/WP</li> <li>▪ 23/08: Draft Final</li> <li>▪ 17/09: Final Report</li> </ul>	25,857
Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Improved Cook Stove Use	<b>EPRO</b> - Mr. Pham Minh Cong [cong.pm@eprovn.com; Phone: +84989807832]	09 July 13	<ul style="list-style-type: none"> <li>▪ 16/07: Inception/WP</li> <li>▪ 20/08: Draft Final</li> <li>▪ 12/09: Final Report</li> </ul>	26,490
Feasibility Study for a Pilot Investment Project to Scale-Up Efficient Bioslurry Management Practices within the Viet Nam National Biogas Program	<b>BTC</b> - Mr. Nguyen Quang Khai [khaitruc@vnn.vn; khaibtc@yahoo.com; +84437187672].	09 July 13	<ul style="list-style-type: none"> <li>▪ 16/07: Inception/WP</li> <li>▪ 20/08: Draft Final</li> <li>▪ 12/09: Final Report</li> </ul>	21,913

SUBJECT	CONTRACTOR & CONTACT	START DATE	DELIVERABLE DEADLINES	BUDGET (US\$)
<b>LAO PDR</b>				
Feasibility Study for a Planned Pilot Investment Project for Building Improved Cook Stoves Value Chains	n/a			
Feasibility Study for a Planned Pilot Investment Project for Scaling-Up Proven Biogas Technology and Efficient Bioslurry Management Practices	n/a			
Feasibility Study for a Pilot Investment Project to Demonstrate Biochar via Rice Mill - Farmer Association Joint Ventures	n/a			